Nov. 22, 1938. W. L. STEINHAUER 2,137,512

COTTON CONVEYING, CLEANING, FEEDING, AND DRYING APPARATUS

Filed Dec. 9, 1935 2 Sheets-Sheet 1

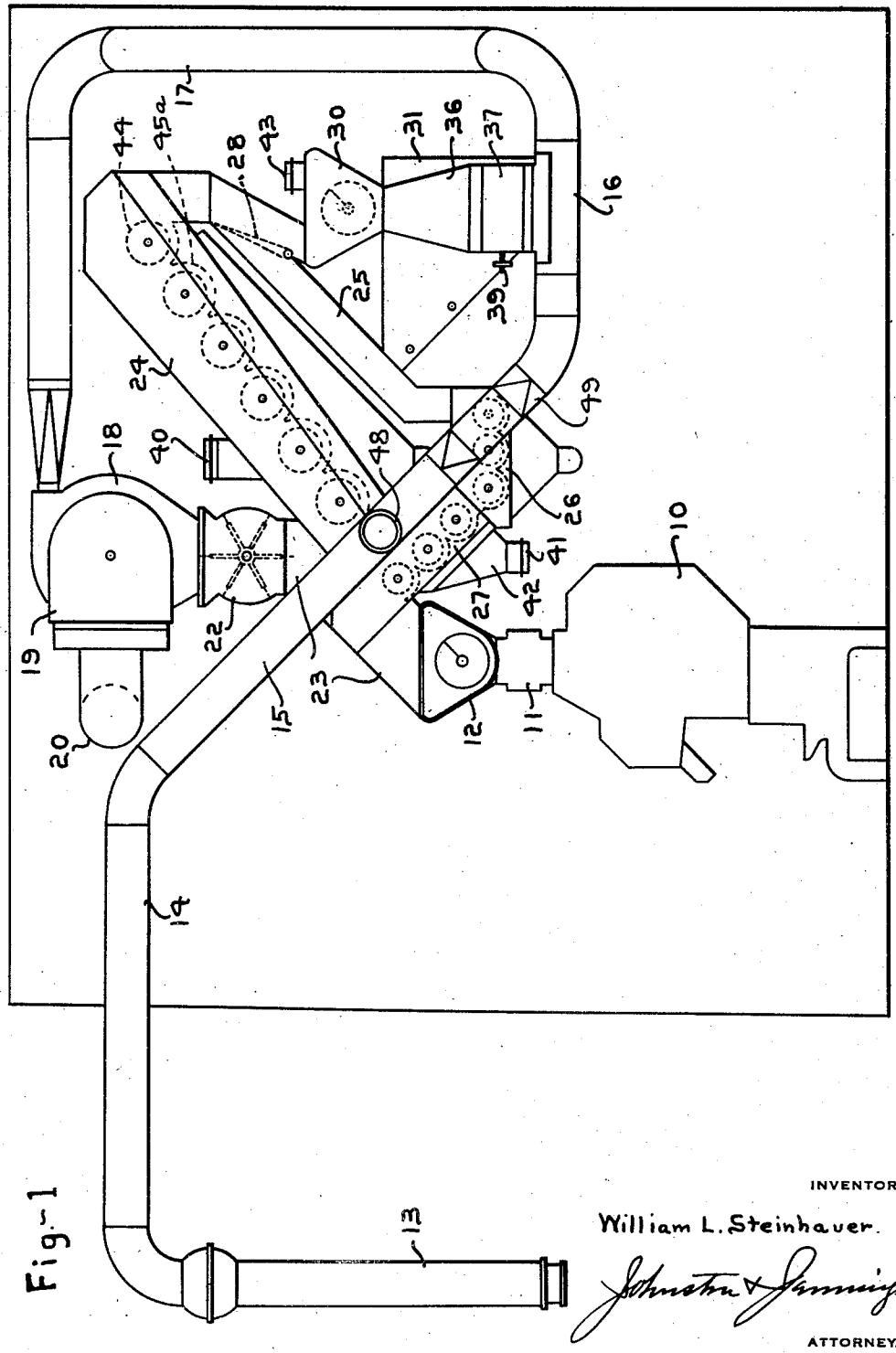


Fig. 1

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Fig. 2

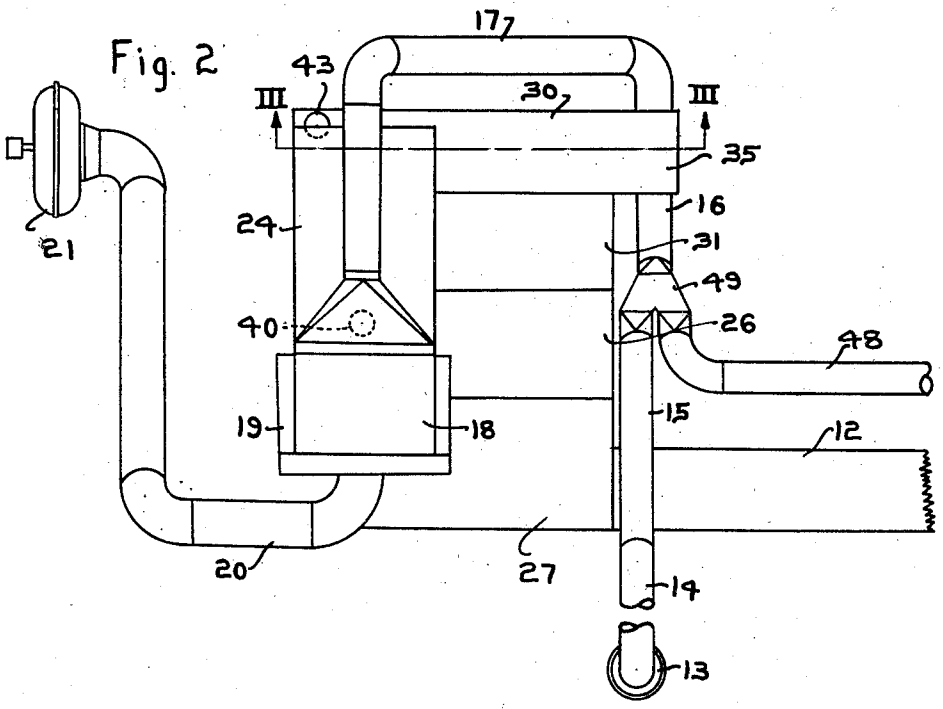


Fig. 3

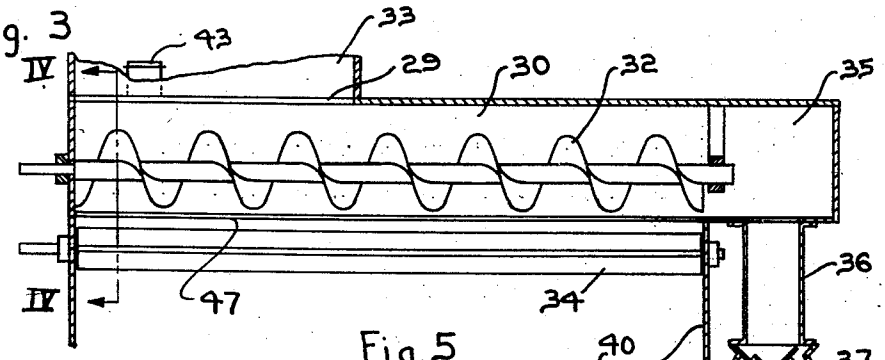


Fig. 4

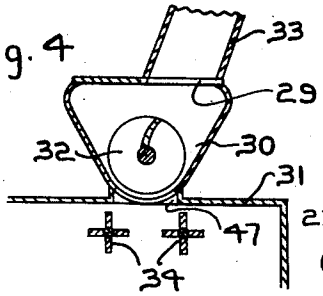
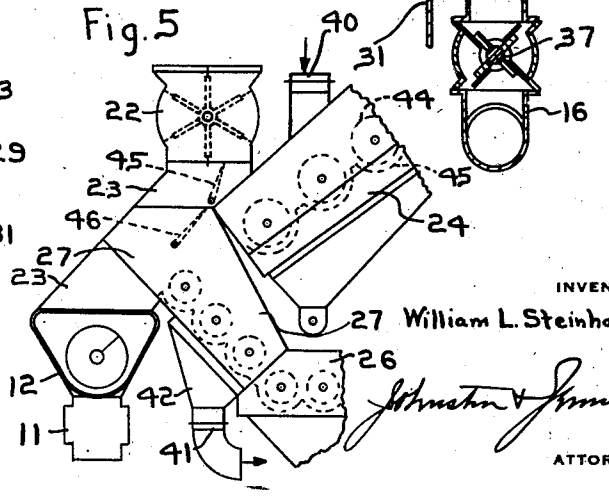


Fig. 5



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2,137,512

COTTON CONVEYING, CLEANING, FEEDING, AND DRYING APPARATUS

William L. Steinhauer, Birmingham, Ala., assignor to Continental Gin Company, a corporation of Delaware

Application December 9, 1935, Serial No. 53,493

8 Claims. (Cl. 19—67)

My invention relates to mechanism for the handling and treatment of seed cotton and is concerned with improved means for the automatic return of overflow cotton via the pneumatic conveying system and with novel methods for the utilization of hot air to dry the seed cotton delivered to the gin distributor.

Preliminary cleaners or extractors have been provided with a distributor and feeder adapted to feed the cotton thereto in a stream which is substantially uniform across the extractor so that it can flow therethrough in a continuous bat of substantially uniform thickness and thus be in the most desirable form for cleaning and hull extracting treatment. Inasmuch, however, as the rate of feed of the cotton to the extractor from the wagon will not be uniform, it has been necessary to provide some means to equalize this irregular feed and it has been proposed to do this by varying the rate of feed to the distributor or from the distributor to the extractor automatically responsive to the volume of the supply from the wagon. Often the supply of cotton to the distributor is in excess of its capacity to handle in the manner above described so that it is desirable to provide an overflow for such excess cotton from the extractor distributor.

One object of this invention is to handle such an overflow in a novel manner and to this end it is proposed to deliver it directly into the suction feed line of the pneumatic elevator by means of an air seal dropper, whereby such overflow cotton is not only returned automatically in circuit to the extractor distributor, but in being thus injected into the suction feed line it acts to check the suction and slow up the feed of cotton from the wagon thereby counteracting the tendency to excessive feeding which is overloading the extractor machinery.

While such an automatic method of overflow return in a closed circuit is more suitable for distributors supplying treatment machines other than gins, due to the fire hazard with the latter, I nevertheless consider it available for the efficient and economic handling of overflow cotton wherever same may occur during its movement to the gins.

It is often desirable to dry cotton that comes wet or very damp to the gin, because it can be better cleaned and ginned when dry and produces a higher grade of lint cotton in the bale. It is well understood that a hot air current passed through or into contact with the cotton stream en route to the gins is an effective drying medium, particularly so when caused to contact the cotton while under treatment which agitates and opens it.

One phase of my present invention relates to improvements in drying methods, particularly as applied to cleaning and extracting mechanism of the type wherein the stream of seed cotton can enter a direct pass to the gin distributor, when no cleaning or drying is needed, or be diverted indirectly thereto either through a cleaning pass or a cleaning and extracting pass. I propose to introduce a drying current of air into the cleaning pass and a second drying current into the extracting pass, the two currents being preferably withdrawn in separate circuits in multiple rather than in series circuit through the cleaner and extractor. This allows the extent of the hot air treatment to be varied according to the needs of the cotton and permits it to be carried out in the pass through the cleaning or extracting mechanism or both that will serve to open up and fluff the cotton to facilitate its becoming dried even when not otherwise needed for the purpose of cleaning the cotton.

Where the heat treatment is applied to the cotton in the extracting pass it is desirable to introduce the air ahead of the extracting mechanism, preferably into its distributor, and under such circumstances the overflow cotton from such distributor will be more or less heated and dried. By putting this hot dry overflow cotton directly into the suction feed line it does not have opportunity to reabsorb moisture.

My invention further comprises the novel details of construction and arrangements of parts, which, in their preferred embodiments only, are illustrated in the accompanying drawings, and in which:—

Fig. 1 is a view in end elevation of a selectively controlled preliminary cleaner and extractor mechanism having a suction feed line into which overflow cotton from the extractor distributor is introduced and recirculated.

Fig. 2 is a plan view of Fig. 1, the gin distributor, and the suction feed lines to the wagon telescope and gin distributor overflow, being broken away.

Fig. 3 is an enlarged sectional view taken on the line III—III of Fig. 2.

Fig. 4 is a detail fragmental view taken on the line IV—IV of Fig. 3.

Fig. 5 is a detail fragmental view showing the valves in the intake hopper for deflecting the cotton to the desired cleaning pass or directly to the gin distributor.

Similar reference numerals refer to similar parts throughout the drawings.

In the embodiment of my invention illustrated, I show a battery of gin units 10 to which cotton is fed through hoppers 11 from a screw conveyor distributor 12, such as is shown in the patent to Beaty No. 1,792,566. Seed cotton is withdrawn from the wagons or other source of supply by suction through the wagon telescope 13 and delivered to the suction feed line 14, which comprises a downturned section 15 so as to bring it to a level to enter the overflow intake connection 16 whence the suction line continues as pipe 17 to separator 18, which may be of any standard construction. The current of air induced through the suction line is taken off through the end fittings 19 of the separator and discharged through the pipe line 20 by a suction fan 21. The cotton, thus separated from the air, is delivered by means of an air seal dropper 22 into the intake hopper 23, wherein diversion valves 45 and 46 are provided and so arranged that the cotton can be shunted (1) directly into the gin distributor 12, which constitutes its direct pass to the gins, or indirectly (2) into a pass termed the long cleaning pass, which directs it through the cleaner 24 and returns it therefrom through a chute 25, coextensive in width with the cleaner, to suitable cleaning and elevating mechanism 26 and 27 into the distributor 12, or (3) into the short cleaning pass which directs it through the cleaners 26 and 27.

A third diversion valve 28, located at the intake end of the chute 25 can be set to return the cotton from the cleaner 24 through the chute 25 and cleaners 26 and 27 to distributor 12, or to deliver it through a chute 33 into the intake opening 29 at one end of the screw conveyor distributor casing 30, which is mounted upon the extractor casing 31. This distributor comprises as a suitable conveying means a screw 32 coextensive with the distributor portion of the casing and adapted to receive the cotton from the intake 29 and distribute it uniformly across the extractor casing so that it will pass through the feed opening 47 in a continuous bat of substantially uniform thickness to the feed rolls 34 for the extractor. I have not shown the mechanism in the extractor in detail as it may be widely varied.

When the supply of cotton to the distributor 30 is not excessive, there will be no overflow, but when the feed is excessive, provision must be made for an overflow beyond the extractor outlet 47 and to this end I extend the casing 30 beyond the extractor and in its overhung end 35 I provide a bottom outlet through which any overflow cotton may pass into a hopper 36 having substantial storage capacity. An air seal dropper 37 discharges cotton from hopper 36 into the overflow connection 16 of the suction feed line where it mingles with the cotton stream from the wagons and is returned therewith in circuit to the distributor 30. This air seal dropper is driven in any suitable manner, as by the pulley 39, and will feed the overflow cotton from the distributor 30 into the suction feed line while intercepting access of the vacuum in said line to the distributor 30. From the extractor 31 the treated cotton is returned by the cleaners 26 and 27 to the intake hopper 23 for the gin distributor 12.

It will be understood that the distributor and feeder elements 30, 32 and 34 are the equivalent of any feeder means for a cotton treating machine wherein provision is made for an overflow that can be conducted to an air seal dropper and discharged thereby into the suction feed line of the ginning plant.

Where it is desired to dry the cotton, I propose to introduce a stream of hot dry air from any suitable source through an inlet 40 into the upper portion of the cleaner 24 near its intake end, and the air thus introduced, after passing through the cotton under treatment, is drawn off at any suitable point as through the outlet 41 leading from the hopper 42 under the cleaner casing 27 through which the cleaned cotton leaves both cleaning passes and enters the gin distributor. To apply a heat treatment to the cotton in the extractor, I provide an inlet 43 which enters the distributor casing 30 at its intake end and delivers the dry hot air along with the cotton into the extractor, this heated air being also drawn off through the outlet 41 by reason of the fact that the cotton treated in the extractor also passes through the cleaner 27 on its way to the gin distributor. Thus an arrangement is provided in the cleaning pass for a heat treatment of the cotton while being cleaned and also for a second heat treatment of the cleaned cotton while traversing the extractor, if it be diverted through the extracting pass.

I have only formally and in dotted lines illustrated conventional cleaner elements comprising beaters 44 and a screen 45a in the cleaner 24. I have not sought to illustrate the mechanism in the extractor 31 as this may have any suitable arrangement of rotary boll breaking and cleaning elements to break the bolls and extract the boll particles together with any leaves and trash remaining in the cotton after its traverse of the cleaner 24, the details of such extracting mechanism forming no particular part of my present invention.

The initial diversion valves 45 and 46, illustrated in dotted lines in Fig. 5, may also be of any suitable character which will deliver the entering stream of cotton either directly to the distributor 12, to the intake end of the cleaner 24 for the long cleaning pass, or to the cleaners 27 and 26 for the short cleaning pass.

Where there is an overflow of cotton from the gin distributor, as is generally the case, the same is adapted to be returned to the suction feed line to the separator 18 by the pipe 48 which enters one side of a connection 49 in the suction feed line 15 ahead of the overflow connection 16. Both the feed lines 15 and 48 entering the connection 49 have valve control so that either can be placed under the suction.

In operation therefore, assuming that the cotton is dry and clean, suction is applied to withdraw it from the source of supply through the ducts 13 and the suction lines 14, 15, 16 and 17 to the separator 18, whence it is diverted directly by the valves 45 and 46 into the distributor 12 and delivered to the gins. If the cotton be dirty and need cleaning treatment, the valve 45 is set to divert the cotton through what I term the full cleaning pass, causing it to flow through cleaner 24 and return by chute 25 through cleaners 26 and 27 to the distributor. If less cleaning is required the valves 45 and 46 can be set to direct the cotton into the cleaner 27 and it will be carried over the rotary beaters through the cleaner 26 and returned under the beaters and over the screen (the beaters and screen being shown in dotted lines in Fig. 5) and returned to the feed hopper 23 for the gin distributor.

If the cotton be of a character to require treatment in the extractor 31, valve 45 is set to divert the cotton into the cleaner 24 and the valve 28 is set to deliver it into the extractor distributor 30 whence the extractor withdraws its normal supply and any overflow will be delivered through hopper 36 past the air seal dropper 37 into the suction feed line.

The flexibility of the drying treatment available in my present invention is clearly apparent from the following description of its operation. When only a small amount of drying is required for cotton that has to traverse the extracting pass, this drying can be started in the cleaner 24 by the hot air stream entering through the inlet duct 40 and flowing with the cotton stream through elements 24, 30, 31, 26, 27 to outlet 41; or the hot air stream can enter by the duct 43 and flow with the cotton stream through the elements 30, 31, 26 and 27 to the outlet 41. When such cotton is very wet, it may be subjected to both of said hot air streams. The outlet duct 41 is preferably connected to a suction main, see Fig. 5, to more effectively exhaust the warm moist air from the cotton before it enters the closed gin distributor 12.

When the cotton does not require treatment in the extractor but does require a considerable amount of cleaning, it is diverted through the long cleaning pass and a hot air stream entering through the inlet duct 40 will flow with the cotton through the elements 24, 25, 26 and 27, being exhausted at 41. If only very slight cleaning is required with some drying, the valves 45 and 46 may be set to direct the cotton into the cleaners 27, 26 and hot air can be drawn therethrough by way of cleaner 24 and chute 25, or may be directly supplied to the short cleaning pass if such be desired.

While I have shown my invention in but one form, it will be obvious to those skilled in the art that it is not so limited, but is susceptible of various changes and modifications, without departing from the spirit thereof, and I desire, therefore, that only such limitations shall be placed thereupon as are imposed by the prior art or as are specifically set forth in the appended claims.

What I claim is:—

1. In apparatus for handling cotton and like material, a preliminary cleaner mechanism having a feed means, a distributor for supplying material to said feed means, an overflow outlet for said distributor, a main suction feed line for supplying material to said distributor which passes adjacent said outlet, a conduit connecting the overflow with the suction feed line, and air seal means in said conduit to feed overflow material from said distributor directly into said main suction feed line.

2. In apparatus for handling cotton and like material, preliminary cleaning and extracting mechanisms and a gin distributor, means for the direct delivery of material to said distributor, means to shunt the material to the distributor by different passes through said mechanisms, hot air means to dry the material under treatment in each of said shunt passes, an extractor distributor interposed in the extracting pass, a suction feed line to supply material to said mechanisms, and means for the direct discharge of overflow material, as it originates in said extractor distributor, into said feed line.

3. In apparatus for handling cotton, a separator, a distributor for a battery of gins, a suction feed line for the main supply of cotton to said separator, a supplemental cleaning mechanism having a distributor, means to direct cotton through said cleaner distributor to the gin distributor, and an air seal dropper to feed overflow cotton from the cleaner distributor directly into said suction feed line and return it along with the main supply to said separator.

4. Cotton handling apparatus according to claim 3, in which the suction duct is deflected downwardly to pass under the air seal dropper and then upwardly to enter the separator.

5. In a cotton gin, cotton treating apparatus, a main suction feed line to supply cotton to the said apparatus, a distributor, a separator between the suction feed line and the distributor, an air seal dropper for the overflow from said distributor disposed above the main suction feed line, and a conduit connecting the dropper and the suction feed line.

6. In apparatus for handling cotton and like material, a separator, a distributor for delivering said material to treatment machinery, an overflow discharge for said distributor, a main suction feed line for the separator which passes under said discharge to receive the overflow material therefrom, a conduit connecting the overflow discharge and the main suction feed line, and an air seal dropper in said conduit.

7. In apparatus for handling cotton and like material, a preliminary cleaner mechanism having a feed means, a distributor for supplying material to said feed means, an overflow outlet for said distributor overhung beyond said mechanism, a main suction feed line for supplying material to said distributor which passes under said outlet, a conduit connecting the overflow outlet and the suction feed line, and an air seal means in said conduit to feed overflow material in a closed circuit from said distributor directly into said suction feed line.

8. In a cotton gin, a battery of gin stands, a suction feed line to supply cotton to said gin stands, a separator in said feed line, a distributor for the gin stands, a multiple pass cleaning and drying apparatus, means to divert cotton directly from the separator to the distributor for the gin stands, means to divert cotton from the separator selectively to the cleaning and drying passes, an extractor, a distributor for the extractor, an overflow conduit from the latter distributor to the suction feed line, and an air seal dropper for the overflow in said conduit.

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