

**O'ZBEKISTON RESPUBLIKASI OLIY VA O'RTA MAXSUS TA'LIM
VAZIRLIGI**

**NAMANGAN MUHANDISLIK - TEXNOLOGIYA INSTITUTI
YENGIL SANOAT TEXNOLOGIYASI FAKULTETI**

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yo’nalishi bo’yicha bitiruvchi

ISMOILOV XAKIMJON RASULJON O'G'LI ning
“Jin mashinasini takomillashtirish” mavzusidagi

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4. Hisoblash-tushuntirish yozuvlarining tarkibi.
Kirish
I-bob. Tadqiqot mavzusi bo’yicha analitik tahlil
II-bob. Jin mashinasini takomillashtirish
III-bob. Mehnat muhofazasi
IV-bob. Iqtisodiy qism
5. Chizma ishlar ro’yhati (chizmalar nomi aniq ko’rsatiladi)
 1. Paxta tozalash korxonasining bosh binosi
 2. PD jin ta`minlagichi sxemasi
 3. “Imperial” rusumli 128-arrali jin va 5DP-130 rusumli jinlar sxemasi
 4. Takomillashtirilgan arrali jin ishchi kamerasing va ta`minlagichining ishlash sxemasi
 5. Arrali silindr motorining yuklanish tokini vaqt bo’yicha o’zgarish ostsillogrammasi, hamda tola va chigitning sifat ko’rsatkichlari.
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2	Texnologik qism	X.T. Axmedxodjayev	15.01.2018	28.04.2018
3	Mexanika qism	X.T. Axmedxodjayev	26.02.2018	26.05.2018
4	Mehnat muhofazasi	Z.Abduqahharov	14.05.2018	26.05.2018
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2	Texnologik qism	28.04.2018	
3	Mexanika qism	26.05.2018	
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KIRISH

Mamlakatimizda paxtachilik tarmog'ini rivojlantirish, paxta tozalash korxonalarini modernizatsiyalash va texnik qayta jihozlash, ishlab chiqarish va paxta xom ashyosini qayta ishlash rentabelligini, shuningdek, ishlab chiqariladigan mahsulotlarning raqobatbardoshligini oshirish bo'yicha kompleks chora-tadbirlar amalga oshirilmoqda [1].

Shu bilan birga, mazkur sohadagi ishlarning haqiqiy ahvoli ishlab chiqarish jarayonlarini tezkor yangilash va modernizatsiya qilish, ilg'or texnologiyalar va korporativ boshqaruvning zamonaviy uslublarini joriy etish, umuman tarmoqning jadal rivojlanishiga to'siq bo'layotgan tizimli muammo va kamchiliklar mavjudligidan dalolat beradi [1].

Zamonaviy axborot-kommunikatsiya texnologiyalari yetarlicha joriy qilinmaganligi oqibatida xom ashyoni qabul qilish, tashish va qayta ishlash, tayyor mahsulotlarni realizatsiya qilish jarayonlari ustidan lozim darajada hisobot va nazorat tizimi mavjud emas [1].

Paxtachilik tarmog'ini boshqarish tizimini tubdan takomillashtirish, yuqori qo'shilgan qiymatli raqobatbardosh va sifatli tayyor mahsulot ishlab chiqarishni kengaytirish, ularni yirik xorijiy bozorlarga yanada olib chiqish, 2017-2021-yillarda O'zbekiston Respublikasini rivojlantirishning beshta ustuvor yo'nalishi bo'yicha Harakatlar strategiyasida belgilangan vazifalarni izchil amalga oshirish maqsadida, shuningdek, O'zbekiston Respublikasida ma'muriy islohotlar kontsepsiyasiga muvofiq muhim yo'nalishlar belgilandi [1].

Ilmiy-texnik va tajriba-eksperimental tadqiqotlarni rivojlantirish, paxtachilik tarmog'iga innovatsion g'oya, ishlanma va texnologiyalarni joriy etish O'zbekiston Respublikasi Prezidentining PQ-3408-sonli qarorida aks etgan.

O'zbekistonda 2018 yilni «Faol tadbirkorlik, innovatsion g'oyalar va texnologiyalarni qo'llab-quvvatlash yili» deb e'lon qilinishi yuqoridagi qarorning bajarilishiga katta qadamlardan biri bo'ldi.

“Paxta xom ashyosini yetishtirishdan boshlab, unga dastlabki ishlov berish, mahsulotni paxta tozalash korxonalarida keyingi qayta ishlash va yuqori

qo'shilgan qiymatli tayyor to'qimachilik mahsuloti chiqarish bosqichigacha bo'lgan ishlab chiqarishni integratsiya qilishni nazarda tutuvchi rivojlanishning klaster modelini amalga oshirish" O'zbekiston Respublikasi to'qimachilik sanoatini yanada isloh qilishning muhim yo'nalishlari etib belgilandi [2].

O'zbekiston iqtisodiyotida paxtani dastlabki ishlash sohasi muhim o'rin tutadi. Paxtani dastlabki ishlash texnologiyasining samaradorligi ko'p jihatdan chigitli paxtani ishlash jarayonida bir me'yorda uzatishga bog'liq.

Paxtani dastlabki ishlashning asosiy texnologik operatsiyasi – jinlash jarayonida chigitli paxtani notekis uzatilishi va xom ashyo valigi kerakli zichligini ushlab turish mexanizmlari yetarli darajada takomillashgan emasligi tufayli tola va chigitning sifati yomonlashadi.

Mavjud jinni ta'minlash tizimlarining kamchiligi – asosiy ish organlarning jinlash qobiliyati holatini nazorat vositalari bilan bog'lanishning samarali emasligi, rostlash kechikib va pog'onali amalga oshirilishi, ishlovga uzatilayotgan chigitli paxta miqdorini o'zgarishiga reaksiyaning kechikishi va xom ashyo valigi zichligini boshqarish mexanizmi samaradorligi pastligi natijasida, ayniqsa past navli chigitli paxtani ishlashda, ta'minlashning og'irlik va hajm jihatidan ortishida xom ashyo valigini ortiqcha zichlanishi imkoniyati mavjudligidir, bu esa, ayniqsa namligi yuqoriroq chigitli paxtani ishlashda, olinayotgan mahsulot hajmiga ta'sir etadi va jinlashning texnologik rejimlarini buzilishiga, tez-tez tiqilishlarga va mashinalarni to'xtab turishiga olib keladi.

Yuqoridagilardan kelib chiqib, jinlash jarayonini, xususan ta'minlash tizimining ishini o'rganish, hamda ularni takomillashtirish masalalari hozirgi kunda dolzarb hisoblanadi.

Ishning maqsadi: ushbu diplom loyihasining maqsadi 5DP-130 arrali jinining ta'minlash jarayonini takomillashtirishdan iborat.

Ishning vazifasi: mavjud 5DP-130 arrali jin mashinalarida ta'minlash jarayonidagi kamchiliklarni aniqlash.

Ishning ilmiy yangiligi: ushbu diplom loyihasida arrali jinlar uchun

ta'minlagichning yangi konstruksiyasi tavsiya etiladi.

Amaliy ahamiyati: 5DP-130 arrali jinida xom ashyi valigi zichligiga qarab, ta'minlovchi valiklar tezligini avtomatik rostlash tizimi taklif etildi.

Tadqiqot ob`ekti: jinlangan tola vachigit.

Tadqiqot predmeti: ta'minlovchi valiklar tezligini avtomatik rostlash tizimli 5DP-13- arrali jini.

Ishning hajmi va tuzilishi: diplom loyihasi kirish, 4 ta bob, umumiy xulosa, adabiyotlar ruyxati va ilovalardan iborat.

Diplom loyihasi 64 betdan iborat bo'lib, 15 ta rasm, 9 ta jadval va 16 ta adabiyotlar ruyxatidan iborat.

**I-BOB. TADQIQOT MAVZUSI
BO'YICHA ANALITIK TAHLIL**

1.1. Paxta tolasini arrali jinlarda ajratish

Paxta tolasini ajratish, bu – jinlarda tolani chigitdan ajratish jarayoni hisoblanadi. Jinlar ishchi organning konstruktsiyasiga ko'ra, arrali va g'o'lalilarga bo'linadi. Tola ajratishdan maqsad talab etilgan unumdorlikda qabul sifatli va eng ko'p tola chiqarishga erishishdir.

Arrali jinlar PD rusumli ta'minlagichlar (1.1-rasm) bilan jihozlangan bo'lib, ular paxtaning jinga bir maromda va muvofiqlashgan holda uzatilishini, shuningdek, uning qo'shimcha titilishini hamda mayda iflosliklardan tozalanishini ta'minlashi lozim.

Paxta iflosliklardan tozalashda oqim tizimi va agregatlardan foydalanganda tozalangan paxtani jinga oxirgi tozalagichdan uzatish mumkin.

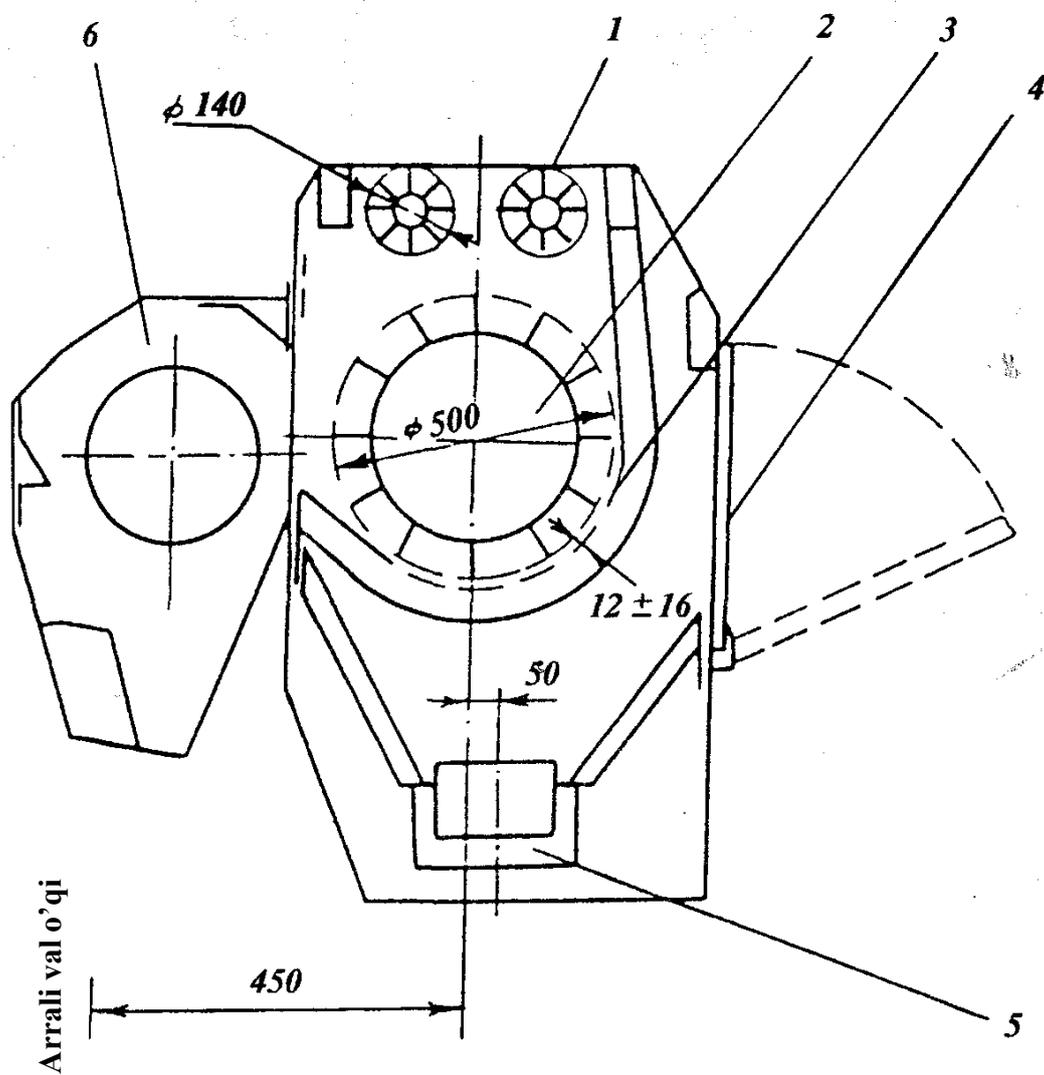
O'rta tolali paxtaning barcha sanoat navlari 4DP (1.2-rasm) va 5DP (1.3-rasm) arrali jinlarda qayta ishlanadi.

5DP-130 jinida arradan tolani ajratish uchun havo kamerasining konstruktsiyasi o'zgartirilgan, tovonni kengaytirilgan konsol tipidagi kolosniklar, jinni avtomatik usulda paxta bilan ta'minlash moslamasi hamda toladan iflosliklarni ajratish uchun o'lik ajratish kolosniklari o'rnatilgan.

Paxta taqsimlash shnekidan PD ta'minlagichiga uzatilib, unda titiladi va mayda iflosliklardan tozalanadi. Jinning unumdorligi, uning ta'minlash valiklarining aylanish tezligini o'zgartirish bilan sozlanadi.

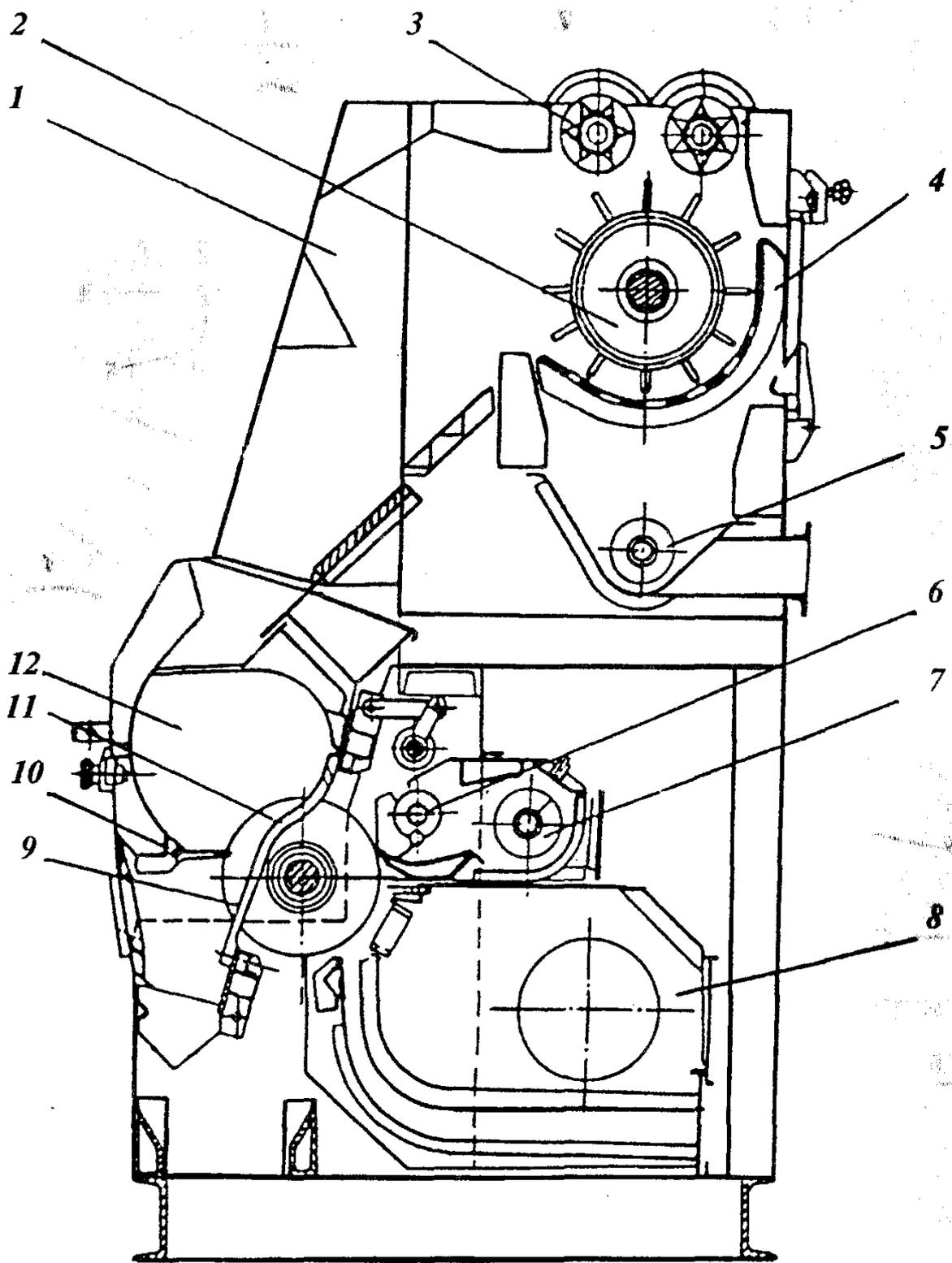
Ta'minlagichlardan paxta tarnovlar orqali ishchi kamerasiga tushirilib, unda arra tsilindri tishlari ta'siriga uchraydi va xom ashyo valigini hosil qiladi.

Arra tsilindri tishlari xom ashyo valigidagi paxta tolalarini ilib, kolosniklar orasiga olib kiradi va chigit sirtidan yulib oladi. Arra tishlaridagi tolalar soplodan 55-65 m/daqqa tezlikda chiqayotgan havo oqimi bilan ajratilib, umumiy tola quvuri orqali tola tozalash dastgohiga uzatiladi. Kolosniklarning ishchi qismida tirqishlar kengligi 3,2 mm. dan katta bo'lmagani uchun chigit o'tib keta olmaydi, aylanib turgan chigit paxta valigiga ko'shilib ketadi va hamma tolalari ajralmaguncha aylanishda davom etadi.



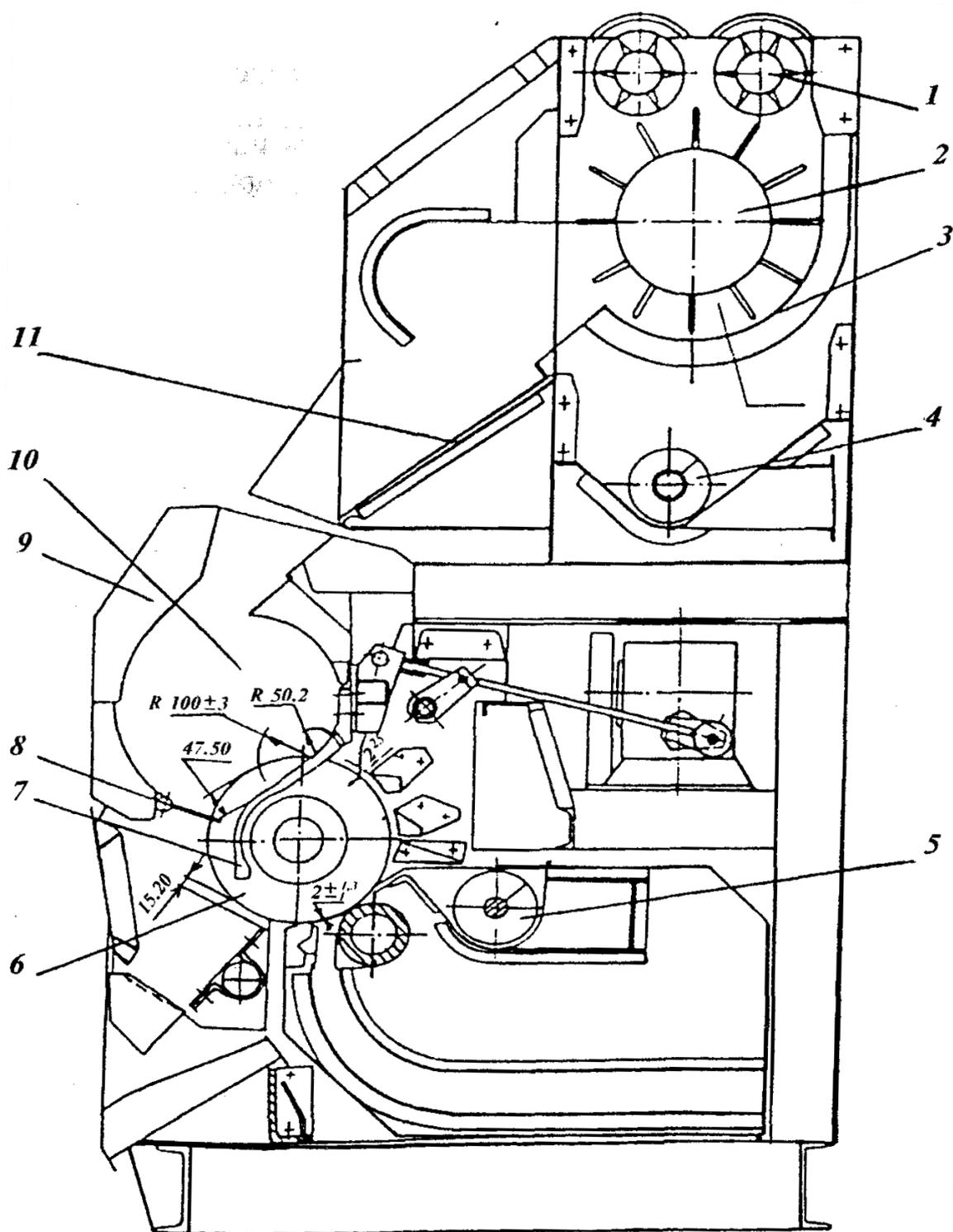
1.1-rasm. PD jin ta'minlagichi:

- 1 – ta'minlagich valiklari; 2 – qoziqli baraban; 3 – teshikli to'r; 4 – orqa qopqoq;
5 – iflosliklarni yig'ishtirgich; 6 – tarnov.



1.2-rasm. 4DP-130 arrali jin:

1 – ta`minlagich; 2 – qoziqli baraban; 3 – ta`minlovchi valik; 4 – teshikli to`r;
 5 – chiqindi yig`uvchi kamera; 6 – kurak; 7 – o`lik konveyeri; 8 – havo kamerasi; 9
 – arrali tsilindr; 10 – chigit tarog`i; 11 – kolosnik; 12 – ishchi kamera.



1.3-rasm. 5DP-130 arrali jin:

1 – ta`minlovchi valiklar; 2 – qoziqli baraban; 3 – teshikli to`r; 4 – chiqindi yig`uvchi konveyer; 5 – o`lik konveyer; 6 – arrali tsilindr; 7 – kolosniklar; 8 – chigit tarog`i; 9 – fartuk; 10 – ishchi kamera; 11 – tarnov.

Arrali jinlarning texnik tavsifi

Ko'rsatkichlar	3XDDM	UMPD kamerasi bilan	DP-130	4DP-130	5DP-130
Unumdorlik, tola bo'yicha, kg/s					
I, III navlar bo'yicha	700	780	1700	2000	2000
IV va V navlar bo'yicha	530	550	1200	1200	1200
Havo kameradagi statik bosim, mm. suv. ust.	180-200	180-200	180-200	380	220
Tola olish uchun havo sarfı, m ³ /s	0,55	0,55	0,6-0,8	0,8 gacha	0,8 gacha
Tola tozalagichni biriktiruvchi qisqa quvurda havoning statik bosimi, mm. suv. ust.	0,5	0,5	0,5	0,5	0,5
Chiqindilarni tashish uchun havo sarfi, m ³	0,1	0,1	0,2-0,3	0,2-0,3	0,2-0,3
Chigitning tukdorligi, %	12,3- 14,5	12,3- 14,5	12,3- 14,5	12,3- 14,5	12,3- 14,5
Ishchi organlarning aylanish tezligi, ayl/daq:					
arrali tsilindrda	735	735	735	735	730
qoziqli barabanniki	500	500	500	500	512
ta'minlagich g'o'lalarniki	0-14	0-14	0-14	0-14	0-14
o'lik va ifloslik konveyerlarniki	49	49	63	35	23
O'rnatilgan quvvat, kVt shu jumladan:	47,8	58,9	78,5	79,6	80,25
arrali tsilindrda	45	55	75	75	75
ta'minlagichda	2,2	2,2	2,2	2,2	2,2
ta'minlovchi valiklarda	-	-	-	0,2	0,85
Siljitishda:					
ishchi kamerada	-	1,1	0,55	1,1	1,1
o'lik va ifloslik yig'uvchi konveyerda	0,6	0,6	0,75	1,1	1,1
Texnologik tirqishlar, mm:					
kolosniklar va ishchi zonasi oralig'i	2,8-3,2	2,8-3,2	2,8-3,2	2,8-3,2	2,8-3,2

yuqori zonadagi kolosniklar orasida	5,0-3,8	5,4-3,5	5,4-3,5	5,4-3,5	5,4-3,5
qoziqli barabanning to'ri va qoziqlari orasida	15-18	15-18	10-20	10-20	10-20
havo kamerasing brusi va arrali tsilindri orasida	1-3	1-3	0,5-2,7	1-3	1-3
kolosniklar ustida arralarning chiqib turishi	46-50	46-50	47-50	47-50	47-50
o'lik koziryogi, kolosniklari va arrali tsilindr orasida	10-20	10-20	3-15	3-15	3-15
Arralar soni	80	86	130	130	130
Ishchi organlarining asosiy o'lchamlari, mm:					
arralarning tashqi diametri	320	320	320	320	320
arralarning ichki diametri	61,8	61,8	100	100	100
arralarning oralig'i	19,4	18	18	18	18
qistirmasining keng ligi	18	17	17	17	17
qistirmaning tashqi diametri	160	160	160	160	160
o'lik va ifloslik konveyerining diametri	150	150	150	150	150
qoziqli baraban diametri	400	400	400	400	400
ta'minlovchi g'o'lalar diametri	140	140	140	140	140
kurak diametri	-	-	150	150	-
Arra valining diametri	61,8	61,8	100	100	100
chetki arralar orasi	1534	1531	2323	2323	2323

Jami tolalardan ajratilgan chigitlar o'zining ishlash qobiliyatini yo'kotadi, chigitli tola valigidan ajralib, kolosnik sirtiga va u orqali pastga tushadi. Jindan chiqayotgan chigitlarning tuklilik darajasi taroq bilan o'zgartirilib turiladi.

Arra tishlari ishchi kamerasidan kolosnik orqasiga chiqqandan keyin, tolani tishlardan ajratish bilan birga o'lik va mayda iflosliklardan tozalash jarayoni bajariladi.

O'lik va mayda iflosliklar tolalar arra tishidan ajralmasdan oldin markazdan qochma kuch ta'sirida toladan ajraladi va o'lik koziryogi orqasiga o'tib ketadi. Ajratilgan iflosliklar va o'lik mashinadan vintli konveyer yordamida chiqariladi.

Jinning ta`minlagichi ostidagi iflosliklar mexanik uzatgichlar yordamida ishlab chiqarish chiqindilarini pnevmatik usulda yig'ish tizimiga uzatilib, tsexdan tashqariga chiqariladi.

Jindan ajratilgan iflosliklar va o'lik pnevmatik uzatish sistemasi yordamida jinlash tsexi chiqindilarini regeneratsiyalash mashinasiga uzatiladi. Arrali jinlar batareyasining ishlash samaradorligi mashinalarning texnik holati va qayta ishlayotgan paxtaning sifatiga bog'likdir.

Arrali jinlarning texnik tavsifi 1.1-jadvalda keltirilgan.

Paxta zavodining jin bo'limida kamida bir yoki ikkita jin batareyasi o'rnatilib, ularning har qaysisi uchtdan 5DP-130 (4PD-130) jin bilan jihozlanadi. Jinni to'la va bir tekis paxta bilan ta`minlash maqsadida taksimlash shneki oxirida jamg'arma bunkeri o'rnatilishi mumkin.

1.2. “Imperial” rusumli 128-arrali jin

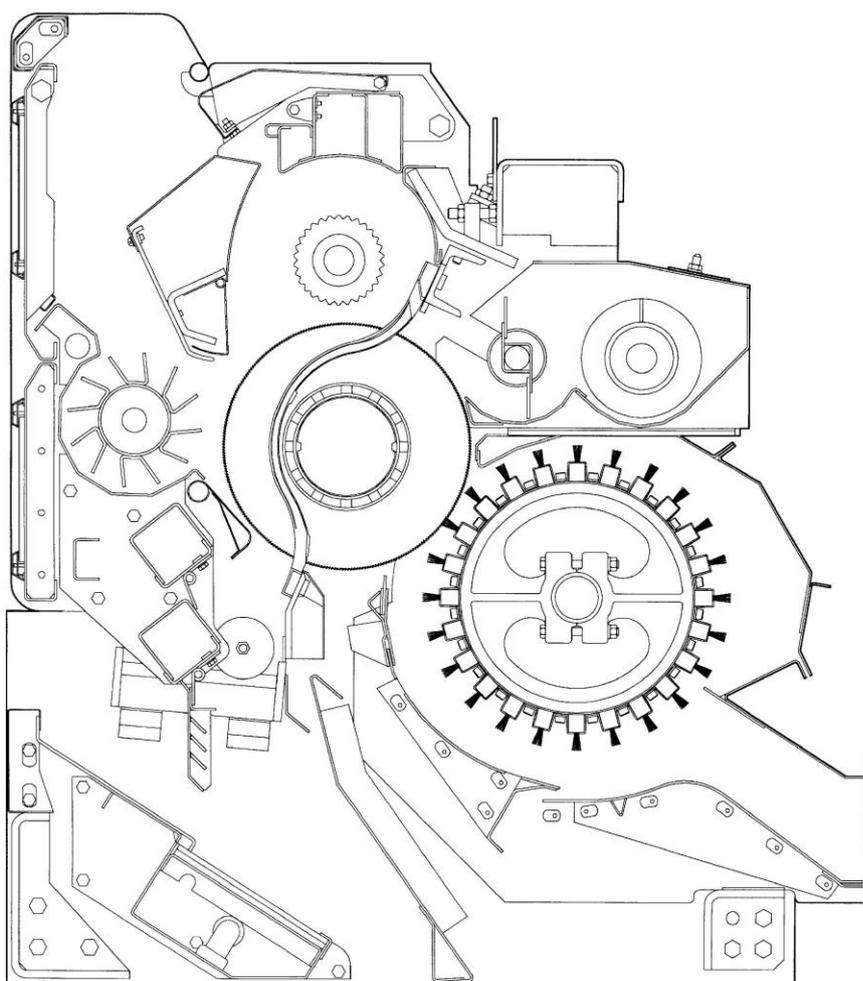
“Imperial” rusumli 128-arrali jin – ikkikamerali bo'lib, kameralardan birinchisi (titish kamerasi) chigitli paxtani tozalash va alohida bo'lakchalarga ajratish uchun, ikkinchisi (xom ashyo kamerasi) jinlash uchun mo'ljallangan.

1.4-rasmda “Platt-Lyummus” firmasining 128-arrali “Imperial” rusumli jin sxemasi keltirilgan. U quyidagi asosiy ishchi organlardan iborat: titish kamerasi, xom ashyo (ishchi) kamerasi, tolaechish apparati, ulyukajratish tizimi, tashuvchi vositalar, jinni boshqarish tizimi va gidroyuritma.

Titish kamerasi yuqori va quyi ajraluvchi sektsiyalardan iborat bo'lib, yuqorisi quyisiga yo'naltiruvchi shaxta sifatida hizmat qiladi.

Titish kamerasining yuqori sektsiyasida, kameraning tashqi devori bo'lib hizmat qiluvchi, old panel bilan biriktirilgan, yong'inga qarshi klapan o'rnatilgan.

Titish kamerasiga chigitli paxta uzatilishini tezkor to'xtatilishi uchun (masalan, chigitli paxtani yonishida) old panel tashqariga suriladi va yong'inga qarshi klapan titish kamerasi kirishini berkitadi va chigitli paxtani kameraga kirishini oldini oladi.



1.4-rasm. "Imperial" rusumli 128-arrali jini

Titish kamerasi quyi seksiyasida xamma asosiy ishchi organlar joylashtirilgan: tashlovchi qoziqli baraban, qo'zg'almas chyotka, arrachali regeneratsiya barabani, titish kolosniklari, ikkiseksiyali kolosnikli panjara. Titish kolosniklari orqali kameraga arrali tsilindr segmenti kiradi.

Qoziqli barabanda 128 ta qoziq bo'lib (har bir arraga bittadan qoziq), uning diametri 165 mm. Har bir qoziq titish kolosniklarining yuqori qismida bir-oz ichiga kirib, bir vaqtda chigitli paxtani arraga uzatilishini va titish kolosniklari yuqori qismida yig'ilgan iflos aralashmalardan, arra tomonidan ilinmagan, paxta bo'lakchalaridan tozalashni amalga oshiradi.

Tashlovchi baraban qoziqlari regeneratsiya arralari orasidagi oraliqqa kirib, ularning to'xtovsiz tozalanishini amalga oshiradi.

Arrachali regeneratsiya barabani yuritma validada o'rnatilgan yaxlitmetall payvand konstruksiyada bo'lib, baraban yuzasida vintlar yordamida qotirilgan arracha segmentlardan iborat.

Tishlar uchi bo'yicha baraban diametri 135 mm. Arracha o'qlari arrali tsilindr orasidagi oraliq o'qlari bilan mos keladi.

1.3. Tola ajratish jarayonida xom ashyo valigi zichligi va tezligining ahamiyati haqida umumiy ma'lumotlar

Paxta tozalashda eng asosiy texnologik jarayon bo'lgan arrali jinlashda unumdorlik, xom ashyo valigi zichligi va tola sifatining o'zaro yaqin bog'lanishi borligi paxta tozalash amaliyotida anchadan beri ma'lum.

I.G. Boldinskiy o'z tadqiqotlarida jin unumdorligini o'sishi albatta xom ashyo valigi zichligini ortishi bilan birga sodir bo'lishini isbotladi.

Ammo zichlikning ortishi bilan unumdorlik ortishi ma'lum chegaragacha bo'lib keyin unumdorlik pasaya boshlaydi. Bu holat yonbosh yo'nalishdagi kuchlanmalarning ta'sirida xom ashyo valigi aylanish tezligi kamayib borishi bilan bog'liq bo'lib zichlik $550\div 600 \text{ kg/m}^3$ bo'lganida jarayon butunlay to'xtab qolishini G.I. Miroshnichenko isbot qilgan.

A.D. Grober jinlash jarayoni xarakteristikalarini o'rganish va matematik ifodalash bo'yicha nazariy va eksperimental tadqiqotlar o'tkazgan. U jinlash jarayonining statistik qonuniyatlarini aniqladi. Xususan, muallif ko'rsatdiki, jin ishchi kamerasiga chigitli paxtani uzatish notekisligini kamaytirilishi va jinlash jarayonini stabillanishi paxta tolasining sifat ko'rsatkichlarini yaxshilaydi.

Arrali jinlash asosiy tadqiqotlarining rivojlanish tahlili uni optimallashtirish yo'llarini belgilashga imkon beradi. Jin unumdorligini oshirish va tola sifatini yaxshilash uchun jinlash jarayonini stabillash zarur.

Paxta zavodlarning amaliyotida jinlashda xom ashyo valigining zichligini sub`ektiv o'rnatiladi va rostlanadi. Buning uchun jinning ta`minlanishini chigitli paxta naviga qarab ish tajribasidan aniqlanib belgilangan tezlikka o'rnatiladi, so'ng esa xom ashyo valigining zichligi va chigitlarning tukdorlik darajasini rostlashga o'tiladi. B.I. Bekmirzaev tomonidan xom ashyo valigi zichligining tola va chigit sifatiga ta`siri haqida eksperimental ma'lumotlari olingan (1.2-jadval). Ulardan ko'rinadiki, tolaning eng kam shikastlanganligi I-nav paxtada xom ashyo valigi zichligi 325 kg/m^3 bo'lganida, III-nav paxtada esa – 290 kg/m^3 bo'lganida kuzatiladi (1.5-rasm).

S. Fazildinov, R.M. Kattaxodjaevlarning ilmiy maqolasida chigitli paxtani arrali jinlashdan keyin toladagi nuqsonlar yig'indisi yirik xas-cho'p, ulyuk, tolali po'stloq va singan chigit miqdorini oshishi sabablari va bular ichida xom ashyo valigi zichligining roli tekshirilgan.

“Paxtasanoat ilmiy markazi” IChM va TTESI da o'tkazilgan tadqiqotlar ko'rsatdiki, tolada jinlash nuqsonlarini hosil bo'lish sabablaridan asosiysi – xom ashyo valigining ortiqcha va o'zgaruvchan zichligidir. Xom ashyo valigi zichligi oshganda to'quv jarayonida yomon ta`sir qiluvchi chigallar, kombinatsiyalangan chigallar va tugunaklar hosil bo'ladi.

Jinlash nuqsonlarini kamaytirish uchun jinlash jarayonini xom ashyo valigining nisbatan bo'sh va turg'un zichligida amalga oshirish kerak. Mualliflar xom ashyo valigi yordamida zichligi pasaytirilgan bo'lganda jinda olingan tola

sifatini tadqiq qilishgan. Tajribalarda 108F I-nav qo'lda terilgan, namligi 7,2% va jinlashdan oldingi ifloslanganligi 0,4% chigitli paxtadan foydalanilgan. Optimal diametri 150 mm va tezligi 230 r/min bo'lgan xom ashyo valigining elastik elementli arrali jin ish natijalarini 3XDD-M jin ishi ko'rsatkichlari bilan solishtirilgan.

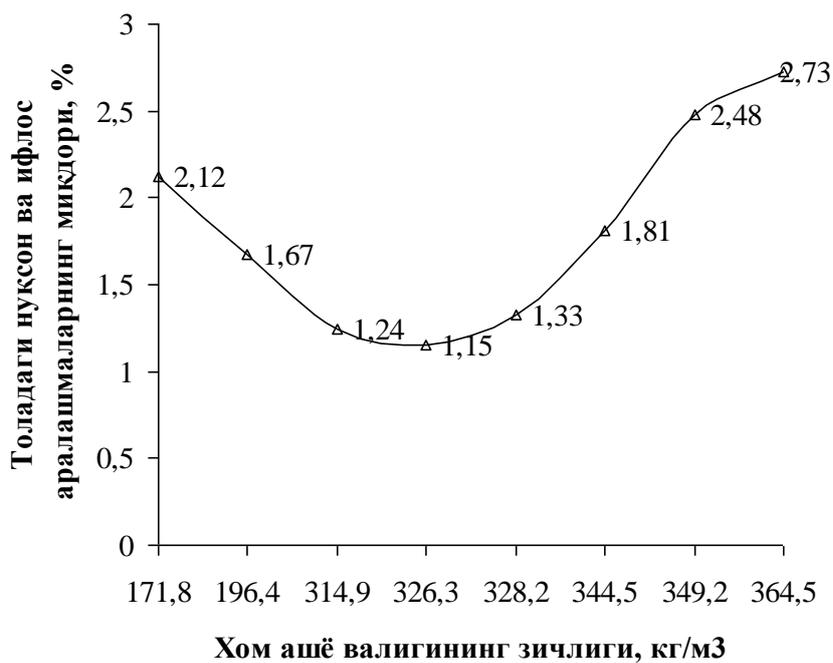
1.2-jadval.

I- va III-navli o'rta tolali chigitli paxtani ishlashda xom ashyo valigi zichligini tola sifatiga ta'siri

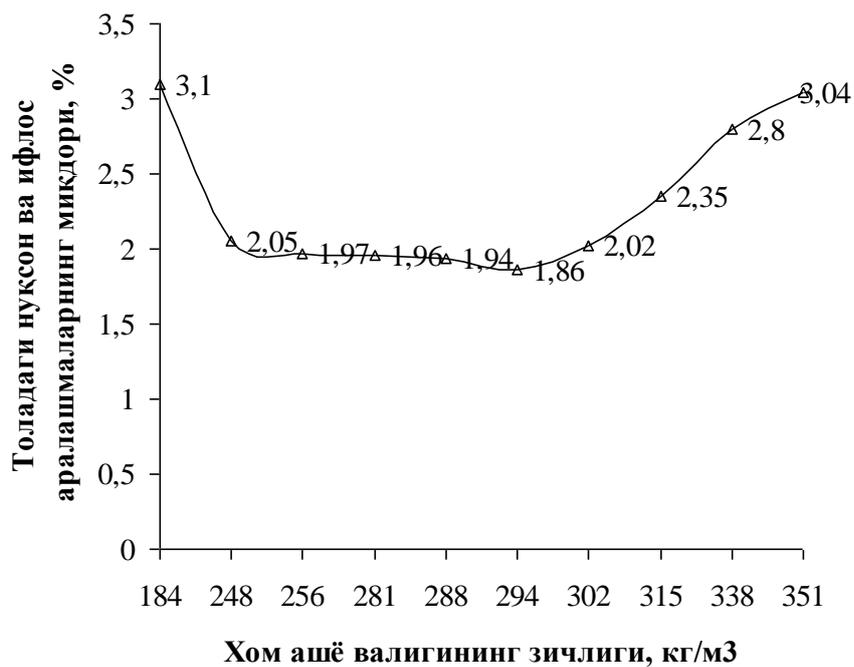
I-navli chigitli paxta		III-navli chigitli paxta	
Xom ashyo valigining zichligi, kg/m ³	Toladagi jinlash nuqsonlari miqdori, %	Xom ashyo valigining zichligi, kg/m ³	Toladagi jinlash nuqsonlari miqdori, %
171,8	2,12	183,6	3,1
196,4	1,67	248,1	2,05
314,9	1,24	255,7	1,97
326,3	1,15	280,5	1,96
328,2	1,33	288,2	1,94
344,5	1,81	293,9	1,86
349,2	2,48	301,5	2,02
364,5	2,73	314,9	2,35
		337,8	2,8
		351,1	3,04

Unumdorlik oshishi bilan xom ashyo valigi zichligi ham oshadi, bu esa jinlash nuqsonlarini ortishiga olib keladi. Ikki jinning ishi solishtirilganda ko'rinadiki, xom ashyo valigi zichligi pasaytirilishi natijasida nuqsonlar yig'indisi va tolani ifloslanganligi asosan jinlash nuqsonlari hisobiga 0,5-0,6 % ga kamayadi.

Tajriba natijalari bo'yicha mualliflarning xulosalariga ko'ra jinlash nuqsonlarini kamaytirish uchun xom ashyo valigi zichligini kamaytirish kerak. Shu tadqiqot doirasidagi "Paxtasanoat ilmiy markazi" IChMning yigirish laboratoriyasining olingan toladan yigirilgan ip sifati bo'yicha ma'lumotlari ham shu fikrni tasdiqlaydi (1.3-jadval).



a)



b)

1.5-rasm. Tola nuqsonlari miqdorini (tolali po'stloq, kombinatsiyalangan chigallar, chigallar va tugunaklar) I- va III-navli chigitli paxtani jinlashda xom ashyo valigi zichligiga bog'liqligi (mos ravishda a va b)

Yigirilgan ipdagi nuqsonlarga xom ashyo valigi zichligining ta`siri

Jinning unumdorligi, kg/arra-soat	Xom ashyo valigining massasi, kg	Xom ashyo valigining zichligi, kg/m ³	Nuqsonlar yig'indisi va tolaning ifloslanganligi, %			
			Jami	Singan chigit va tolali po'stloq	Singan chigit	Tolali po'stloq
Xom ashyo valigi zichligi odatdagi						
8,8	55,3	354	2,60	1,20	0,29	0,91
10,1	64,1	410	2,73	1,30	0,36	0,94
12,3	67,8	430	2,81	1,37	0,38	0,99
Xom ashyo valigi zichligi pasaytirilgan						
8,6	39,2	300	2,05	0,81	0,15	0,66
13,8	43,5	309	2,15	0,90	0,17	0,73
15,6	44,4	312	2,13	0,93	0,20	0,73
17,3	46,8	314	2,18	0,99	0,25	0,74

Yuqoridagilardan kelib chiqib xulosa qilish mumkinki, arrali jinlash jarayonida xom ashyo valigining zichlik va tezlik parametrlari ta`minlash intensivligi va tozalangan chigitning chiqarib yuborish jarayoni orasidagi muvozanatga bog'liq. Shunga ko'ra jinlashni ta`minlash va tola, chigitni chiqarish masalalari bo'yicha bajarilgan asosiy tadqiqotlar bilan tanishib chiqdik.

I-bob bo'yicha xulosa

Paxta tolasini arrali jinlarda ajratish jarayonini o'rganib chiqdik;

PD ta'minlagichi, 4DP-130, 5DP-130 arrali jin mashinalari ishlash prinsipi, texnik xarakteristikasini o'rgandik;

Chet el arrali jin mashinalarini o'rganib chiqdik;

Tola ajratish jarayonida xom ashyo valigi zichligi va tezligining ahamiyatini o'rgandik.

II-BOB. JIN MASHINASINI TAKOMILLASHTIRISH

2.1. Jin mashinasi ishchi kamerasini ta`minlash jarayonini takomillashtirish

Arrali jin ishchi kamerasining keng tarqalgan konstruksiyasi ma`lum bo`lib, u old tomonidan fartuk, orqadan lobovoy brus, pastdan arra tsilindri o`tishi uchun kolosnikaro tirqishli alohida kolosniklardan terilgan kolosnikli panjara va yonlardan chap va o`ng yondevorlar bilan chegaralangan. Ta`minlagichdan ishchi kamerasiga tushayotgan chigitli paxta massasi aylanayotgan arra bilan o`zaro ta`sirlashib aylanayotgan xom ashyo valigini hosil qiladi.

Ushbu ishchi kamerasining kamchiligi – uzatilayotgan chigitli paxta miqdorini o`zgarishiga reaksiyani va xom ashyo valigi zichligini boshqarish mexanizmini yo`qligidir, bu esa, ayniqsa past navli chigitli paxtani ishlashda, jinlashning texnologik rejimlarini buzilishiga, tez-tez tiqilishlarga va mashinalarni to`xtab turishiga olib keladi.

Jin ishchi kamerasini takomillashtirish mavjud konstruksiyaga asoslangan bo`lib u arrali tsilindr, oldingi to`sinda qotirilgan qobirg`ali panjara, o`qda o`rnatilgan ko`chishga imkoni bor old fartuk, chigit tarog`i va quyi fartukdan iborat arrali jinning ishchi kamerasi hisoblanadi. Quyi fartuk o`qda buralishi mumkin qilib o`rnatilgan. Kamera fartuk ko`chishini nazorat qurilmasi bilan ta`minlangan. Qurilma kameraning tashqi tomonidan o`rnatilgan va qayishqoq elementlar va xom ashyo valigi zichligining mexanik datchigi bilan bog`langan ko`chish chegaralovchisidan iborat.

Lekin ushbu konstruksiya bikrlilik bilan, og`irlik va hajmni ortishida, ayniqsa past navli chigitli paxtani ishlashda, xom ashyo valigini ortiqcha zichlanishi mumkinligi bilan farqlanadi, bu esa olinayotgan mahsulot hajmiga ta`sir etadi va tiqilishlar hosil bo`lishini oldini olmaydi.

Bizning maqsadimiz – xom ashyo valigi zichligini o`zgarishiga bog`liq holda ta`minlagich valining aylanish chastotasini avtomatlashtirilgan rostlashli ishchi kamerasini yaratish.

Jinning arrali tsilindri elektromotorining umumiy iste`mol quvvati va xom ashyo valigining zichligi orasida to`g`riproportsional bog`lanish mavjudligi

ma`lum. Elektromotor tomonidan iste`mol qilinayotgan quvvat P quyidagicha aniqlanadi:

$$P = \sqrt{3} \cdot U \cdot I \cdot \eta \cdot \cos \varphi$$

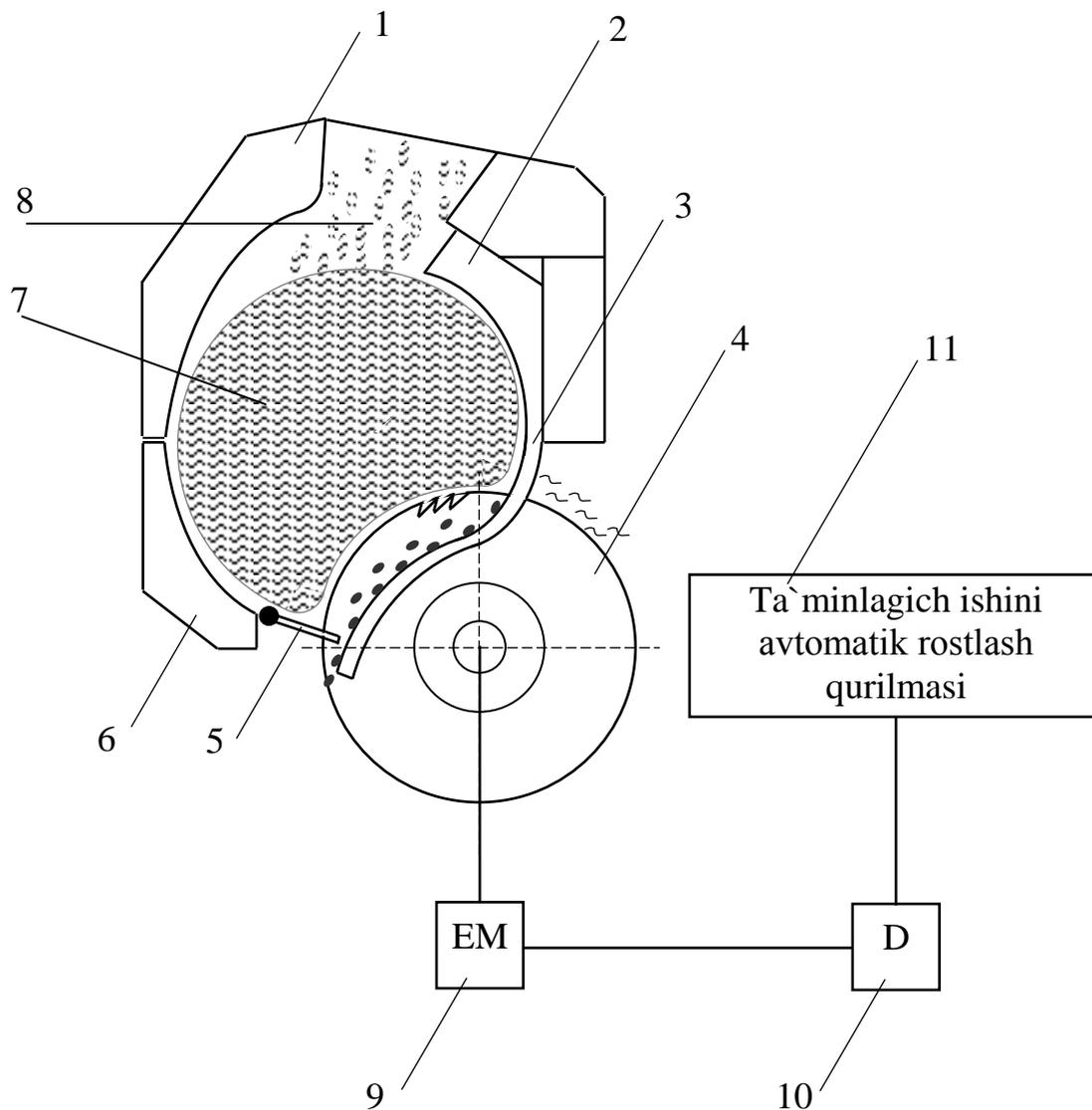
bunda U va I – tok kuchlanishi va tok kuchi;
 φ – ular orasidagi fazalar surilish burchagi;
 η – foydali ish koeffitsienti.

Jinga kelayotgan elektrik tarmoqda kuchlanish o`zgarmas qilib ushlab turilganligi sababli, bu elektrik tok kuchi va xom ashyo valigi zichligi orasida o`xshash to`g`riproportsional bog`lanish mavjudligini bildiradi.

Qo`yilgan masala quyidagicha yechildi. Ishchi kamerasi old fartuk 1, oldingi to`sin 2, unda o`rnatilgan kolosnik panjara 3, arrali tsilindr 4, chigit tarog`i 5 va quyi fartuk 6 dan iborat (2.1-rasm). Arrali tsilindr 4 ning arrali vali yuklanish tokini nazorat datchigi 10 bilan ta`minlangan jinning elektromotor 9 vali bilan birlashtirilgan. Ta`minlagich elektromotori uni ta`minlash kuchlanishi chastotasining o`zgartirgichidan iborat bo`lgan ta`minlagich ishini avtomatik rostlash qurilmasi 11 bilan bog`langan.

Ishchi kamerasini yuklanish toki o`zgarishini nazorat qilish qurilmasi bilan ta`minlanishi xom ashyo valigi zichligini nazorat qilish va ishchi kamerasiga uzatilayotgan material hajmini rostlash imkonini beradi.

Arrali jinning ta`minlanishi takomillashtirilgan ishchi kamerasi quyidagicha ishlaydi. Kelayotgan chigitli paxta 8 arrali tsilindr 4 bilan kontaktga kiruvchi xom ashyo valigi 7 ni hosil qiladi. Xom ashyo valigi 7 dan kolosnik panjara 3 orqali arrali tsilindr 4 yordamida tola ishchi kamerasidan chiqariladi, bunda chigitni chiqarilishi chigit tarog`i 5 ning holati bilan rostlanadi. Xom ashyo valigi 7 ning zichligi o`zgarishida va mos ravishda arrali tsilindr 4 elektromotori 9 da yuklanish tokini o`zgarishida, ta`minlagich elektromotori ishini avtomatik rostlash qurilmasi 11ni boshqaruvchi, yuklanish tokining nazorat datchigi 10 ta`sirlanadi.



2.1-rasm. Ta`minlanishi takomillashtirilgan arrali jin ishchi kamerasining ishlash sxemasi

1 – old fartuk; 2 – oldingi to’sin; 3 – kolosnik panjara; 4 – arrali tsilindr; 5 – chigit tarog’i; 6 – quyi fartuk; 7 – xom ashyo valigi; 8 – chigitli paxta; 9 – arrali tsilindr vali elektromotori; 10 – arrali tsilindr vali elektromotorining yuklanish tokini nazorat datchigi; 11 – ta`minlagich elektromotori ishini avtomatik rostlash qurilmasi.

Ta`minlagich elektromotori ishini avtomatik roslash qurilmasi 11 ta`minlagich elektromotori ta`minlashning kuchlanish chastotasini roslash yo`li bilan uning tezligini va ishchi kamerasiga uzatilayotgan chigitli paxta 8 miqdorini shunday o`zgartiradiki, xom ashyo valigi zichligining o`rnatilgan kattaligi tiklanadi.

2.2. Arrali jin ta`minlagichini takomillashtirish

Ko`pchilik jin mashinalarida qo`llaniladigan jin ta`minlagichining konstruktsiyasi malum bo`lib, u ta`minlovchi valiklar, qoziqli baraban, to`r, xascho`plarni chiqarish transportyori, jin ishchi kamerasiga chigitli paxtani uzatish novidan iborat. Ta`minlovchi valiklar tezligini rostlanishi ta`minlovchi valik o`qida o`rnatilgan impul sli variator IVA orqali amalga oshiriladi.

Ushbu ta`minlagichning kamchiligi – asosiy ish organlarning jinlash qobiliyati holatini nazorat vositalari bilan bog`lanish yo`qligidir, bu esa jinlash texnologik rejimlarini buzilishiga, tez-tez tiqilishlarga va mashinalarni to`xtab turishiga olib keladi.

Ta`minlagichni takomillashtirishda tuzilishi bo`yicha birtomonlama davriy harakat mexanizmining yetaklovchi validan va ko`pbo`g`inli richag ko`rinishida bajarilgan uni roslash mexanizmidan tashkil topgan impul sli variatordan iborat bo`lgan arrali jin ta`minlagichi asos qilib olindi.

Ko`pbo`g`inli richag qo`l boshqaruvli richag va avtomatlashtirilgan roslash richagidan iborat. Ikkala richag bir-biri bilan qayishqoq qilib bog`langan. Qo`l boshqaruvli richag boshqaruvchi kulachok valiga erkin o`tqazilgan. Avtomatlashtirilgan boshqarish richagi boshqaruv kulachogining vali bilan biki bog`langan. Elastik bog`lanish o`zakni chegaralangan harakatli elektromagnitlar zanjiridan roslashning bir necha pog`onasi ko`rinishida bajarilgan. Elektromagnitlar o`zaro ketma-ket birlashtirilgan.

Lekin ushbu konstruktsiya bikrligi va murakkabligi bilan farqlanadi. Rostlash kechikib va pog`onali amalga oshiriladi, bu esa tiqilish holatlariga, va natijada jinlash mashinalarini to`xtashiga olib keladi.

Quyilgan vazifa – xom ashyo valigi zichligini o'zgarishiga bog'liq holda arrali tsilindr elektromotorining yuklanish toki o'zgarishini nazorati orqali jin elektromotori yuklanish tokining datchigini qo'llab ta'minlagich elektromotori valini aylanish chastotasini pog'onasiz avtomatik rostdashli ta'minlagich konstruktsiyasini yaratish.

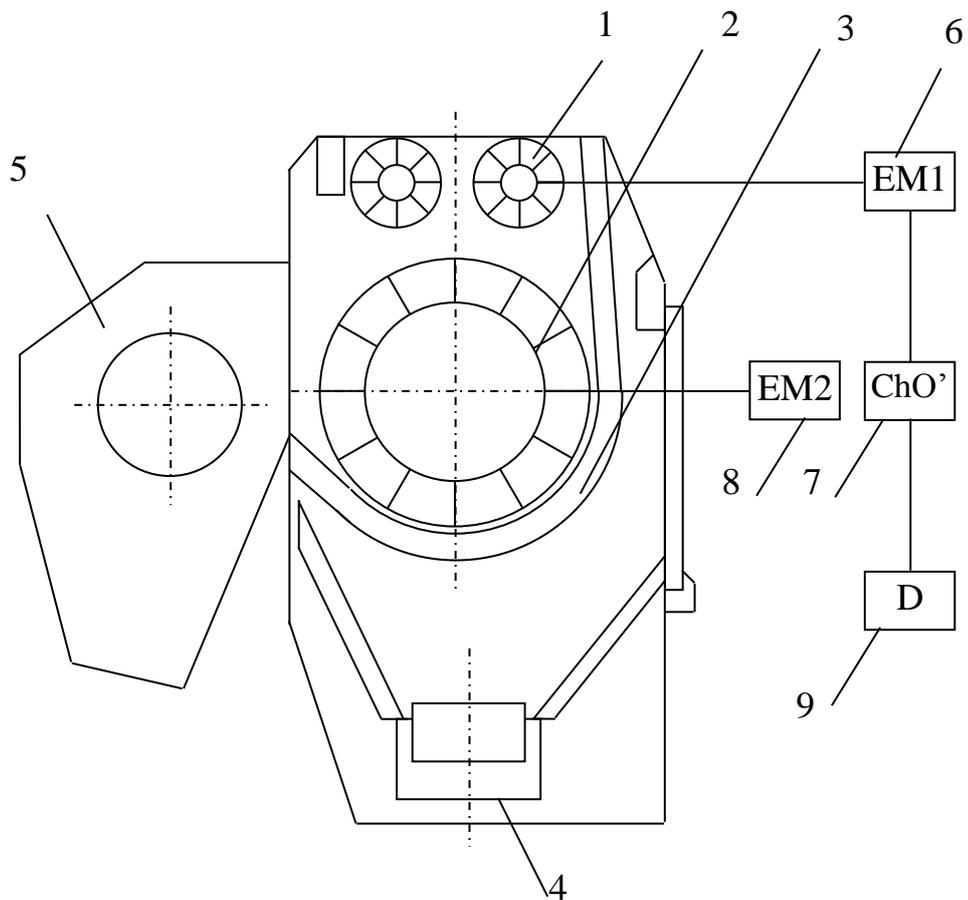
Quyilgan masala quyidagicha yechiladi. Arrali jin ta'minlagichidagi chastota o'zgartirgich xom ashyo valigi zichligini o'zgarishi bo'yicha jin elektromotorining yuklanish toki datchigidan signal oladi va ta'minlagich elektromotorining aylanish chastotasini rostlab ta'minlovchi valiklar aylanish tezligini o'zgartiradi.

Ta'minlagichni takomillashgan rostdash qurilmasi bilan ta'minlanishi ta'minlovchi valiklar tezligini o'zgartirish hisobiga xom ashyo valigi zichligini nazorat qilishga va uzatilayotgan material hajmini rostdashga imkon beradi.

2.2-rasmda arrali jin ta'minlagichining ishlash sxemasi keltirilgan. U ta'minlovchi valiklar 1, qoziqli baraban 2, to'r 3, xas-cho'plarni chiqarish transportyori 4, jin ishchi kamerasiga chigitli paxtani uzatish novi 5, aylanish chastotasi jin elektromotorining yuklanish toki datchigi 9 dan olayotgan xom ashyo valigi zichligi to'g'risidagi signalga qarab chastota o'zgartirgich tomonidan rostdanuvchi elektromotor 6 dan iborat. Jin elektromotorining yuklanish toki datchigi jin arrali tsilindri elektromotorining elektr ta'minot joyida joylashgan.

Qoziqli baraban aylanish tezligini ta'minlovchi valiklar tezligiga bog'liq bo'lmagan holda o'zgarmas qilib saqlab turish uchun u alohida elektromotor 8 bilan ta'minlangan.

Arrali jin ta'minlagichi quyidagicha ishlaydi. Xom ashyo valigining zichligi ruxsat etilgandan katta kattalikka o'zgarganda jin elektromotorining yuklanish toki datchigi chastota o'zgartirgich 7 ga signal uzatadi. Chastota o'zgartirgich 7 ta'minlovchi valiklar 1 ni aylantiruvchi elektromotor 6 ning aylanish chastotasini rostlaydi, va shu bilan jin ishchi kamerasiga chigitli paxta uzatilish tezligini shunday o'zgartiradiki, xom ashyo valigi zichligining o'rnatilgan kattaligi tiklanadi. Jarayon pog'onasiz amalga oshadi va shu rejimda davom etadi.



2.2-rasm. Arrali jin takomillashgan ta`minlagichining ishlash sxemasi

1 – ta`minlovchi valiklar; 2 – qoziqli baraban; 3 – to`r; 4 – xas-cho`plarni chiqarish transportyori; 5 – jin ishchi kamerasiga chigitli paxtani uzatish novi; 6 – ta`minlovchi valiklar elektromotori; 7 – chastota o`zgartirgichi; 8 – qoziqli baraban elektromotori; 9 – jin elektromotorining yuklanish toki datchigi.

2.3. Arrali jinni qo'l bilan va avtomatik boshqarishning tahlili

Arrali jindagi jarayonlarni tadqiq qilishda ish davomida ishchi organlarning tezliklarini, yuklanishini, ishlash vaqtini va boshqa ko'rsatkichlarni o'zgartirish va aniqlash zarurati paydo bo'ladi.

Arrali jinlarda xom ashyo valigi zichligini roslash uchun ta'minlovchi valiklar tezligini o'zgartiriladi. Tadqiqotlarda ta'minlovchi valiklar tezligini chastota o'zgartirgich yordamida roslash taklif etilgan. Bu tizimning yana bir afzalligi – jarayon davomida ishchi organlar ko'rsatkichlarini o'zgarishini vaqt davomida kuzatish imkoni borligidadir.

Jinlash jarayoni davomida ta'minlovchi valiklar tezligini rostlanishi natijasida undagi parametrlarni o'zgarishini tekshirish maqsadida “To'raqo'rffon paxta tolasi” h.j. da ishlab chiqarish sharoitida 5DP-130 jinida tajribalar o'tkazildi. Sinovlar Namangan-77 seleksion navli I- va V-nav qo'l terimi chigitli paxtada olib borildi.

Tajribada Danfoss VLT seriyadagi chastota o'zgartirgichidan foydalanildi. Chastota o'zgartirgichni standart USB kabel orqali noutbukka ulandi. Bunda Danfoss firmasi tomonidan ishlab chiqilgan MST 10 dasturidan foydalanildi.

Chastota o'zgartirgichni va arrali tsilindrdagi yuklanish tokini aniqlash datchigini 2.3-rasmda keltirilgan sxema bo'yicha ulandi, hamda ularni o'rnatish talablariga muvofiq, elektr shitga o'rnatildi (2.4-rasm). Ta'minlovchi valiklar tezligini roslash uchun arrali jinga boshqarish pulti o'rnatildi (2.5-rasm). Boshqarish pul ti avtomatik va qo'lda boshqarish muruvatidan, qo'lda boshqarganda ta'minlovchi valiklar tezligini o'zgartirish potentsiometridan va ta'minlovchi valiklar motorini yoqish-o'chirish tugmasidan iborat.

Mavjud 5DP-130 arrali jindagi IVA variatori o'rniga 0,85 kVt quvvatli motor-reduktor o'rnatildi.



2.4-rasm. Chastota o'zgartirgich va tok transformatorini shitga o'rnatishning umumiy ko'rinishi



2.5-rasm. Ta'minlovchi valiklarni avtomatik boshqarish pultining umumiy ko'rinishi

Chigitli paxta tolasining sifat ko'rsatkichlari

Ko'rsatkich nomi	Mazmuni	I-sanoat navli chigitli paxta tolasini		V-sanoat navli chigitli paxta tolasini	
		Qo'lda boshqarishda	Avtomatik boshqarishda	Qo'lda boshqarishda	Avtomatik boshqarishda
Mic	Mikroneyr	4,5	4,6	3,9	3,9
Str	HVI ning solishtirma uzilish kuchi, gs/teks	33,0	33,2	30,7	32,1
Len	Yuqori o'rtacha uzunlik, dyuym	1,15	1,15	1,15	1,15
Unf	Uzunlik bo'yicha birxillik, %	83,3	84,2	82,4	82,9
SFI	Kalta tolalar indeksi	6,3	5,8	9,8	8,8
Elg	Uzilishdagi uzayishi, %	6,9	6,8	7,1	7,4
T	Trash, ifloslik kodi, $T = Area \cdot 10$	7	7	0	0
Cnt	O'lchash darchasining maydonidagi iflos aralashmalar miqdori	12	8	51	70
Area	O'lchash darchasining maydoniga nisbatan iflos aralashmalar maydoni, %	0,8	0,7	2,1	2,1
CG	Rangi bo'yicha navi	31-1	21-2	35-2	35-2
Rd	Tolaning nur qaytarish koeffitsienti, %	78,4	79,8	58,6	60,1
Qb	Tolaning sarfshlik darajasi	8,2	8,0	15,8	15,2

Chastota o'zgartirgichga quyidagi ma'lumotlar kiritildi:

Analog chiqish signali	0-10 V
Minimal signal	4 V
Maksimal signal	6 V
Minimal signaldagi ta'minlovchi valik motorining tezligi	Maksimal
Maksimal signaldagi ta'minlovchi valik motorining tezligi	Minimal
Ta'minlovchi valik motorining maksimal tezligi	700 ay/min
Ta'minlovchi valik motorining minimal tezligi	0

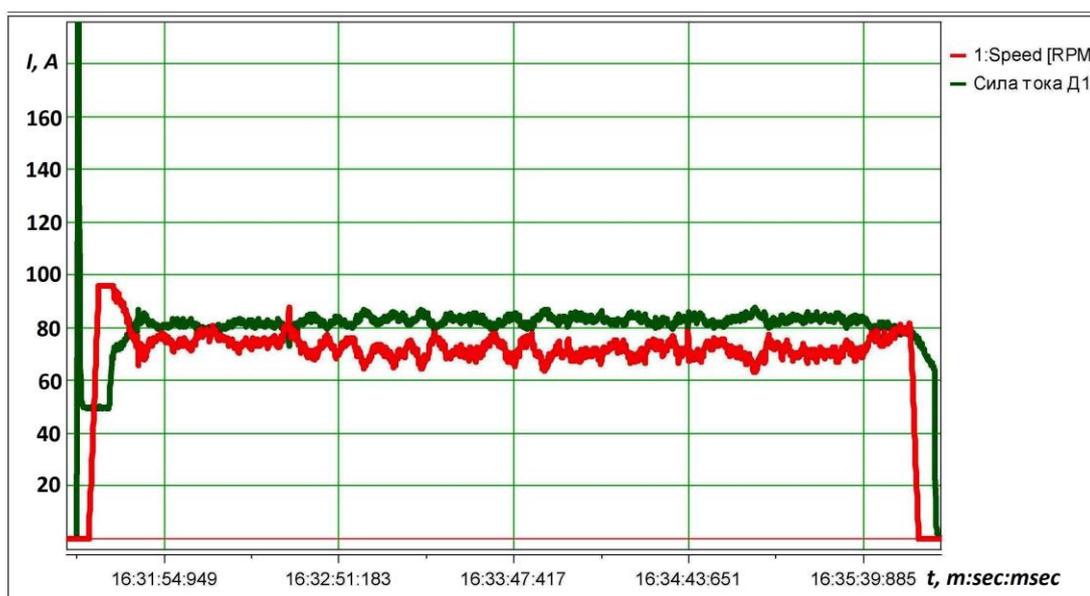
2.6-rasmda MST 10 dasturida arrali tsilindr motorining yuklanish tokini vaqt bo'yicha o'zgarish ostsillogrammasi keltirilgan. Undan ko'rinib turibdiki, qurilma qo'lda boshqarilganda arrali tsilindr motorining yuklanish toki 80-130 A oraliqda (a) o'zgarmoqda. Avtomatik boshqarishda bu ko'rsatkich (b, zangor chiziq) 75-85 A oraliqda, ta'minlovchi valiklar tezligi esa unga teskari proportsional o'zgarmoqda (qizil chiziq). Ya'ni ta'minlovchi valiklar tezligini rostdash tizimi avtomatik rejimda ishlashini ko'rishimiz mumkin.

Ko'rsatkich nomi	Qo'lda boshqarish			Avtomatik boshqarish		
	1-tajriba	2-tajriba	O'rtacha	1-tajriba	2-tajriba	O'rtacha
I-sanoat navli chigitli paxta chigiti						
Mexanik shikastlanish, %	4,0	3,7	3,9	2,5	2,2	2,4
Tola qoldiq, %	1,1	1,0	1,1	0,9	1,0	1,0
V-sanoat navli chigitli paxta chigiti						
Mexanik shikastlanish, %	12,6	12,3	12,5	11,2	11,7	11,5

Qurilma o'rnatilgan arrali jindan olingan tolaning sifat ko'rsatkichlari HVI tizimida aniqlandi. Paxta chigitining sifat ko'rsatkichlari esa Chust paxta urufchilik laboratoriyasida aniqlandi. 2.3-jadvaldan ko'rinib turibdiki, I-sanoat navli chigitli paxtani ishlashda chigitning mexanik shikastlanishi 3,9 % dan 2,4 % ga, tola qoldiq esa 1,1% dan 1,0 % ga yaxshilandi. V-sanoat navli chigitli



a



b

2.6-rasm. MST 10 dasturida arrali tsilindr motorining yuklanish tokini vaqt bo'yicha o'zgarish ostsillogrammasi

a. Qo'l rejimida;

b. Avtomatik rejimda (zangor chiziq), mos ravishda ta'minlovchi valiklarning aylanish tezligini o'zgarishi (qizil chiziq).

paxtani ishlashda chigitning mexanik shikastlanishi 12,5 % dan 11,5 % ga yaxshilandi.

MST 10 dasturida motorning maksimal va minimal tezliklari, tok chastotasi, yuklanish toki, kiruvchi va chiquvchi signallar kabi boshqa ko'plab ko'rsatkichlarni tanlash mumkin. Shuningdek, ostsillograf rejimidan ham foydalanib ko'rsatkichlari sozlangan loyihalarni yaratish, yuklash va saqlash mumkin. Bu rejim real vaqt rejimida tanlangan ko'rsatkichlar qiymatlarini joriy o'zgarishini kuzatishga imkon beradi. Yozuv tugatilgach to'la jarayonni taxlilini o'tkazish va qiymatlarni Excel dasturida jadval ko'rinishida saqlanadi. Xulosa qilib, MST 10 dasturi chastota o'gartirgichlar o'rnatilgan jihozlarni sozlash uchun qulay vosita hisoblanadi.

2.4. Yangi ta'minlash tizimini ishlab chiqarish sharoitida sinash

Ta'minlash tizimini boshqarish va arrali jin texnologik ishida shu maqsadni amalga oshirish uchun Namangan viloyatining To'raqo'rg'on paxta tozalash zavodida arrali jinning takomillashtirilgan ta'minlash tizimining sinov tajribalari o'tkazildi. Sinovlar S65-24 seleksion navli I-nav 9 % namlikdagi va 2,5 % ifloslikdagi. Dastlabki sinovlar natijalaridan kelib chiqib boshqarish usulini tanlash uchun xom ashyo valigining zichligi va u tomonidan arrali tsilindr valining elektromotorida hosil qilinayotgan yuklanish toki biz tomondan tanlandi.

Arrali jin arrali tsilindr elektromotorining yuklanish toki 110 A ga chiqqandan so'ng xom ashyo valigining zichligi ta'minlagich elektromotori tezligini chastota o'zgartirgich orqali rostlash yo'li bilan nazorat qilib turildi, ampermetr ko'rsatkichi 100 A dan 110 A gacha oraliqda o'zgardi. Xom ashyo valigi zichligining o'zgarishiga qarab ta'minlagich elektromotorining aylanishi silliq pog'onasiz rostlandi.

Ta'minlashni rostlash tizimini qo'llash va arrali jin ishchi kamerasini chigitli paxta bilan birtekis yuklash hisobiga qator ijobiy natijalar olindi, xususan:

- I-navli paxtani ishlashda xom ashyo valigi zichligini 310-350 kg/m³ oraliqda stabil ushlab turish imkoni tug'ildi;

- o'z vaqtida tiqilishlarning oldi olinishi natijasida arrali jinlarni tiqilishlardan keyingi ishchi kamerasini silkitish va kolosniklarni tozalashga vaqt sarflanishining oldi olindi.

5DP-130 (diagrammadagi 1-ustun) va ta'minlashni rostlash qurilmali 5DP-130 (diagrammadagi 2-ustun) arrali jinida o'tkazilgan sinov davomida olingan paxta tolasining sifat ko'rsatkichlari I-navli paxta uchun 2.5-jadvalda, solishtirma diagrammalar 2.7-2.10-rasmlarda keltirilgan.

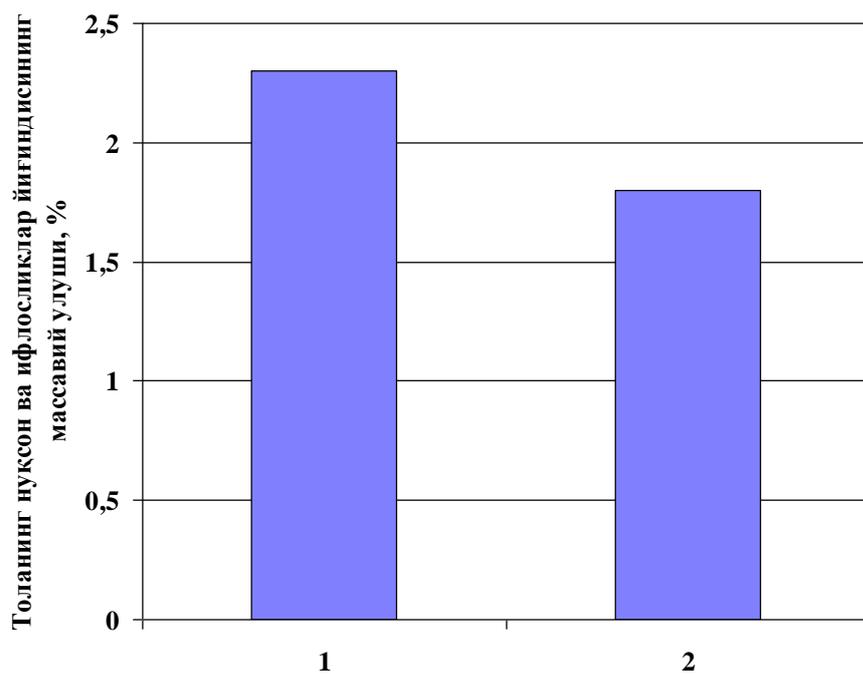
Jadvallardan ko'rinib turibdiki, jinning bir tekis ishlashi natijasida paxta tolasining nuqson va iflosliklar yig'indisi va shtapel massauzunligi kabi sifat ko'rsatkichlari yaxshilandi. Bundan tashqari chigitning ham sifat ko'rsatkichlari, xususan, chigitning mexanik shikastlanganligi va to'la tukdorligi kamaydi.

Sinov natijalari 5DP-130 arrali jinlarda ta'minlashni rostlash qurilmasini o'rnatilishi ishchi kamerasini bir tekis yuklanishini ta'minlashini va natijada ishlanayotgan chigitli paxtadan sifatliroq tola va chigitlar olinishini ko'rsatdi.

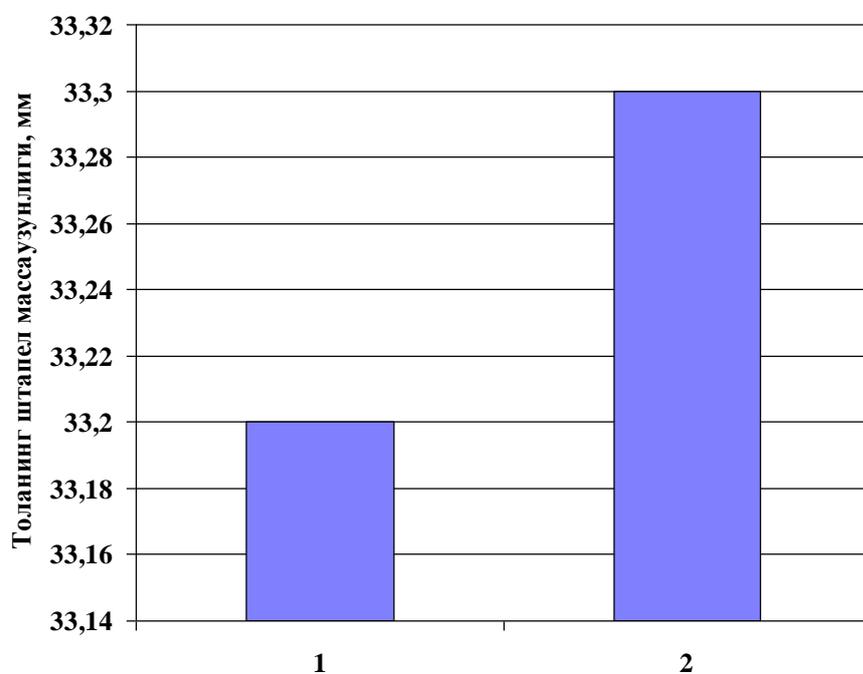
2.5-jadval

S65-24 selektsion navli I-nav chigitli paxtada turli ta'minlash tizimli arrali jinlarda o'tkazilgan tajribalarning solishtirma natijalari

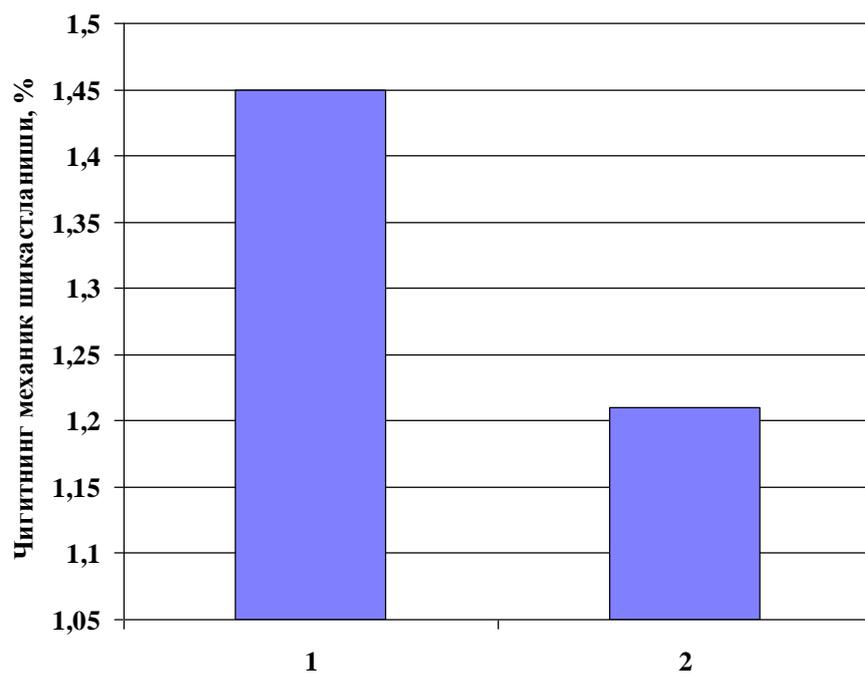
№	Sifat ko'rsatkichlari	5DP-130	Yangi ta'minlash tizimli 5DP-130
1	Unumdorlik, kg/arra-soat	8	8
2	Chigitli paxtaning namligi, %	8	8
3	Chigitli paxtaning ifloslanganligi, %	1	1
3	Tozalashdan keyingi tolaning nuqson va iflosliklar yig'indisining vazniy ulushi, %	2,3	1,8
4	Shtapel massauzunligi, mm	33,2	33,3
5	Jindan keyingi chigitning mexanik shikastlanganligi, %	1,45	1,21
6	Chigitning to'la tukdorligi, %	11,8	11,0



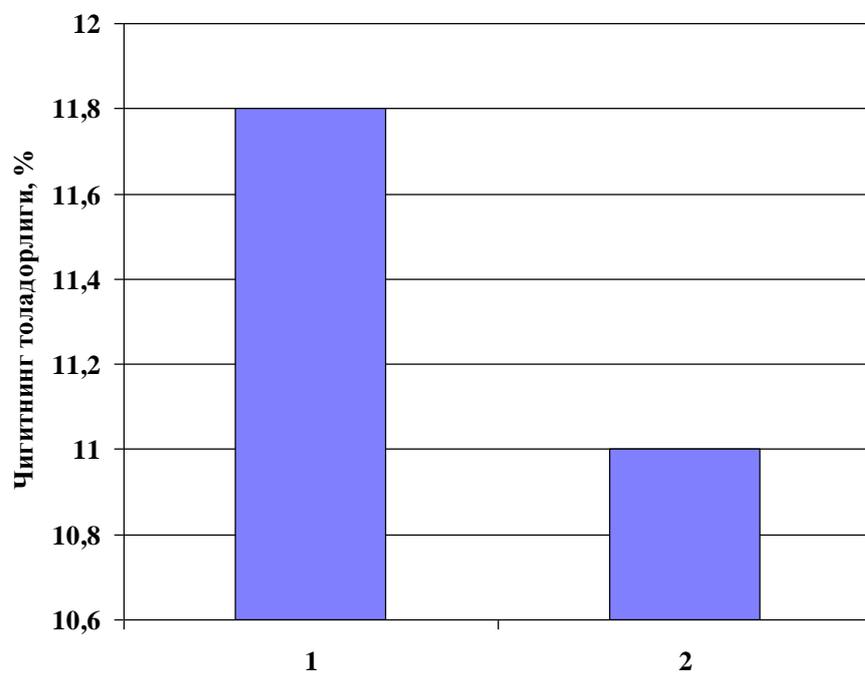
2.7-rasm. I-nav chigitli paxtani jinlashda tolaning nuqson va iflosliklar yig'indisining vazniy ulushi



2.8-rasm. I-nav chigitli paxtani jinlashda tolaning shtapel massauzunligi



2.9-rasm. I-nav chigitli paxtani jinlashda chigitning mexanik shikastlanganligi



2.10-rasm. I-nav chigitli paxtani jinlashda chigitning to'la tukdorligi

II-bob bo'yicha xulosa

Jin mashinasi ishchi kamasini ta`minlash jarayonini takomillashtirish bo'yicha taklif berildi;

Arrali jin ta`minlagichini takomillashtirish bo'yicha taklif berildi;

Arrali jinni qo'l bilan va avtomatik boshqarishning tahlili o'tkazildi;

Yangi ta`minlash tizimini ishlab chiqarish sharoitida sinov natijalari keltirildi.

III-BOB. MEHNAT MUHOFAZASI

3.1. Elektr xavfsizligini ta'minlash

Ishlovchilarning birvarakayiga ikkala fazaga ulanib qolish va faza bilan yer oralig'iga ulanib qolish xavfi bor. Ikkala fazaga ulanib qolish juda xavfli.

Ishlovchining bir fazali ulanib qolishida, uning ixotalangan toksiz simga (neytralga) ulangani (uch simli), yerga ulangan toksiz simga ulanganidan ko'ra xavfsizroqdir (to'rt simli).[8]

Elektr toki ta'sirida odam organizmi ikki xil jarohatlanishi: tashqi (elektr jarohatlanishi) va ichki (elektr urishi-tok udari). Elektr bilan jarohatlanishda-organizm kuyishi, teri metallashishi va mexanik jaroxatlanishi mumkin. Ichki-elektr urishi natijasida odam organizmidagi qon elektrolizlanishi, asab sistemasi, yurak va organizm boshqa qismlarining faoliyati buzilishi mumkin.

Odamni tok urganda, elektr urishini 4 xilga bo'lishadi: 1 – odam o'zidan ketmaydi, uning muskullari qisqaradi; 2 – muskullar qisqaradi, odam o'zidan ketadi, lekin nafas olib turadi, yuragi ishlab turadi; 3 – o'zidan ketadi, nafas olish va yurak urish faoliyati buziladi (unisi yoki bunisi, ba'zida ikkalasi ham); 4 — klinik o'lim — nafas olish va qon aylanishi to'xtagan bo'ladi. O'z vaqtida malakali yordam berilsa, jaroxatlangan shaxsni o'limdan saqlab qolish mumkin.

Elektr toki ta'siri natijasi (oqibati) inson tanasi qarshiligiga, tok kuchiga va uning davomiyligi, tok turi va chastotasiga, odamning shaxsiy holatiga bog'liq bo'ladi. ($R_{\text{odam}} = 1000 \text{ Om}$).

- 1) 0,6 — 1,5 mA — sezish toki (odam sezadi), xavfsiz.
- 2) 10 — 15 mA — ushlab qoluvchi tok, elektr o'tkazgichdan ajralib ketish qiyin, bu tokning muddatli ta'siri odamning o'lishiga sabab bo'ladi. SHuning uchun o'tkazgichdan tezda ajralishning ilojini ko'rish kerak. Odam uchun xavfli.
- 3) 25 50 mA ko'krak qafasi muskullarining xam qisqarishiga sabab bo'ladi, bunday tok fibrilyatsiya porog toki deb ataladi. Nafas siqiladi, qon tomirlari kanallari torayadi natijada arteriya bosim ko'payadi.
- 4) 100 mA — bevosita yurak muskullariga ta'sir etadi, yurakda fibrilyatsiya xosil qiladi, yurak to'xtashiga va odamning hayotdan ko'z yumushiga sabab bo'ladi.

3.2. Korxonalar ishlab chiqarish xonalariga elektr xavfsizligi bo'yicha qo'yiladigan talablar

Korxonalar ishlab chiqarish binolari elektr uskunalari xizmat ko'rsatish xavfsizligi ishlab chiqarish xonalaridagi muhit holatiga bog'liq bo'ladi. Namlik, chang, zararli gaz va bug', yuqori harorat elektr uskunalari elektr ixotalarini buzadi, odamning elektr qarshiligini kamaytiradi. Mixsiz taxtali (parket) va asfalt pollarning elektr qarshiligi bo'ladi. G'isht, beton, yer pollar tok o'tkazuvchan bo'ladi.

Ishlovchilarning elektr toki bilan jarohatlanishiga ko'ra binolar uchta kategoriyaga bo'linadi: xavfliligi yuqori bo'lgan xonalar, juda xavfli xonalar va xavfliligi yuqori bo'lmagan xonalar.

Xavfliligi yuqori bo'lgan xonada - quyidagi shartlardan biri mavjud bo'lishi kerak: nam yoki tok o'tkazuvchan changli havo; tok o'tkazuvchan pol; yuqori harorat; Ishlovchining bir paytning o'zida binoning metall qismlari, texnologik uskunalarga, mexanizmlarga va bolg'alarga bir tomondan hamda elektr uskunalari metall korpuslariga ikkinchi tomondan ulanib qolish xavfi mavjudligi.

Juda xavfli xona-quyidagi shartlardan birining mavjud bo'lishi bilan xarakterlanadi: juda nam havo (100% - namlik); kimyoviy faol muhit; bir paytning o'zida xavfliligi yuqori omillar shartlaridan ikki va undan ortiq shartning mavjudligi. Xavfliligi yuqori bo'lmagan xonalarda xavf tug'diruvchi zararli omillar bo'lmaydi.

3.3. Paxta tozalash korxonalarida elektr xavfsizligini ta'minlashning texnik uslublari va vositalari

Elektr uskunalarning tok o'tkazuvchan qismlariga tegib ketmaslik tok o'tkazuvchan qismlarga ishlovchilarning tegib ketmaydigan qilib o'rnatilishi, uskunalarni masofadan boshqarish, blokirovka qilish va signalizatsiyalar o'rnatish evaziga amalga oshiriladi. Tok o'tkazuvchan qismlar ishonchli ravishda izolyatsiyalanadi (ixotalanadi) yoki qobiqlar bilan yopiladi.

Elektr uskunalarini himoyalovchi yerga ulash-kuchlanish ostida qolishi mumkin bo'lgan elektr uskunasi tok o'tkazmaydigan qismlarini oldindan yerga ulash.

Elektr uskunalarini himoyalovchi nolga ulash — kuchlanish ostida qolishi mumkin bo'lgan elektr uskunalarning tok o'tkazmaydigan qismlarini oldindan nol o'tkazgichga ulash.

Mustahkam yerga ulangan neytral generator yoki transformatorning yerga ulagich vositasiga bevosita ulangan neytral. Ixotalangan neytral-generator yoki transformatorning yerga ulovchi qurilmaga ulanmagan neytrali.

Himoyalovchi yerga ulashning vazifasi elektr uskunasi qobig'i bilan yer orasida kichik elektr qarshilikli bog'lanish hosil qilish. Mubodo qobiqqa tok o'tsa (tokka ulanib qolgan taqdirda), odam qobiqqa bexosdan tegib ketsa, tok odamdan emas, balki yerga ulangan sim-o'tkazgichdan o'tsin.

Izolyatsiyalangan neytralda ximoyalovchi yerga ulashning qarshiligi = 4 Om, mustahkam yerga ulangan neytralda himoyalovchi yerga ulash qarshiligi 10 Om. Odamning qarshiligi 1000 Om deb qabul qilinadi.

Himoyalovchi nolga ulashda (1000 voltgacha bo'lgan uskunalarda) elektr qabul qiluvchining korpusi transformatorning himoyalovchi yerga ulangan neytrali bilan nol o'tkazgich ulangan bo'ladi (To'rtinchi sim). SHuning uchun korpusga har qanday tok o'tishi qisqa tutashuvga sabab bo'ladi va avariya uchastkasi saqlagich yoki avtomat bilan tokdan uziladi. Qisqa tutashuv zanjiri qarshiligi kichik bo'lishi kerak. SHartli ravishda qisqa tutashuv zanjiri «faza zanjiri qarshiligi- nol» deyiladi, aslida esa qisqa tutashuv zanjiri ta'minlovchi transformatoridan, faza o'tkazgichdan va himoyalovchi nol o'tkazgichdan iborat bo'ladi. Ixotalangan neytralda (uchta simli), elektr uskunalarining tokga ulanmagan qismlari (qobiqlari) ximoyalovchi yerga ulanadi.

Elektr uskunalarini o'rnatish qoidalari talablariga ko'ra, mustahkam neytralli elektr uskunalarda nolga ulash, ixotalangan neytralli elektr uskunalarda himoyalovchi yerga ulash qo'llaniladi (teskarisiga ruxsat etilmaydi).

«Nol sim» tushunchasi mustahkam neytralli himoyalovchi yerga ulovchi sim tushunchasi ixotalangan neytralli elektr uskunalariga tegishlidir.

Himoyalovchi uchirish: uskuna qobig'ida tok paydo bo'lgan taqdirda, qobiq orqali yerga tok o'tadi va rele ishlaydi, uning kontaktlari ochilib, magnitli o'chirgich chulg'amini toksizlantiradi va natijada magnitli o'chirgich kontaktlari avariya uchastkasini tok manbasidan uzib qo'yadi.

3.4. Elektr himoya vositalarini sinash va ko'rikdan o'tkazish muddatlari

Elektr uskunalari bilan ishlaydigan hodimlarni elektr jarohatlanishdan, elektr yoyi va yonish mahsulotlari ta'siridan himoya qilishga xizmat qiluvchi asbob, apparat va surilmalar elektrdan himoyalovchi vositalarga kiradi.

Himoyalovchi vositalar shartli ravishda uchga: ixotalovchi, to'suvchi va yordamchi vositalarga bo'linadi. Ixotalovchi vositalar asosiy va yordamchi vositalarga bo'linadi. Asosiy ixota vositalari uzoq vaqt elektr uskunalari ish kuchlanganligi bilan ishlashga imkon beradi (o'tkazgichlarga tegish mumkin). Bunga dielektr rezina perchatkalar, ixotasi bor asboblar, ixotalangan shtangalar, qisqichlar va b.q. kiradi. Qo'shimcha vositalar asosiy vositalar bilan birgalikda qo'llaniladi va asosiylari himoyasini kuchaytiradi, qo'shimcha vositalarning faqat bir o'zi odamni elektr toki bilan jarohatlanishdan saqlab qola olmaydi. Bularga 1000V gacha dielektrik kalishlar, gilamchalar, ixotali to'shamalar; 1000V dan yuqorida dielektr perchatka, kalishlar, gilamchalar kiradi.

To'siqli himoyalovchi vositalar vaqtincha tok o'tkazuvchi qismlarni to'sish uchun qo'llaniladi. Bunga himoyalovchi qalqonlar, ixotalangan qalpoqlar, ogoxlantiruvchi plakatlar, vaqtinchalik himoyalovchi yerga ulash kiradi. Yordamchi himoyalovchi vositalar ishlovchilarni yorug'lik, issiqlik va mexanik ta'sirlardan shaxsan himoyalash uchun kerak. Bunga himoyalovchi ko'zoynak, gazniqoblar, maxsus qo'lqoplar kiradi. Ularning sozligi xar bir qo'llanishdan oldin xamda davriy ravishda xar 6—12 oyda tekshirib turiladi.

Himoyalovchi vositalarga:

-ixotalovchi -izolyatsiyalovchi (dielektrik perchatkalar, kalishlar, botilar, gilamchalar, o'lchov va izolyatsiya qiluvchi shtangalar);

-ko'chma yerga ulashlar, himoyalovchi qobiqlar va ogohlantiruvchi ko'rgazmalar;

-kuchlanishning ko'chma ko'rsatkichi va tok o'lchagich qisqichlar;

-elektr yoyi, yonish mahsulotlari ta'siri va mexanik jarohatlanishlardan himoyalash vositalari (ko'zoynak, qo'lqop, gazniqob).

Ixotalovchi shtangalar, qisqichlar 2 yilda 1 marta davriy sinovdan, 1 yilda 1 marta davriy ko'rikdan o'tkaziladi. Tok o'lchovchi qisqichlar va kuchlanishni ko'rsatuvchilar 1 yilda 1 marta davriy sinovdan va 6 oyda 1 marta davriy ko'rikdan o'tkaziladi.

Kuchlanish ostida sozlash ishlarini bajarish himoya vositalari, dielektr rezina ko'lqoplar har 6 oyda 1 marta davriy sinovdan va ishlatishdan oldin ko'rikdan o'tkaziladi. Dielektr rezina botilar va qo'lqoplar har 3 yilda 1 marta davriy sinovdan va har 6 oyda davriy ko'rikdan o'tkaziladi. Dielektr kalishlar, qattiq to'shamalar har yili 1 marta davriy sinovdan har 6 oyda 1 marta davriy ko'rikdan utkaziladi.

Dielektr rezina gilamchalar har 2 yilda 1 marta davriy sinovdan va har yili 1 marta davriy kurikdan utkaziladi.

Paxta tozalash korxonalarida podstantsiyalardan xavfsiz foydalanish talablari hamda ularni texnik ko'rikdan o'tkazish

Elektr xavfsizligi jihatidan elektr uskunalari ikkiga: 1000 voltgacha va 1000 voltdan yuqori bo'lgan elektr uskunalarga bo'linadi. Transformatorlar (podstantsiyalar) elektr energiyasini qabul qilish, o'zgartirish va tarqatish uchun qo'llaniladi.

Transformatorlarni o'rnatish, ulardan foydalanish EEU (PUE)

-elektr uskunalarni o'rnatish qoidalari talablariga binoan bajarilishi shart.

Transformator o'rnatilgan joyda ogohlantiruvchi ko'rgazmalar yopishtiriladi, eshiklar qulf bilan yopiladi.

Barcha moy tuldiriladigan transformatorlar moy haroratini o'lchash uchun termometrlarga ega bulishi, bak ichidagi bosimni o'lchash uchun manovakuummetrlarga, bak ichidagi bosim 0,6 atm dan oshib ketganda ishlaydigan bosim relesiga ega bo'ladi. Transformatorlarda moy-suv sovutgichni ishlatganda, birinchi navbatda moy, so'ngra suv nasosi ishga tushiriladi.

Havoning nisbiy namligi va haroratning o'zgarishi zavod yo'riqnomasida ko'rsatilganidan oshib ketmasligi kerak.

Transformator kurilmalari yong'inga qarshi vositalar bilan ta'minlangan bo'lishi kerak.

Transformatorlarni quyidagi muddatlarda ko'rikdan o'tkazib turish kerak:

- doimiy navbatchilik qilinmaydiganlarini uskunalarni har sutkada 1 marta;
- doimiy navbatchilik qilinmaydiganlarini esa har oyda 1 marta, transformator punktlarini har 6 oyda 1 marta;

Navbatdan tashqari ko'riklar tashqi muhit harorati tez sur'atlarda o'zgarganda, gaz va differentsial ximoya natijasidagi har bir o'chirish sodir etilganda amalga oshiriladi.

Transformator ko'rikdan o'tkazilayotganda quyidagilar tekshirilishi kerak:

- termometr va manovakkuummetrlarning kursatkichlarini;
- transformator qobiqlari holati, moy tommasligi, moy borligi;
- moy bilan sovutish va moy yig'ish qurilmalari va izolyatorlarning holati;
- kabellar holati, kontakt bog'lanishlarning kuymaganligi;
- signalizatsiya vositalari va uzib qo'ygich saqlagichlarning sozligi;
- yerga ulash zanjirining holati;
- moy tozalagich qurilma, termosifon filtrlari va nam tortgich patronlari holati.

Joriy ta'mirlash ishlari markaziy ta'minlovchi podstantsiyalarda mahalliy yo'riqnomalarga binoan, 1 yilda 1 marta; kuchli ifloslanish bo'lishi mumkin bo'lgan joylarda, mahalliy yo'riqnomalarga asosan; barcha boshqa transformatorlar uchun, kerak bo'lganda, lekin kamida 3 yilda 1 marta.

3.5. Jinlash bo'limida elektrodvigatellarni xavfsiz ishlatish

Elektrodvigatellar ishlashining me'yoriy holatini ta'minlashda elektr zanjirining parametrlarini o'lchash asboblari qo'llaniladi (ampermetr, voltmetr, vattmetr, ommetr va sh.k).

Himoya apparatlari — elektr uskunalarini unda ro'y beradigan zararli va xavfli rejimlardan saqlash uchun qo'llaniladi. Elektr zanjirida uchraydigan qisqa tutashish, elektr dvigatellarining «o'ta zo'riqishi» va tarmoq, kuchlanishining nolga tushib qolishi kabi hodisalar zararli va xavfli rejimlardir. Bunday rejimlar sodir bo'lmasligi va o'z vaqtida bartaraf etilishini ta'minlaydigan himoya apparatlari sifatida eruvchan simli saqlagichlar, uzgich avtomatlar, tok va issiqlik relelari, blokirovkalash sxemalarini ko'rsatish mumkin.

Eruvchan saqlagichlar elektr dvigatelini qisqa tutashish oqibatida hosil bo'ladigan behad katta tok ta'siridan saqlab qoladi.

Elektr dvigatellarini qisqa tutashish va o'ta zo'riqish tokidan saklash uchun elektr magnitli tok relesi va issiqlik relesidan foydalaniladi. Bu maqsadlar uchun avtomatik himoyalash vositalari ham qo'llaniladi.

Kontaktor va magnitli ishga tushirgichlar kuchli tok zanjirlarini uzib ulash uchun qo'llaniladi. Texnologiya jarayonining ma'lum omillarini me'yorda ushlab turish uchun, me'yordan chiqib ketganda to'xtatib qolish uchun mexanik datchiklar (chegaraviy o'chirgich, mikroperklyuchatellar) qo'llaniladi.

Elektr uskunalarning yerga ulanishi kerak bo'lgan qismlariga quyidagilar kiradi:

- elektr mashinalari, transformatorlar, yoritgichlar, apparatlar va shu kabi qobiqlari;
- elektr apparatlarning yuritmalari;
- o'lchov transformatorlarining ikkilamchi chulg'amlari;
- taqsimot, boshqarish shitlari va boshqarish shkaflarining karkaslari;
- ko'chma elektr qabul qiluvchilarning metall qobiqlari;
- taqsimot uskunalari metal konstruktsiyalari, metall kabel konstruktsiyalar, kabel muftalar metal qobig'i tekshiruv, kuch kabellarining metall qobiqlari, sirtlari (bronyalari) va boshkalar.

3.6. Arrali jinlarda xavfsizlik texnikasi

Arrali silindr butun uzunligi bo'yicha pastki, orqa tomonidan (kolosniklar orqasidan) himoyalovchi panjara bilan to'silgan bo'lishi, kolosniklarning pastki qismi esa – ish kamerasi ko'tarilganda, avtomatik ravishda ochiluvchi himoyalovchi taroq bilan to'silishi kerak.

Kameraning ajraluvchi fartugi, yopiq xolatda ishonchli ravishda ushlab turuvchi, jinning elektr dvigateli bilan blokirovka qilingan maxsus yopqichi bo'lishi kerak.

Ish kamerasi ko'tarilgan holatda qattiq sharnirli tirsak bilan tutib turilishi kerak.

Kolosnikli panjaraning pastki qismi, chigitlarning o'tishini va kolosniklarning pastki qismini nazorat qilish imkonini beradigan, darchali, qopqoq bilan berkitilgan bo'ladi. Kolosnikli panjara, uni ko'tarish, yechib olish va ko'tarilgan xolatida mustahkam ushlab qolish imkonini beradigan moslamaga ega bo'lishi kerak.

Chigitni chiqaruvchi shnekning mashinadan chiqib turgan qismining ustida qopqoq bo'lishi, agar chiqindilar havo bilan so'rib olinsa, bu qopqoqning ustida teshikchalar qilingan bo'lishi kerak.

Kolosnikli panjara shunday o'rnatilishi kerakki, arralar ko'tarilgan xolatida kolosniklar yuzasidan chiqib turmasligi kerak. Kolosnikli panjarani faqat ish kamerasi ko'tarilgan xolatda tozalash kerak. Bunda kolosniklarning pastki qismini (fartuk osti) yog'och belkuraklar, yuqori qismini esa maxsus moslamalar bilan tozalash (ilgak, uch shoxli pichoq va h.k.) kerak.

Havo kamerasi chetlarini, ish kamerasining ko'tarilgan xolatida va arrali silindrni yog'och tayoqcha bilan to'xtatib tozalash kerak.

Elektr uskunalarni tok o'tkazuvchan qismlariga tegib ketishdan saqlash va ularni ixotalash

Elektr uskunalarni tok o'tkazuvchan qismlariga tegib ketishdan saqlash, tok utkazuvchan qismlarni tegmaydigan kilib joylashtirish, masofadan boshqarishni, blokirovka va ogohlantiruvchi xabarlash (signalizatsiya)

vositalarini qo'llash evaziga amalga oshiriladi. Bu ishlarni bajarishning iloji bo'lmagan hollarda elektr uskunalarning tok o'tkazuvchan qismlari ishonchli ravishda ixotalanadi va to'siladi.

Avariya va baxtsiz hodisalarning asosiy sababi ixotalarning mexanik shikastlanishidir. Undan tashqari vaqt o'tishi bilan ixotalash materiallari eskirishi natijasida o'z xususiyatlarini yo'qotadi. Ixotaning sifati va uning qarshiligi ham muhim o'rin tutadi.

Ikki saqlagich orasidagi qochma tok kuchi 1 mA gacha bo'lsa u xavfsiz hisoblaniladi. Bunga 120 V da ixotani qarshiligi (I.K.) 120 kom, 220 V da I.K. 220 kom va 380 V da I.K. 380 kom da erishiladi.

Elektr uskunalarning ishonchli ishlashi, odamlar xavfsizligini ta'minlash maqsadida, mashinalarni ixotasining qarshiligi o'lchanib, sinab turiladi.

Yangi montaj qilinganda, har bir ta'mirlashdan so'ng davriy ravishda, tashilgan va saqlanilgandan so'ng, xavfsizligi yuqori bo'lmagan binolardagi elektr uskunalari ixotalari – yiliga bir marta, xavfliligi yuqori bulgan binolarda - yiliga 2 marta sinab kuriladi.

Elektr toki bilan jarohatlanmaslik uchun bosh binoda mashinalarni 36 voltgacha kuchlanish bilan ishlatish ma'qul. Mashinalari va ko'chma chiroqlarni 12 volt kuchlanishda ishlaydigan har qanday xonada ham ishlatish xavfsiz bo'ladi.

III-bob bo'yicha xulosa

Mehnat muhofazasi qismida Elektr xavfsizligini ta'minlash, korxonalar ishlab chiqarish xonalariga elektr xavfsizligi bo'yicha qo'yiladigan talablar, paxta tozalash korxonalarida elektr xavfsizligini ta'minlashning texnik uslublari va vositalari, elektr himoya vositalarini sinash va ko'rikdan o'tkazish muddatlari kabi masalalar o'rganildi. Jinlash bo'limida elektrodvigatellarni xavfsiz ishlatish va arrali jinlarda xavfsizlik texnikasi bilan tanishildi.

IV-BOB. IQTISODIY QISM

Arrali jin ta`minlagichining yangi konstruksiyasini “To’raqo’rg’on paxta tozalash” hissadorlik jamiyatida joriy qilishdan faktik iqtisodiy samaraning hisobi

Yillik iqtisodiy samarani aniqlanishi arrali jin ish kamerasi va ta`minlagichining bazaviy va yangi konstruksiyasi bo’yicha xarajatlarni taqqoslashga asoslanadi.

Uslubiy ko’rsatmaning P.2.2. ga muvofiq, agarda yangi texnologik jarayonlarni ishlab chiqarish va mehnatni mexanizatsiyalash va avtomatlashtirishni qo’llanilishi mahsulot sifatini (sifini) oshishiga olib kelsa, yillik iqtisodiy samaraning hisobi qo’yidagi formula bo’yicha bajariladi:

$$\Theta = [(C_1 + E_n \cdot K_1) - (C_2 + E_n \cdot K_2)] \cdot A + (Cm_2 - Cm_1)$$

bu yerda: Θ – yillik iqtisodiy samara, ming so’m;

C_1 va C_2 – mahsulotni bazaviy va yangi texnika yordamida ishlab chiqarilganda o’zgaruvchan moddalar bo’yicha joriy xarajatlar, ming so’m;

E_n – kapital quilmalar samarasining normativ koeffitsienti, 0,15;

K_1 va K_2 – bazaviy va taklif qilinayotgan variantlar bo’yicha solishtirma kapital quilmalar, ming so’m;

A – mahsulotni natural birlikda yillik ishlab chiqarish hajmi;

Cm_1 va Cm_2 – bazaviy va joriy qilinayotgan texnika yordamida ishlab chiqarilgan mahsulot narxi, ming so’m.

Hisobni faqatgina xarajatlarning o’zgaruvchi moddalari bo’yicha olib boramiz.

Taklif qilinayotgan variantda arrali jinni ta`minlanishi avtomatik rostlash qurilmasini tayyorlashga xarajatlar 10000 ming so’mni va elektroenergiyaga xarajatlar bitta 5DP-130 arrali jinga 0,85 kVt soatiga tashkil qiladi.

Hisob uchun boshlang’ich ma`lumotlar jadvalda keltirilgan:

4.1-jadval

№	Ko'rsatkichlar nomi	O'lchov birligi	Variantlar	
			Bazaviy	Yangi
1	Zavoddagi jinlar soni	dona	3	3
2	Jin unumdorligi (o'rtacha)	kg/mash.-soat	1600	1600
3	Paxta zavodning ishlab chiqarish ish vaqti (3 smena, xaftasiga 40 soat, $\Phi BK = 0,85$)	soat	5352	5352
4	Talab koeffitsienti	-	0,7	0,7
5	Yillik tola chiqishi	tonna	11188	11188
6	1 kVt elektroenergiyaning narxi	so'm	227	227
7	Mashina massasi	kg	3396	3400
8	Jin iste'mol qilayotgan energiya: - bittasi - xammasi	kVt soat	79,4 238,2	80,25 240,75
9	Narxi - bittasi - xammasi	ming so'm	30130 93390	40130 123390
10	Arrali jinlashdan so'ng toladagi nuqson va iflos aralashmalar yig'indisi	%	2,2	1,9

Kapital xarajatlar hisobi

Bazaviy va yangi variantlardagi asosiy kapital xarajatlarda jihozning narxi (uchtasi) – 93390 va 123390 ming so'm hisobga olinadi.

Qo'shimcha kapital xarajatlarda jihozni transportirovkasi va montaji (jihoz narxidan 10%) hisobga olinadi, ya'ni 9339 va 12339 ming so'm.

Qo'shimcha kapital xarajatlarni hisobga olib yig'indi kapital xarajatlar ikkala variantda quyidagicha:

$$K_1 = 93390 + 9339 = 102729 \text{ ming so'm,}$$

$$K_2 = 123390 + 12339 = 135729 \text{ ming so'm.}$$

Ekspluatatsion xarajatlar hisobi

Hisob o'zgaruvchi moddalar bo'yicha olib boriladi va ajratmalar va joriy ta'mir kattaliklari hisobidan tashkil topgan.

Amortizatsion ajratmalar asosiy fond bo'yicha ajratmalar normasidan

kelib chiqib aniqlanadi va jihoz narxidan 15% ni tashkil qiladi. Joriy ta'mirga xarajatlar jihoz narxidan 5% miqdorida qabul qilindi.

Bazaviy variantda amortizatsiyaga xarajatlar quyidagini tashkil qiladi:
 $102729 \cdot 0,15 = 15409,3$ ming so'm;

joriy ta'mirga: $102729 \cdot 0,05 = 5136,45$ ming so'm.

Joriy qilinayotgan variantda amortizatsiyaga xarajatlar quyidagini tashkil qiladi: $135729 \cdot 0,15 = 20359,35$ ming so'm;

joriy ta'mirga: $135729 \cdot 0,05 = 6786,45$ ming so'm.

Iste'mol qilinayotgan elektroenergiya narxi

Elektroenergiya narxi quyidagi formuladan hisoblanadi:

$$W = P_y \cdot K_c \cdot T_o \cdot C_e$$

bu yerda: P_y – elektromotrlarning o'rnatilgan quvvati;

K_c – o'rnatilgan quvvatdan iste'mol quvvati ulushini ko'rsatuvchi talab koeffitsienti;

T_o – jihozni ishlash vaqti, soat:

C_e – 1 kVt elektroenergiyani narxi.

Bazaviy variantdagi ikki jinga iste'mol energiya narxi

$$W = 238,2 \cdot 0,7 \cdot 5352 \cdot 227 = 202573,09 \text{ ming so'm.}$$

Yangi variantda

$$W = 240,75 \cdot 0,7 \cdot 5352 \cdot 227 = 204741,70 \text{ ming so'm.}$$

4.2-jadvalda bazaviy va joriy qilinayotgan variantlardagi joriy xarajatlar keltirilgan.

Bazaviy va joriy qilinayotgan variantlardagi joriy xarajatlar

№	Xarajat nomi	Xarajat miqdori, ming so'm	
		Bazaviy variant	Yangi variant
1	Amortizatsiya chiqimlari	15409,35	20359,35
2	Joriy ta'mirga xarajatlar	5136,45	6786,45
3	Elektroenergiyaga xarajatlar	202573,09	204741,70
	Jami, $C_{1,2}$	223118,89	231887,50

Ishlanayotgan tola sifatini yaxshilashdan foydani aniqlash.

Bazaviy va joriy qilinayotgan variantlarda tolaning sotiladigan narxi undagi nuqsonlar va iflos aralashmalar miqdoriga bog'liq. O'zDSt 604:2001 ga muvofiq tola undagi nuqsonlar va iflos aralashmalar miqdoriga bog'liq xolda beshta sinfga bo'linadi. Sinflar orasidagi farq 0,5% dan 3,5% gacha tashkil qiladi.

Olingan ma'lumotlardan kelib chiqib jindan keyin toladagi nuqson va iflos aralashmalar miqdori 0,5% ga kamayadi. Asos uchun oddiy sinf birinchi tip birinchi sort tolani qabul qilamiz. Biz tomonimizdan qabul qilingan toladagi nuqson va iflos aralashmalar miqdorini 0,3% ga kamayishida va oddiy va o'rta sinf orasidagi farq 1,0% bo'lganda, joriy qilinayotgan variantda 50% tola o'z sinfini ko'taradi va uning o'rtacha qiymati 6781940 so'mdan

$$6781940 \cdot 0,5 + 6847150 \cdot 0,5 = 6814545 \text{ so'mga ortadi.}$$

Taxlil qilinayotgan paxta tozalash zavodi yiliga 5352 tonna tola ishlab chiqaradi. Uning bazaviy va joriy qilinayotgan variantdagi narxi quyidagini tashkil qiladi:

$$C_{m1} = 5352 \cdot 6781940 = 75401608,9 \text{ ming so'm,}$$

$$C_{m2} = 5352 \cdot 6814545 = 75764111,3 \text{ ming so'm.}$$

Olingan hisob ma'lumotlarini iqtisodiy samara hisob formulasiga quyib olamiz:

$$\begin{aligned} \mathcal{D} &= [(C_1 + E_n \cdot K_1) - (C_2 + E_n \cdot K_2) \cdot A] + (Cm_2 - Cm_1) = \\ &= [(223118,89 + 0,15 \cdot 102729) - (231887,50 + 0,15 \cdot 135729) \cdot 1] + \\ &+ (75764111,3 - 75401608,9) = 348783,8 \text{ ming so'm} \end{aligned}$$

Ya`ni, uch jinli batareyada arrali jin ta`minlashni rostlash tizimini joriy qilishdan yillik iqtisodiy samara 348783,8 ming so`mni, yoki bitta jinga yiliga 116261,3 ming so`mni, yoki chiqarilayotgan 1 tonna tolaga 31371 so`mni tashkil qiladi.

IV-bob bo'yicha xulosa

“To'raqo'rg'on paxta tozalash” h.j. da uch jinli batareyada arrali jin ta'minlashni rostdash tizimini joriy qilishdan yillik iqtisodiy samara 348783,8 ming so'mni, yoki bitta jinga yiliga 116261,3 ming so'mni, yoki chiqarilayotgan 1 tonna tolaga 31371 so'mni tashkil qiladi.

XULOSALAR

Paxta tolasini arrali jinlarda ajratish jarayonini o'rganib chiqdik;

PD ta'minlagichi, 4DP-130, 5DP-130 arrali jin mashinalari ishlash prinsipi, texnik xarakteristikasini o'rgandik;

Chet el arrali jin mashinalarini o'rganib chiqdik;

Tola ajratish jarayonida xom ashyo valigi zichligi va tezligining ahamiyatini o'rgandik.

Mehnat muhofazasi qismida Elektr xavfsizligini ta'minlash, korxonalar ishlab chiqarish xonalariga elektr xavfsizligi bo'yicha qo'yiladigan talablar, paxta tozalash korxonalarida elektr xavfsizligini ta'minlashning texnik uslublari va vositalari, elektr himoya vositalarini sinash va ko'rikdan o'tkazish muddatlari kabi masalalar o'rganildi.

Jinlash bo'limida elektrodvigatellarni xavfsiz ishlatish va arrali jinlarda xavfsizlik texnikasi bilan tanishildi.

Jin mashinasi ishchi kamerasini ta'minlash jarayonini takomillashtirish bo'yicha taklif berildi;

Arrali jin ta'minlagichini takomillashtirish bo'yicha taklif berildi;

Arrali jinni qo'l bilan va avtomatik boshqarishning tahlili o'tkazildi;

Yangi ta'minlash tizimini ishlab chiqarish sharoitida sinov natijalari keltirildi.

“To'raqo'rg'on paxta tozalash” h.j. da uch jinli batareyada arrali jin ta'minlashni rostdash tizimini joriy qilishdan yillik iqtisodiy samara 348783,8 ming so'mni, yoki bitta jinga yiliga 116261,3 ming so'mni, yoki chiqarilayotgan 1 tonna tolaga 31371 so'mni tashkil qiladi.

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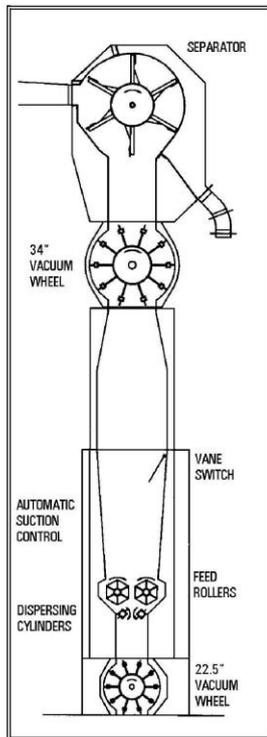
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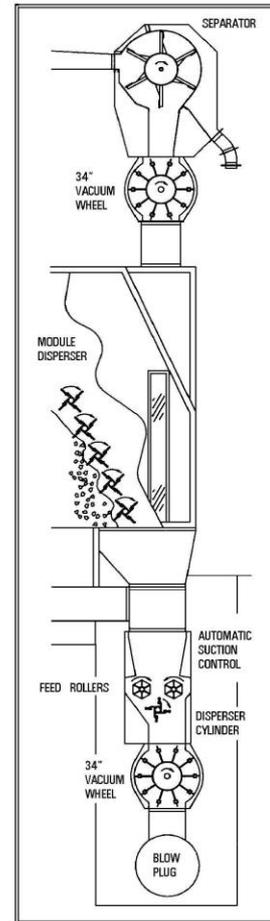
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Drying Systems: Rock Catchers, Burners & Tower Dryers

New High-Volume Tower Dryers

Lummus Tower Dryers are available in both the High-Volume configuration (27-inch shelf spacing) and the Standard (13.5-inch) spacing.

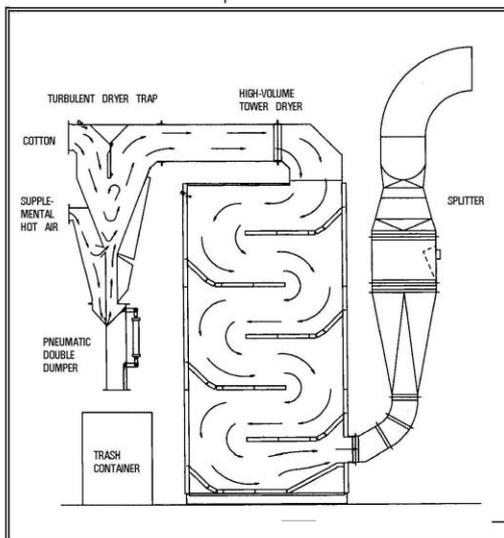
The 27-inch-high shelf spacing makes the Lummus High-Volume units the largest Tower Dryers in the industry for maximum heat transfer to the cotton, while maintaining acceptable mix point temperatures.

Lummus High-Volume Towers use the same basic side panels as our Standard Towers for simplified manufacturing and installation standards. They also use the same optional insulation system as the Standard Towers.

Lummus High-Volume Towers are designed primarily for use in pull-through drying systems, while Standard Towers can be configured for use in either push-pull or pull-through drying systems.

Turbulent Dryer Trap

High-Volume Tower Dryers can be equipped either with Lummus' exclusive Turbulent Dryer Trap (shown) or with a High-Capacity Rock Catcher to reduce foreign matter (rocks, green bolls, etc.). The Turbulent Dryer Trap enhances the drying process along with more precise trash separation through the induction of supplemental hot air into two points in the lower section of the trap. When furnished with a High-Capacity Rock Catcher on the inlet, the supplemental hot air is induced between the Rock Catcher and the High-Volume Tower Dryer inlet hood.



Gas Burners

Lummus Gas-Fired Burners are available in capacities from 0.2 million to 18 million Btu/hr for pull-through or push-pull applications.

- Use natural gas or propane
- Modulating temperature controls
- Convenient external air/fuel mixture control
- Convertible to butane or propane
- Turn-down ratios of up to 40:1 for more efficient operation

Oil-Fired Burners

Lummus Oil-Fired Burners are available in capacities from 0.5 million to

12 million Btu/hr for pull-through or push-pull applications.

- Integral combustion air fan
- Modulating temperature controls

Integrated System Design

Lummus Drying Systems are designed and sized for efficient drying and cleaning without wasted energy. Using one or two large heaters is much less expensive than many smaller heaters with the same total Btu output.

Burner control, as well as incoming and final moisture sensing, can be combined in the total gin plant control system.

All Lummus burners feature a Modulating High-Temperature Limit Control to prevent excessive temperatures at the air/cotton mix point



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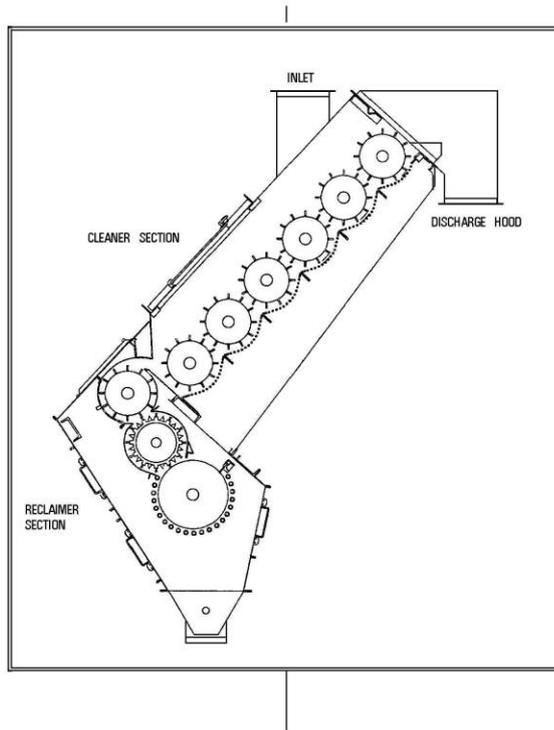
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TrashMaster™ Cleaner

First in Cleaning Efficiency

The TrashMaster™ removes whole trash to prevent it from being ground into hard-to-remove, nep-producing particles and pin trash. The TrashMaster™ removes sticks, burrs, stems, large leaf grass, and bark before it reaches the gin.

- Widely-spaced grid bars for separation of large trash
- All trash is fed through an efficient reclaimer, which plucks cotton locks from total trash, and trash is then removed by widely spaced grid bars
- Large, airtight doors provide access to all areas
- Rugged, dependable timing belt drives
- Three-piece side panels for ease of maintenance
- Available in 96-inch and 144-inch widths



Increase your profits with the TrashMaster's™ gentle, positive cleaning action.



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Model 700 II™ Feeder

Proven Design

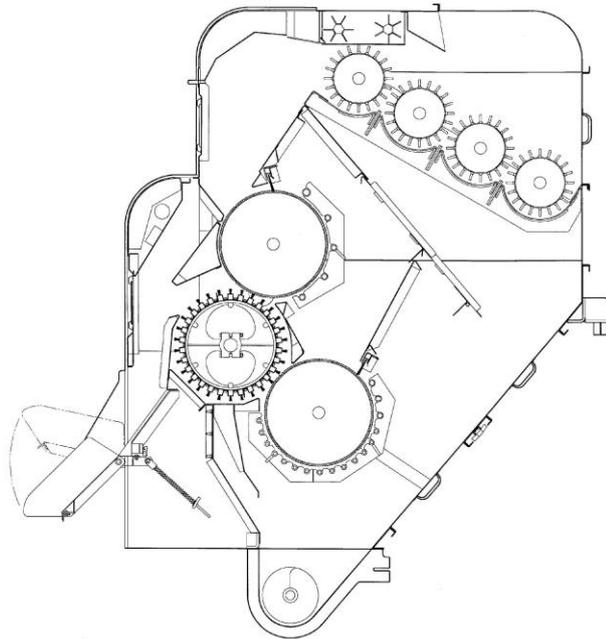
Often imitated, but never equaled, the Lummus Model 700 II Feeder design has proven itself throughout the cotton world since its introduction in 1962. Since then, no other feeder has been as popular.

A New Generation

In an ongoing program of product improvement, the Model 700 II Feeder became the first product in the Lummus cotton ginning machinery line to undergo a substantial refinement of its design to reduce cost, improve serviceability, and facilitate quicker fabrication. It becomes the initial offering in the Lummus Series 2000 product line.

Features

- Available in 96" wide and 66" wide models.
 - Can be installed over any model of gin stand – makes any gin stand run more effectively.
 - Variable-speed Feed Rollers maintain optimum feed of seed cotton over a wide range of ginning conditions.
 - Four (4) Spiked Cylinders over Screen Grids single-lock the seed cotton while removing fine trash – each Spiked Cylinder features twenty (20) rows of densely-placed spikes.
 - Heavy-duty Grid Bar Sections for upper Spiked Cylinder section of feeder are available as an upgrade.
 - Extractor and Reclaimer Saw Cylinders with Grid Rod Sections remove leaves and fine trash.
 - Both Saw Cylinders are positively doffed by a common Brush Cylinder.
 - Trash from the upper Spiked Cylinder Section of the feeder is blocked from the lower Extractor Section.
 - An optional Bypass Valve can be added to allow bypassing the lower Extractor Section.
 - Side Panels are constructed from 3/8" thick plate and allow for easy removal of all cylinders.
- Independent Idler Assemblies for Upper and Lower Sections.
 - Independent V-Drive from 20-HP motor (96" wide model) or 15-HP motor (66" wide model).
 - Optional Magnet for Feeder Apron is available.
 - Feeder ships as a single assembly.
 - Feeder also available configured for use as a Precleaner, allowing for stacked (double) feeders over each gin stand, or it can be mounted further upstream in the gin plant's precleaning system.



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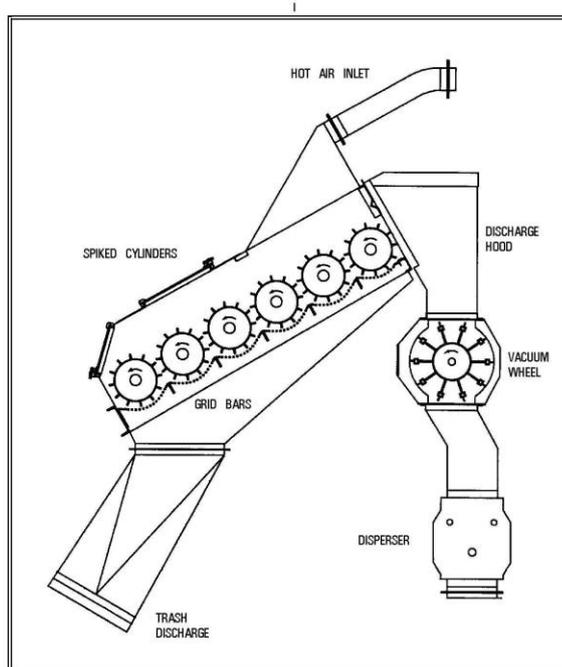
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Inclined Cleaners: Hot Air & Gravity

Precleaning for high-capacity gins

With the Lummus system, you eliminate unnecessary handling, preserving fiber quality, to produce better grades and higher turnout.

- Removes sand, dust, small sticks, and leaf trash
- Adjustable grid racks
- Easy-access doors
- Air-tight doors and dust seals around shafts
- Three-piece side panels on both sides for ease of maintenance
- Available in 96-inch and 144-inch widths
- Also available for use in gravity-fed applications



Cotton flows freely through the machine for increased capacity. Grid bars remove fine trash to prevent it from becoming embedded in the cotton. The Lummus Vacuum Wheel, with ten-flight design, gives 50% more sealing. Quick-change flashing in Vacuum Wheels is replaceable in minutes to minimize downtime.



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S&GH™ (Stripper & Ground Harvester) Machine

Cleans Efficiently

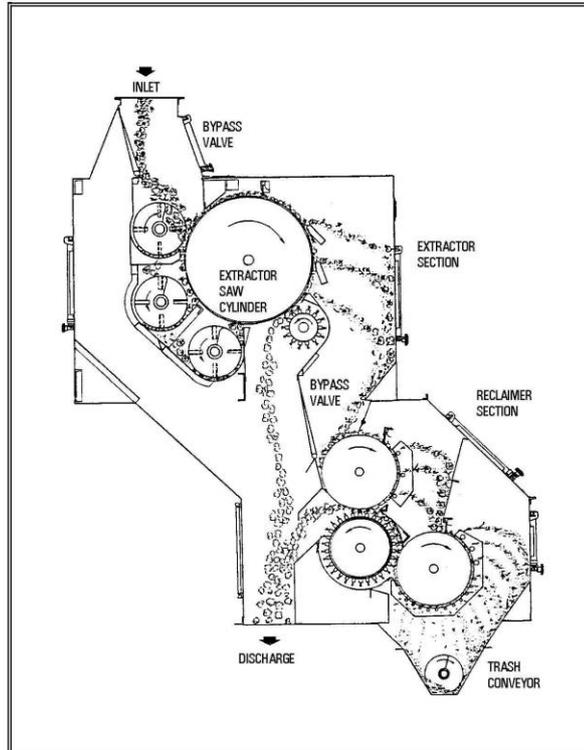
This three-cylinder, extractor-type seed cotton cleaner uses the Lummus patented "Sling-Off Principle" to separate large trash from good seed cotton.

Three 12-inch diameter lug conveyors apply seed cotton across the length of a 30-inch diameter extractor saw cylinder three times for effective cleaning of machine-stripped and ground-harvested cotton. The extractor cylinder separates cotton from heavy trash, roots, dirt clods, burrs, and stems.

Cleaner cotton is passed on to the next machine, bypassing the reclaimer.

The cotton with heavier trash content is "slung-off" and drops into the reclaimer section for further cleaning.

In the reclaimer section, two reclaimer saw cylinders recover the good cotton from the trash. A single brush cylinder doffs both saw cylinders.



Features

- Available in 96-inch and 144-inch widths
- Two built-in bypasses for use when reclaimer section is not needed
- Large access doors for easy inspection and maintenance
- Easy adjustment of stripper bars, applicator brushes, and grid rods
- Dynamically balanced saw cylinder reduces upkeep and maintenance
- Heat-treated saws provide longer wear
- Channel saws with self-tapping screws permit easy replacement of worn or damaged saw segments
- Standard accessories, such as platforms, panel-type safety guards, guard rails, ladders; deluxe guards are available also for an additional cost



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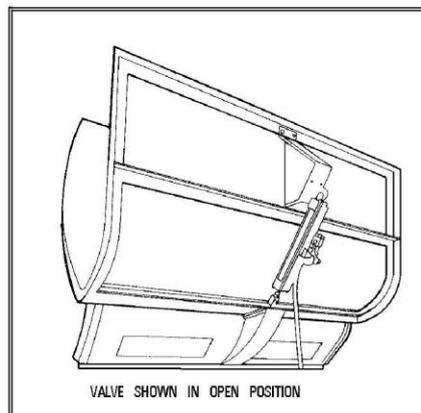
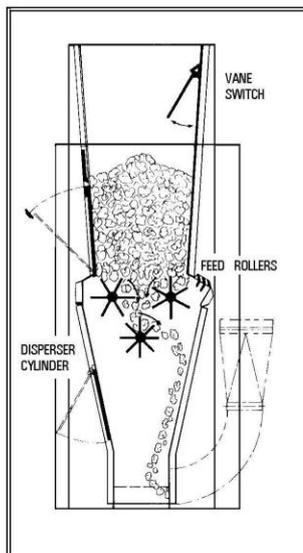
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Conveyor Distributor/Automatic Overflow

Automatic Overflow Hopper

- Receives and holds excess cotton from conveyor distributor
- Eliminates overflow pen, telescope, and operator
- Variable-height hopper fits almost any existing conveyor distributor
- Receives signal from gin stand to activate feed rollers automatically
- When hopper is full, contact vane cuts off incoming and activates feed rollers to feed gin through overflow separator
- Large storage area
- Large access doors
- Vertical observation windows
- Full-length drive guards
- Trench not required

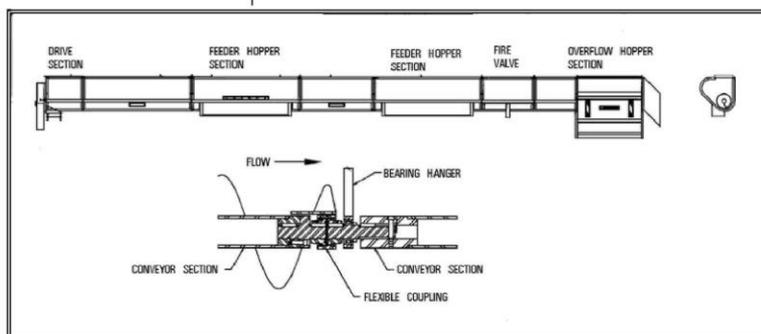


Fire Valve

- Fire valve dumps cotton before it reaches the overflow hopper
- Pneumatically-operated valve electronically controlled from gin console for quick response in an emergency

Conveyor Distributor

- Designed for performance, not ease of manufacture
- Larger trough cross section
- High capacity while reducing "roping"
- 16-inch diameter auger
- Auger supported by heavy-duty bearings and bearing struts
- Flexible couplings



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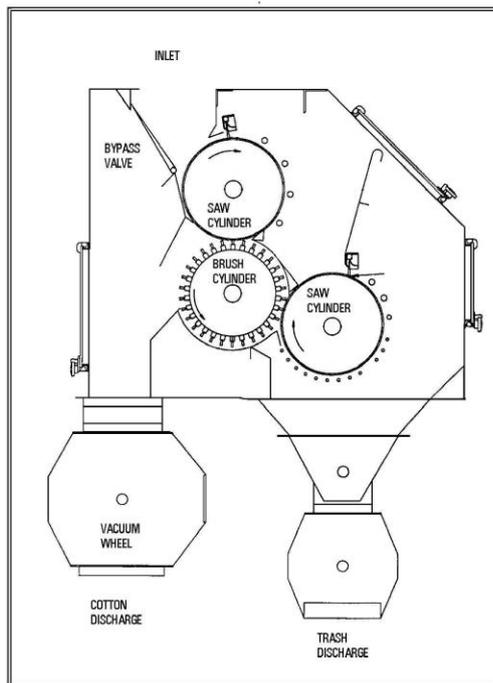
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“Little Giant”™ Stick Machine

Widely spaced grid bars gently remove trash, while the patented Lummus “Sling-Off” action uses centrifugal force to remove trash from cotton fibers.

- Available in 96-inch and 144-inch widths
- Precision engineered
- Rugged construction
- Heat-treated saws
- Heavy-duty bearings with dust seals
- Built-in bypass valve

Simplicity of design and increased efficiency mean cotton is subjected to less machinery, which preserves and improves grades.



Lummus pioneered the development of the stick machine and is still number one in sales throughout the world.



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Imperial III™ Saw Gins

The Industry Standard

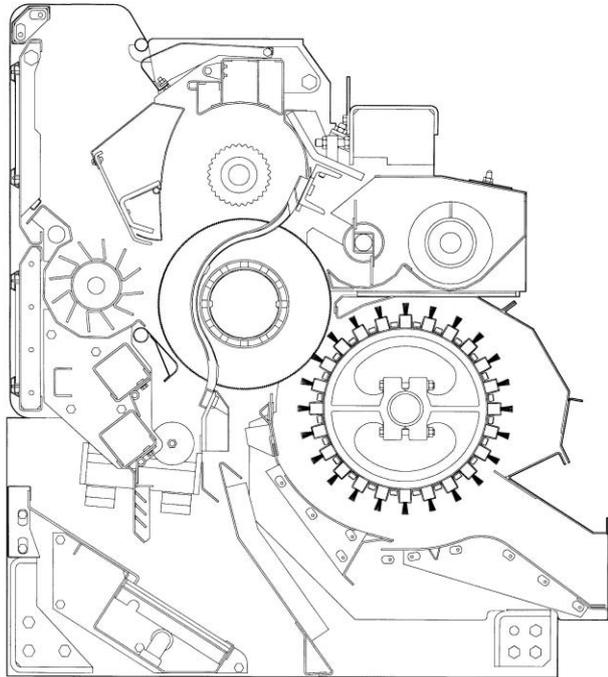
Lummus gins have consistently been the standard by which all others are measured. Drawing upon the expertise of a staff with more industry knowledge than any other manufacturer, Lummus has evolved its line of saw gins through the years, offering to the industry products unparalleled in performance and reliability – all while doing the utmost to preserve fiber quality.

The Best Gets Better

Like its matched companion, the Model 700 II Feeder, the Imperial III gins have undergone a substantial design refinement. No changes have been made to the fundamental operating settings and component arrangements, which are critical to its proven success. Rather, the Series 2000 Imperial III gin design takes advantage of updated fabrication methods and fewer raw materials. This, in turn, results in reduced cost and lead times, both of which are essential in today's price-competitive and delivery-conscious marketplace.

Features

- Available in 170-Saw (96" wide) and 116-Saw (66" wide) models.
- Uses 12" diameter gin saws – historically proven to cause less seed damage than larger diameter saws.
- Larger Gin Front to accommodate increased seed cotton flow.
- Seed Roll Box redesigned to optimize free turning of the seed roll.
- Agitator Roller redesigned for more traction in rotating the seed roll.
- Two stages of seed reclaiming – first, at the upper Seed Control Panel (in the roll box) and second, at the new Seed Reclaiming Panel (in the gin front). Both stages have single-lever adjustment.
- Sensitive Digital Gin and Feeder Controls provide quick and accurate response to variations in seed roll conditions.
- Independent V-Drive from 150-HP motor (170-Saw model) or 100-HP motor (116-Saw model).
- Upper Moting System provides effective trash removal without fiber damage.
- Safest gins on the market, with guarded cleanout slot, electrical control interlocks, and drive guards.
- Proven capacity and performance around the world in all types of upland cotton.
- The 170-Saw Gin fits into the same space as a 128 or 158-Saw Gin, and the 116-Saw Gin fits into the same space as an 88 or 108-Saw Gin.



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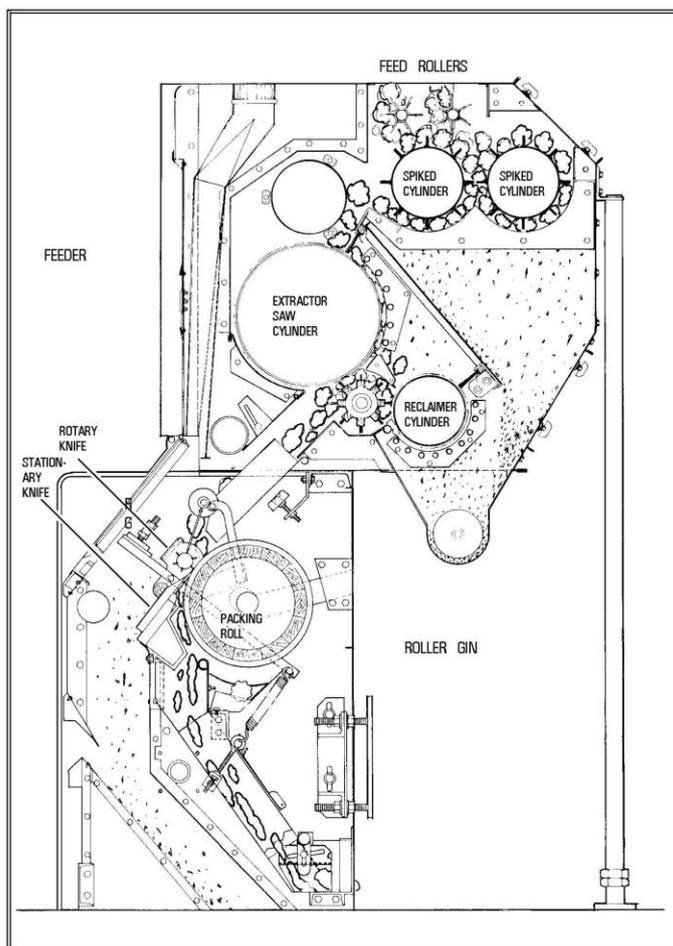
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Rota-Matic™ Roller Gin and Feeder

- **UNIFORM FEED**
- **EFFICIENT CLEANING**
- **FEEDER DUST CONTROL SYSTEM**

The Lummus Rota-Matic™ Roller Gin and Feeder is the world's leader, producing up to 1½ bales per hour of high-quality lint with increased turnout on extra long staple cottons, and up to ¼ bale per hour on upland cotton.

- Field tested around the world
- Lower operating and maintenance costs
- Advanced safety features
- Interlock door latches with time delays
- Audible warning
- Patented Feed Control Systems extend gin roll life
- Patented Lint Doffing System increases production, reduces gin roll wear, provides greater cooling action
- Patented Rotary Knife Assembly is retractable, preventing damage to knife and gin roll, while allowing easy cleaning
- Unique stationary knife design, eliminates seed or cotton buildup
- Easy adjustment to maintain uniform pressure



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Super-Jet® Air-Type Lint Cleaner

Textile Mill Endorsement

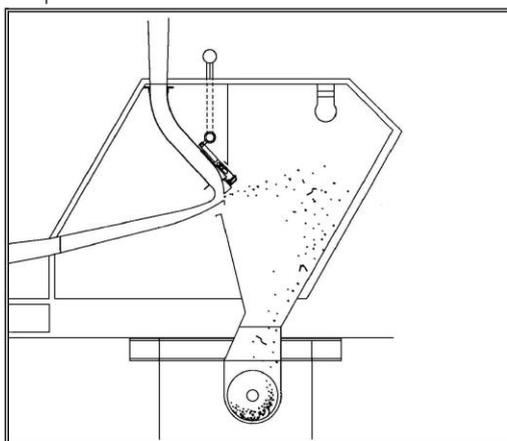
Textile mills use the Lummus Super-Jet® Cleaner because the machine does not damage fiber and has high cleaning efficiency.

Staple Length and Quality Improved

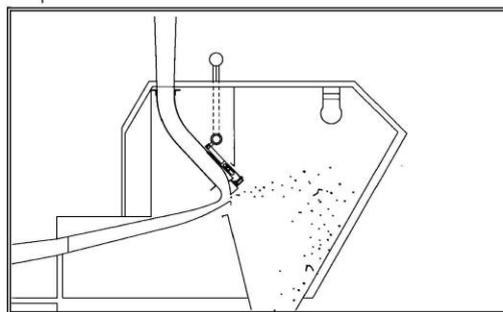
Immature fibers are removed before they become neps, and the Super-Jet® Cleaner reduces the percentage of trash, short fibers and pin trash in the bale.

- Unique design, no moving parts
- Removes sticks, motes, seed particles, leaf trash, bark, and spindle twists without breaking them into small particles
- Recommended to precede saw-type lint cleaners
- Used in majority of roller gins for lint cleaning
- No deterioration of fibers as capacity is increased
- One lever, easy operator control

A close-coupled model fits in the limited space available when adding Super-Jet® Cleaners to an existing gin plant.



Standard Super-Jet® Lint Cleaner



Close-coupled Super-Jet® Lint Cleaner for limited space



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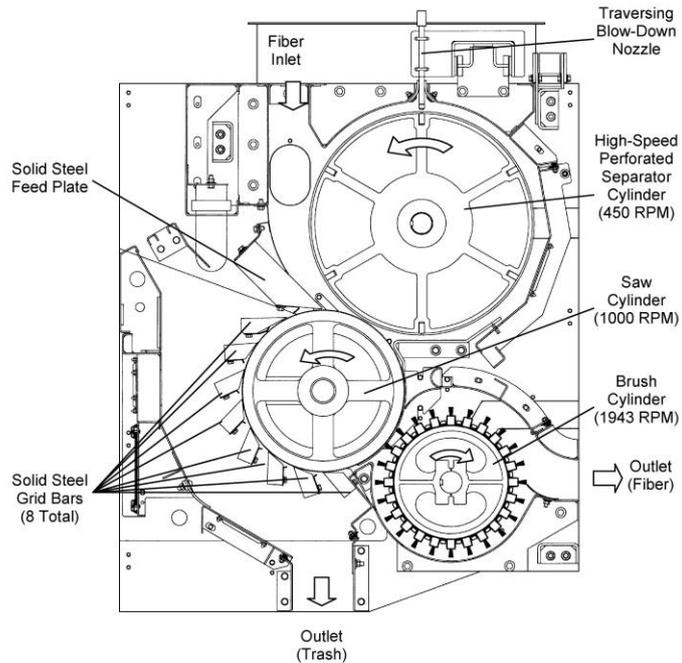
Sentinel™ Lint Cleaner

The Lummus Sentinel™ Lint Cleaner is a saw-type lint cleaner that applies individual tufts of fiber directly to the saw through the use of a high-speed perforated air and dust separator cylinder, rather than agglomerating the lint into a batt on a low-speed revolving condenser drum. By using this method, the conveying air and dust are more effectively removed than in conventional saw-type lint cleaners, where the batt tends to act as a filter, trapping dust before it can be exhausted with the conveying air. Also, trash particles are never compressed into the fiber, due to the absence of the traditional lint cleaner feed works. The reduction in mechanical parts, through the elimination of the condenser and its drive assembly, along with the simplified feeding concept, have yielded a more forgiving design for operation over a wider range of ginning speeds. The Sentinel™ design incorporates numerous maintenance-friendly features and improvements without compromising safety. Field performance and evaluation over four years of operation have demonstrated encouraging results in both fiber quality and throughput capacity. The Sentinel™ Lint Cleaner is available in 86" and 108" widths.



SENTINEL™ FEATURES:

- Eight (8) grid bars for better cleaning and less fiber loss.
- Removable grid bar section with rigid frame – allows for removal of the saw cylinder through the front of the machine without disturbing grid bar settings.
- No feed works for simplified maintenance and operation (due to the elimination of the requirement to alter feed works speed based upon fluctuations in ginning rate).
- High-speed Separator Cylinder for improved dust and fine trash removal.
- Stop-Motion Sensors with indicator lights on door interlocks for personnel safety.
- Saw and Brush Cylinders are the same as those used in Lummus' Model 86 and 108 Lint Cleaners.
- Heavy-duty steel Feed Plate, Grid Bars and End Heads.
- Only three (3) cylinders in the entire machine – the same size pillow block bearing is used for all three shafts.
- Only one motor per lint cleaner (30-HP for 86" wide model and 40-HP for 108" wide model) – no variable-speed condenser drive motors.



Cross-section of Sentinel™ Lint Cleaner



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Model 86 & 108 Saw-Type Lint Cleaners

The Model 86 & 108 Lint Cleaners provide greater performance than competitive models.

Easy Access

- Doors fitted with electrical and mechanical interlocks
- State-of-the-art safety devices
- Large guard doors allow access to the drives for routine maintenance

Versatility

Lummus Lint Cleaners allow a variety of arrangements: singly, in tandem, battery, with or without Super-Jet® Cleaners. The patented Lummus Five-Way Option Valve allows a choice of five different modes of operation

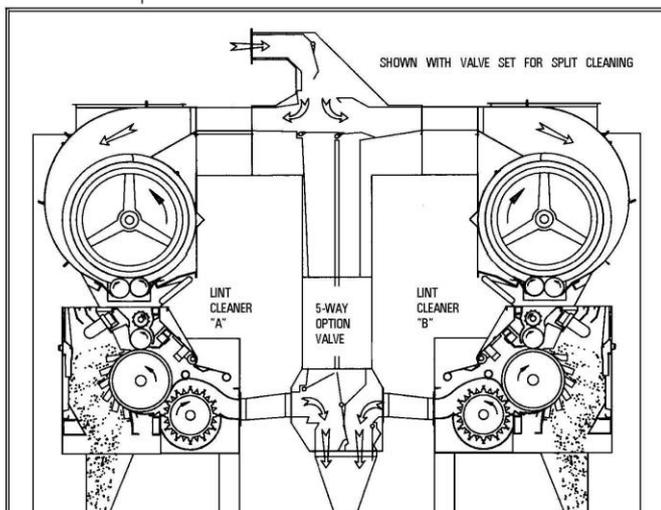
Solid Steel Key Parts for Precision Lint Cleaning

- Cotton enters the condenser through self-cleaning inlet, using full screen area for dust and fine trash removal
- Precision doffing rollers deliver a uniform batt to the feedworks
- Massive solid steel feed roller and feed plate firmly hold and present the cotton to the saw cylinder for smooth combing action
- Dynamically balanced saw and brush cylinders have heavy-duty pillow block bearings for stability and long trouble-free operation
- Massive steel grid bars remove trash without deflecting. Air wash keeps trash away from clean cotton
- Positive brush doffing

Optional

Monorail System allows easy removal of brush and saw cylinders.

With variable feedworks, Lummus Lint Cleaners automatically adjust their combing ratios to match the ginning rate, resulting in far greater productivity than fixed-rate lint cleaner feedworks, which fail to adjust to ginning fluctuations, resulting in lower cleaning efficiency and greater fiber loss. The Lummus Modulating Feed Control maintains the correct combing ratio by electronically regulating the speed of the lint cleaner feedworks.



Tandem Lint Cleaners with Five-Way Option Valve, showing Split Cleaning Option



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Guardian™ Lint Cleaner

The Guardian™ Long-Staple Lint Cleaner combines the cleaning principles most favored by the textile industry as best preserving the quality of the fiber.

- Cleans, combs, and blends the fiber
- Produces clean, smooth lint with the least harm to the delicate cotton fiber
- Combines efficient combing with gentle air cleaning

Condenser

The lint cleaner is normally fed by a rotary drum condenser, which separates the conveying air from the lint. The batt of cotton produced by the condenser is doffed down into the feedworks by two doffing rollers.

Feedworks

The auxiliary roller in the feedworks guides the batt down between the fluted main feed roller and the feed plate. The cotton feeds through the narrow gap between the feed roller and the feed plate, then it reverses direction around the toe of the feed plate to the cylinder.

Beater Cylinder

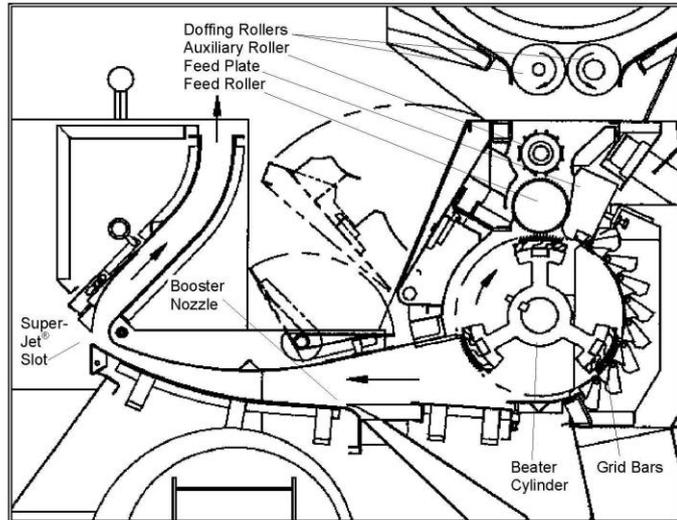
The beater cylinder has three pairs of wooden lags with sharp, angled pins, which comb and clean the cotton. The individual fibers are released by the feed roller at different times, creating the combing action which opens and blends the fiber. Entangled trash is released.

Grid Bars

Fiber is carried by the cylinder over a series of eight adjustable grid bars, and a wash of air from a trash fan removes the trash without recontaminating the cotton.

Super-Jet® Section

As air carries the cotton into the Super-Jet® section of the cleaner, a booster fan accelerates the lint, which is forced around a sharp turn past an adjustable slot on the outside of the turn. The denser sand and pin trash are forced out through the slot by their own momentum as the lint is carried past. The lint is then discharged to another cleaner or a battery condenser.

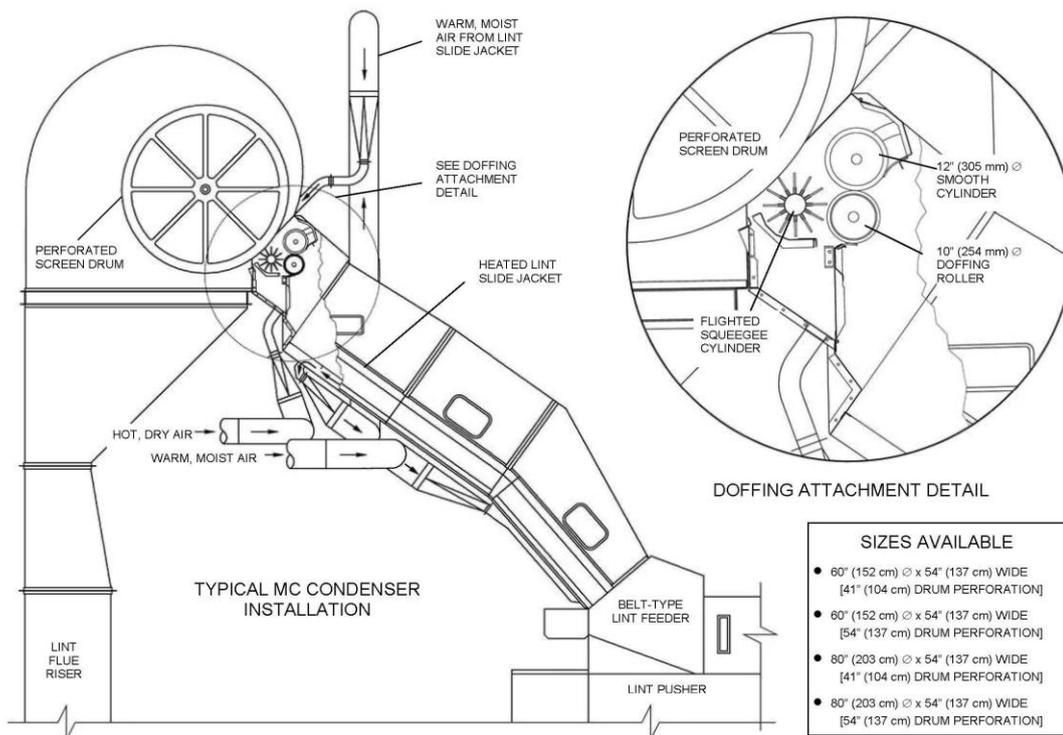


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Moisture Conditioning (MC™) Condenser



The Lummus Moisture Conditioning (MC) Battery Condenser provides for lint moisture restoration within the condenser itself. Warm, moist air is induced in the lower part of a sheet metal jacket that surrounds the bottom and lower sides of the lint slide. This air migrates to the upper portion of the lint slide jacket where it is then routed to the moist air inlet of the condenser. It is injected into the batt just prior to the doffing assembly and pulled completely through the batt by the condenser exhaust fan, which ensures thorough infusion of moist air into the fiber. Hot, dry air is continuously applied to the doffing assembly and condenser drum to prevent condensation.

Upon entering the doffing attachment, the batt is lightly compressed against the perforated condenser drum by a 12" (305 mm) diameter smooth cylinder, then doffed from the drum by a flighted squeegee cylinder.

Final compression takes place when the batt passes between the smooth cylinder and a 10" (254 mm) diameter doffing roller. The level of batt compression is controlled through the adjustment of air cylinders attached to either end of the smooth cylinder, which hold it against the doffing roller. This final compression evenly distributes the moisture, while substantially reducing batt thickness.

Use of the MC Condenser results in more positive lint charges into the trumper, and it can often allow for trumper speed to be reduced without compromising press capacity. Also, the reduction in batt volume can provide for vastly increased throughput for a given lint slide length. Finally, effective moisture restoration in the lint can significantly reduce trumper wear and lower final bale compression hydraulic pressures, thus saving the operator money through lowered energy consumption and less maintenance.



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Lift-Box Dor-Les® Universal Density Press

The Lummus Lift-Box Dor-Les® Press is a down-packing, universal density press, which combines economy with higher capacity.

Using technology pioneered by Lummus, the box is lifted off the bale and held out of the way by a pair of 5-inch hydraulic cylinders during final compression and bale tying.

Final compression by the 14-inch double-acting ram takes place without friction created by side walls, resulting in uniform density throughout the bale.

Each Dor-Les® box is a single solid weldment. The elimination of doors, door latches, and hinges means fewer parts to maintain and re-place.

The down-packing design eliminates the need for a press pit, reducing installation costs/problems.

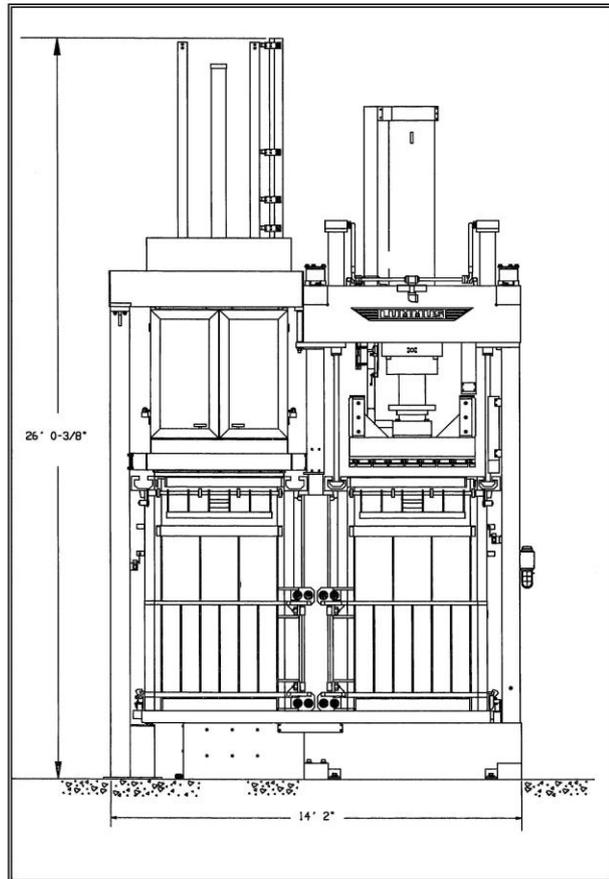
- Free-standing control console
- Fast, reliable 3-hp AC power turning
- Specially designed bale dolly
- Pneumatic bale eject system

High-Capacity (45+ Bales/Hour) Model

- One H-152-HCLB Combination Pumping Unit with an integral Filtration Loop powers all hydraulic components
- Super Hi-Capacity Lint Feeder, Hydraulic Lint Pusher and Hydraulic Trampler are standard
- Service Platform with Ladder is standard

Medium Capacity (25-35+ Bales/Hour) Model

- Super Hi-Capacity Lint Feeder and Hydraulic Trampler are standard
- Trampler powered by H-73-LBT hydraulic pumping unit with 50-hp motor
- A single H-120-B hydraulic pumping unit with 50-hp motor controls all press functions at capacities up to 25 bales/hour
- An additional H-120-B unit provides capacity in excess of 35 bales/hour, while allowing the press to operate on either H-120-B unit at 25 bales/hour
- An optional volume booster pumping unit provides for faster ram travel speed without controlling other press functions
- Service Platform with Ladder is optional



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Premier Dor-Les[®] Universal Density Press

An Integrated Solution To High-Capacity Baling

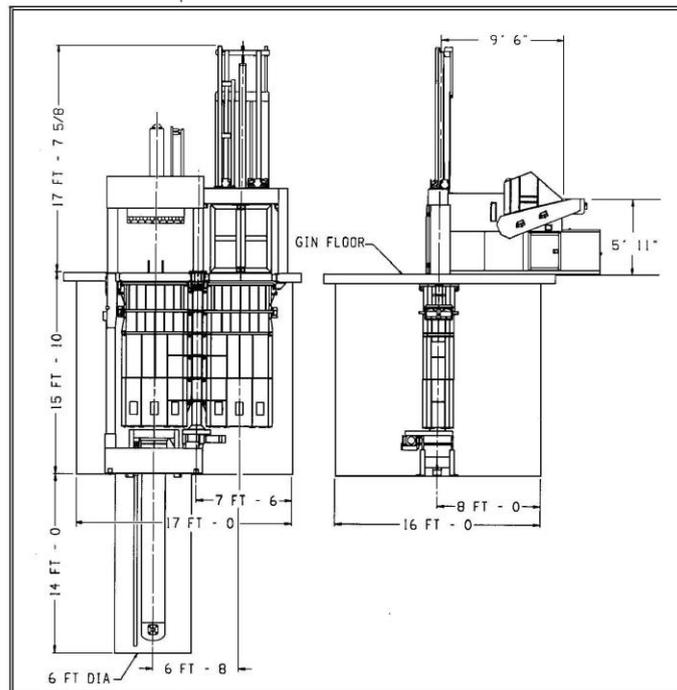
- A single pumping unit powers the pusher, trampler, and press
- With the standard power unit, hydraulic pusher & trampler, and manual tying, the Premier™ produces 30-40 bales per hour
- Add a Kwik-Ty™ semi-automatic wire tying unit for 40-45 bales per hour
- Add an auxiliary pump/motor section to the power unit and belt feeder to the pusher for 45-60 bales per hour

Press:

- Lower compression 18-inch lower ram
- Upper 10-inch double-acting cylinder
- Press boxes without dogs for 20"x54" universal density (U.D.) bale size
- End column with two 4-1/4-inch strain rods
- Center column with one 6-inch strain rod
- Pneumatic press latch
- Fast power turning with 5-hp AC inverter drive
- Manual or automatic wire tying or strapping
- Fixed or variable shut height

Hydraulic Pusher:

- Safety switch on access door.
- Trunnion-mounted cylinder with 2-1/2-inch piston head and 54-inch stroke.
- Guide rollers with high-quality roller bearings and grease fittings
- Steel housing with 1/4-inch-thick panels and perforated metal vents
- Designed for use with or without a belt feeder



Hydraulic Trampler:

- Cylinder with 4-inch piston head and 115-inch stroke
- Guide tube rollers with high-quality roller bearings and grease fittings.
- Safety switches on charging box doors

Hydraulic Power Unit:

- Single H-458-PDL hydraulic power unit for press, trampler, and pusher
- Modular design with skid-mounted pumps and motors
- All pumps have flooded suction
- Reliable design with filtration and oil cooler
- Optional H-164-BPS booster pump skid available for increased capacity



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