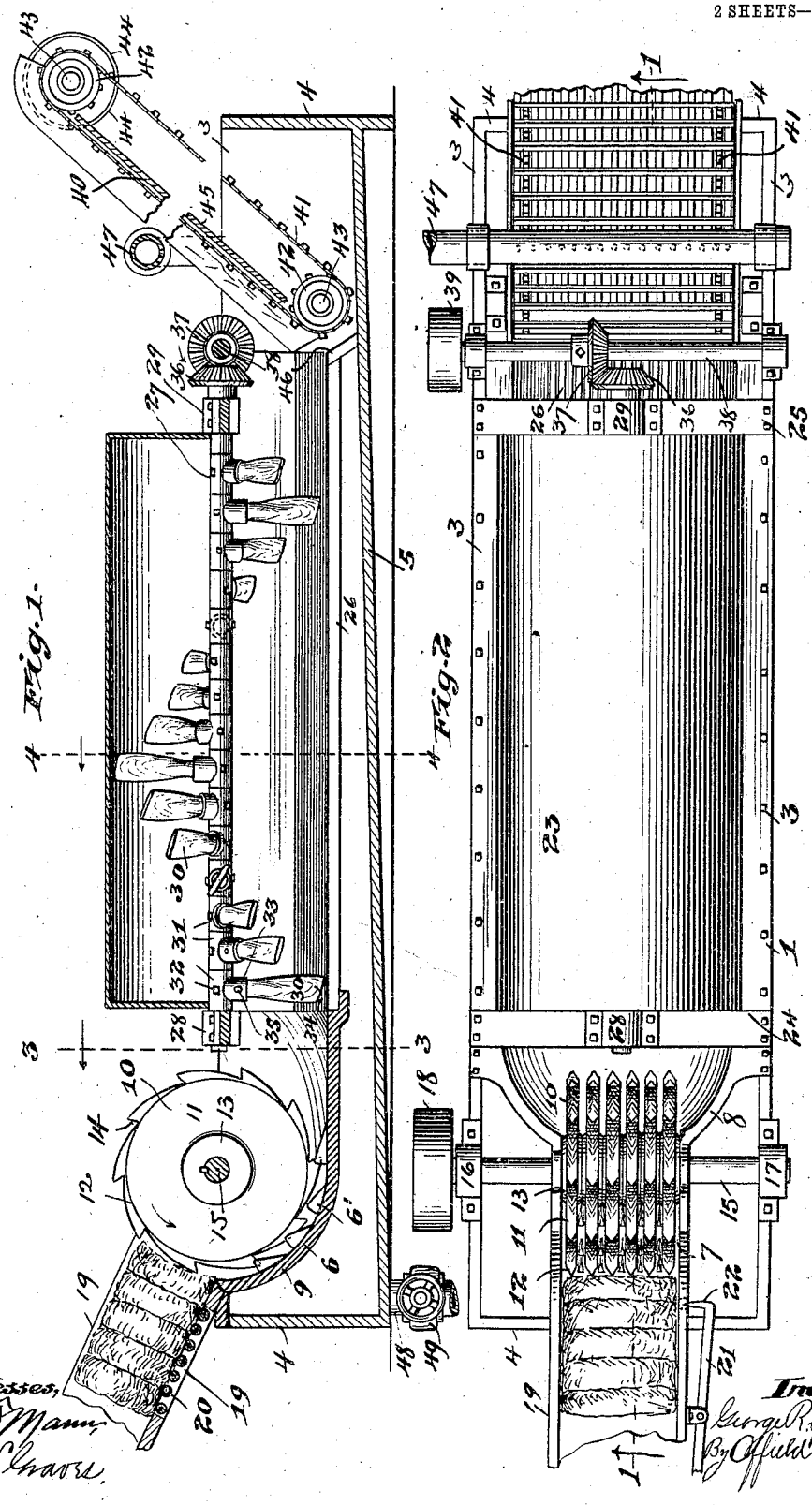
No. 785,025. PATENTED MAR. 14, 1905.

G. R. SHERWOOD.

STOCK WASHER.

APPLICATION FILED JUNE 11, 1904.

2 SHEETS—SHEET 1.



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2 SHEETS—SHEET 2.

Fig. 3.

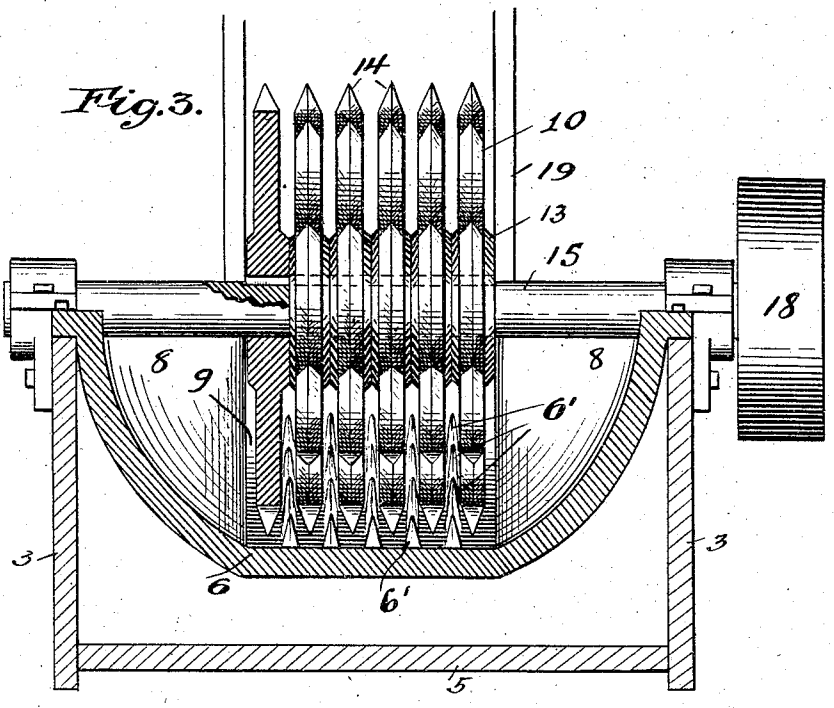
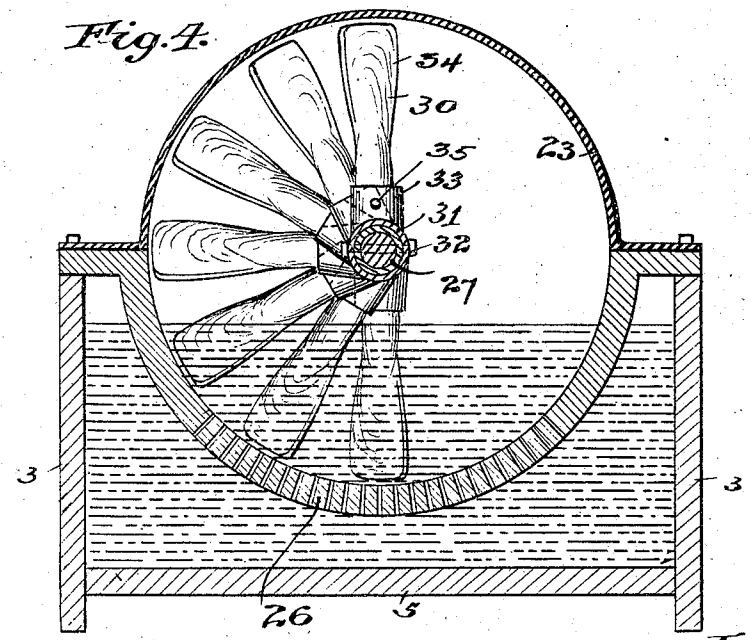


Fig. 4.



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No. 785,025. Patented March 14, 1905.

UNITED STATES PATENT OFFICE.

GEORGE R. SHERWOOD, OF OAK PARK, ILLINOIS.

STOCK-WASHER.

SPECIFICATION forming part of Letters Patent No. 785,025, dated March 14, 1905.

Application filed June 11, 1904. Serial No. 212,222.

To all whom it may concern:

Be it known that I, GEORGE R. SHERWOOD, a citizen of the United States, residing at Oak Park, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Stock-Washers, of which the following is a specification.

This invention relates to improvements in stock-washers, and refers more particularly to a machine designed for washing stock derived from the corn-plant and analogous materials.

Among the salient objects of the present invention are to provide a machine which will receive the material in baled form, disintegrate the bales, thoroughly separate the pieces, and subject them to a thorough washing and beating, which will result in separating therefrom all dirt, sand, and other impurities, especially those of greater specific gravity than water; to provide a machine of the character referred to in which the operation may be continuous or without interruption for any desired length of time; to provide a machine of the character referred to in which the operation of disintegrating, washing, beating, and conveying away is entirely automatic; to provide a machine so constructed that all parts are readily accessible and open to inspection at all times, so that the operation of the machine will be performed under the observation of the operator, and, in general, to provide a simple and effective apparatus of the character referred to.

To the above ends the invention consists in the matters hereinafter described, and more particularly pointed out in the appended claims.

The invention will be readily understood from the following description, reference being had to the accompanying drawings, in which—

Figure 1 is a longitudinal sectional view with parts shown in elevation, taken on line 1 1 of Fig. 2 and looking in the direction of the arrows. Fig. 2 is a plan view of the machine. Fig. 3 is a transverse sectional view taken on line 3 3 of Fig. 1 and looking in the direction of the arrows, and Fig. 4 is also a transverse sectional view taken on line 4 4 of Fig. 1.

Referring to the drawings, 1 designates as a whole a suitable tank or vat, preferably open at its upper side and comprising side and end walls 3 4, respectively, and an inclined bottom 5. In one end of said tank is arranged a chute, (designated as a whole 6,) preferably made in the form of a casting having its side walls extending parallel throughout the greater length of the chute, as indicated at 7, but merging into an outwardly-flared semicircular section 8 at the delivery end of the chute. The bottom of the chute is curved or segmental-shaped, as indicated at 9, at its receiving end, and within said chute is arranged a series of disintegrating-disks 10, fastened together so as to operate as a unit. Each disk in the preferred construction shown comprises a relatively flat body portion 11, having a beveled periphery 12 and a slightly-enlarged hub portion 13. The edges of the disks are toothed, as indicated clearly at 14 in Fig. 1, the points of the teeth being directed forwardly, considered with reference to the direction of rotation in operation. The inner face of the curved portion of the chute 6 is provided with teeth 6′, arranged in longitudinal rows, interposed between the paths of the teeth of the disks 11 and arranged at intervals apart, as seen clearly in Fig. 1, the points of these teeth being arranged in opposed relation to those of the disks. The gang of these disks, aggregating in width or thickness approximately the internal width of the chute 6, is mounted rigidly upon a suitable supporting-shaft 15, which extends out through the sides of the chute and is journaled, as indicated at 16 and 17, upon the side walls of the vat. One end of the said shaft carries a suitable belt-pulley 18, whereby the disintegrating-wheels may be driven.

19 designates a feed-chute which is mounted upon the end of the vat and arranged to deliver the stock against the acting peripheries of the disintegrating-wheels. This chute, as shown clearly in Fig. 1, is inclined forwardly and downwardly and at its lower side connect-

ed with the receiving end of the chute 6. In cross-section the chute 19 will be made rectangular or to correspond with the shape of the bales of stock. Desirably, also, the bottom of the lower portion of the chute will be formed by means of a set of antifriction-rollers 20, extending transversely thereof, so as to permit the bales to feed down by gravity freely. A hand-lever 21, provided at its lower end with an inturned prong 22, is pivoted upon one side of the chute and operates through an opening in the latter in such manner that the lowermost bale may be arrested by simply forcing the prong into engagement therewith when it is desired to stop the feed of the machine.

Extending longitudinally throughout the central portion of the vat is a skeleton trough, (designated as a whole 23,) the ends of this trough being supported conveniently, the front end by means of a series of upright guards 46, hereinafter described, and which rest upon the bottom of the vat. Said trough is semicircular in cross-section, as seen clearly in Fig. 4, and is preferably formed of longitudinally-disposed slats 26, arranged at suitable intervals apart, so as to permit the dirt and detritus to escape therethrough. The receiving end of said trough communicates with and constitutes a continuation of the chute 6, the operating or delivery end of said trough being open and the bottom of the trough being supported some distance above the inclined floor of the vat.

In order to beat the stock and at the same time convey it longitudinally through the trough 23, a shaft 27 is mounted to extend longitudinally and centrally above the trough, the shaft being located approximately concentrically with the curvature of the bottom of the trough and supported at its ends in suitable journals 28 and 29 on the cross frame members 24 and 25. Upon said shaft is mounted a series of beater-blades 30, arranged in a helical spiral and each comprising a hub portion 31, fitted and secured upon the shaft, as indicated at 32, and provided with a radial socket 33, within which is seated a blade 34. The blades are conveniently secured by through-pins 35, and in order that each blade may operate to advance the stock it is disposed obliquely with reference to the longitudinal axis of the trough.

The beater-shaft is driven by means of a beveled gear 36, mounted upon one end thereof and arranged to intermesh with a corresponding gear 37 upon a drive-shaft 38, journaled to extend transversely across the vat and provided with a belt-pulley 39. Adjacent to the delivery end of the trough is mounted an upwardly and outwardly inclined conveyer (designated as a whole 40) and conveniently consisting of a pair of sprocket-belts 41, trained around suitable sprockets 42, mounted on cross-shafts 43, slats being arranged to extend across the belts 41 in the usual manner. The upper shaft 43 carries a belt-pulley 44, whereby the conveyer is driven. The upper lap of the belt is desirably arranged to travel over a drip-board 45, which serves to convey the water dripping from the material back to the vat.

The delivery end of the skeleton trough is extended to a point contiguous to the receiving end of the conveyer 40, and from its end a series of downwardly-inclined slats or guards 46 is provided, which serve the double purpose of directing the stock into engagement with the central portion of the upper lap of the conveyer and also preventing the material from being carried back underneath the trough by the backflow of water, as will be hereinafter described.

47 designates a supply-pipe connected with any suitable source of water-supply and extending transversely above the delivery end of the vat, preferably and as indicated in the drawings vertically above the receiving end of the conveyer 40. The supply-pipe is perforated throughout its delivery portion, so as to discharge water under pressure into the vat and upon the material being carried up by the conveyer, thus finally rinsing the latter.

48 designates a waste-pipe communicating with the end of the tank at the foot of the inclined bottom 5, said waste-pipe being provided with a suitable gate-valve 49, whereby it may be controlled.

The operation of the apparatus constructed and arranged as described has been clearly indicated in connection with the description of the mechanism, but may be briefly summarized as follows: The bales after having their bands detached are fed into the chute 19 and descend by gravity into engagement with the disintegrating-wheels 11. These wheels operate to rapidly pull the bale to pieces and feed it downwardly through the chute 6 and into the skeleton trough, the opposed teeth 6′ in the bottom of the chute 6 operating to effect a very thorough separation of the fragments composing the bale and materially assisting in the washing out of the dirt. It will be understood that the vat will be maintained approximately full of water during the operation of the machine. The material entering the receiving end of the skeleton trough is subjected to the beating, stirring, and washing action of the beater-blades and is at the same time impelled through the trough, the dirt and impurities of higher specific gravity than the water dislodged by the beaters obviously filtering down between the slats of the skeleton trough.

A constant flow of water through the pipe 47 and outflow through the waste-pipe 48 is maintained during the operation of the machine, and this creates a current, which flowing down the inclined bottom of the vat carries the dirt and impurities away as fast as

they are removed. Arrived at the delivery end of the trough the stock is carried into engagement with the conveyer 40 and is thereby carried up and delivered, the inlet-pipe 47 serving to finally rinse the stock as it passes upwardly over the conveyer and the drip-board serving to return the drip to the tank.

I claim as my invention—

1. In a machine of the character described, the combination with a suitable feed-chute, of a disintegrating-wheel journaled adjacent to and transversely of the delivery end of said chute, and provided with forwardly-directed peripheral teeth, a chute within which said disintegrating-wheel operates, provided with a concentrically-curved bottom having upon its inner face a series of teeth opposed to the teeth of the feed-wheel and offset from the path of the latter, a vat into which the delivery end of the disintegrating-wheel chute delivers, mechanism for impelling the stock onwardly within the vat through the liquid therein, and mechanism for collecting and lifting the stock at the delivery end of the vat.

2. In a machine of the character described, the combination with a suitable vat and mechanism for disintegrating stock delivered to the vat, of a trough arranged within said vat having a segmental-shaped bottom, a beater-shaft arranged to extend parallel and concentrically with said trough-bottom, and a series of helically-disposed beater-blades upon said shaft.

3. In a machine of the character described, the combination with a suitable vat and mechanism for disintegrating stock delivered to the vat, of a trough arranged within said vat having a segmental-shaped skeleton bottom, a beater-shaft arranged to extend parallel and concentrically with said trough-bottom, and a series of helically-disposed beater-blades upon said shaft.

4. In a machine of the character described, the combination with a suitable vat of a chute arranged in one end of said vat, a disintegrating-wheel arranged within said chute, means for delivering stock to said disintegrating-wheel, a skeleton trough communicating with the delivery end of said chute, a beater-shaft, carrying a series of spirally-disposed beater-blades, arranged to extend longitudinally within said trough, a conveyer arranged contiguous to the delivery end of said trough, means for admitting a continuous supply of water to the vat, and a waste-pipe communicating with the bottom of the vat, as and for the purpose set forth.

5. In combination with a suitable vat, a gang of disintegrating-wheels journaled upon a transverse axis within one end of said vat, a chute inclosing the lower side of said gang of disintegrating-wheels, having a bottom portion curved concentrically with the peripheries of the wheels and toothed, a skeleton trough with which the delivery end of said chute communicates, a spiral conveyer extending longitudinally within said trough, a skeleton conveyer arranged adjacent to the delivery end of said trough, a series of bars forming a grating extending from the delivery end of the trough downwardly to the bottom of the vat, and contiguous to the receiving end of the conveyer, an inlet-pipe overhanging the receiving end of the conveyer, and a waste-pipe communicating with the vat at the end remote from the conveyer; the bottom of said vat being inclined downwardly toward said waste-pipe, substantially as described.

6. In a machine of the character described, the combination with a suitable vat, of a chute arranged at one end of said vat, a disintegrating device arranged to receive material fed through said chute, a trough within said vat having one end arranged to receive material from the disintegrating device, mechanism operating within said trough for agitating and impelling the stock onwardly, mechanism for collecting and removing the stock from the vat at the delivery end of said trough, a source of liquid-supply communicating with the vat, and means for discharging the liquid at a point forward of the delivery end of said trough whereby the outflow of dirty liquid is in a direction the reverse of the delivery movement of the stock.

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