Feb. 5, 1935. F. L. FURBUSH 1,990,120

PREPARING, FEEDING, AND DUSTING APPARATUS

Filed March 15, 1934 2 Sheets-Sheet 1

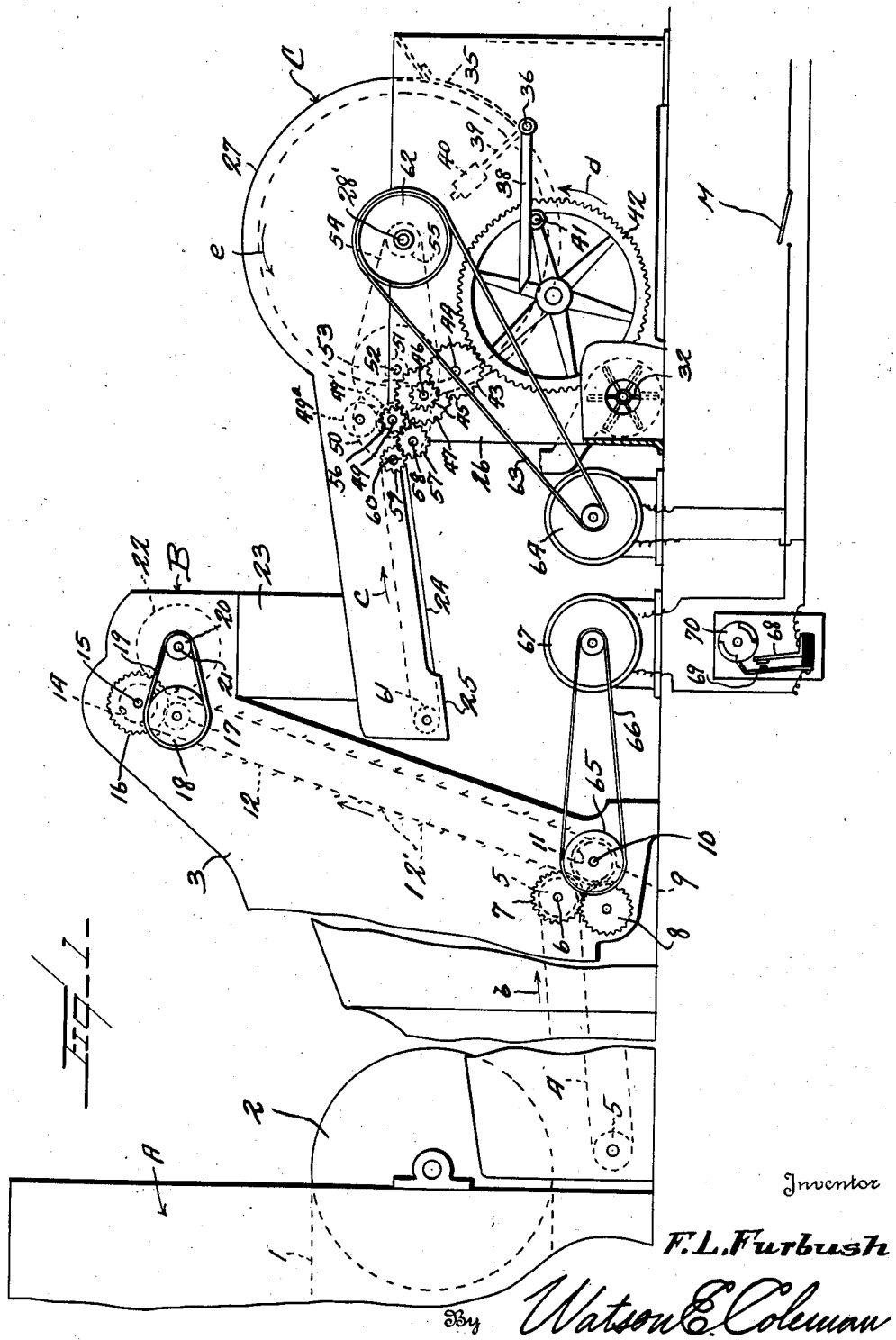


FIG. 1

Inventor

F. L. Furbush

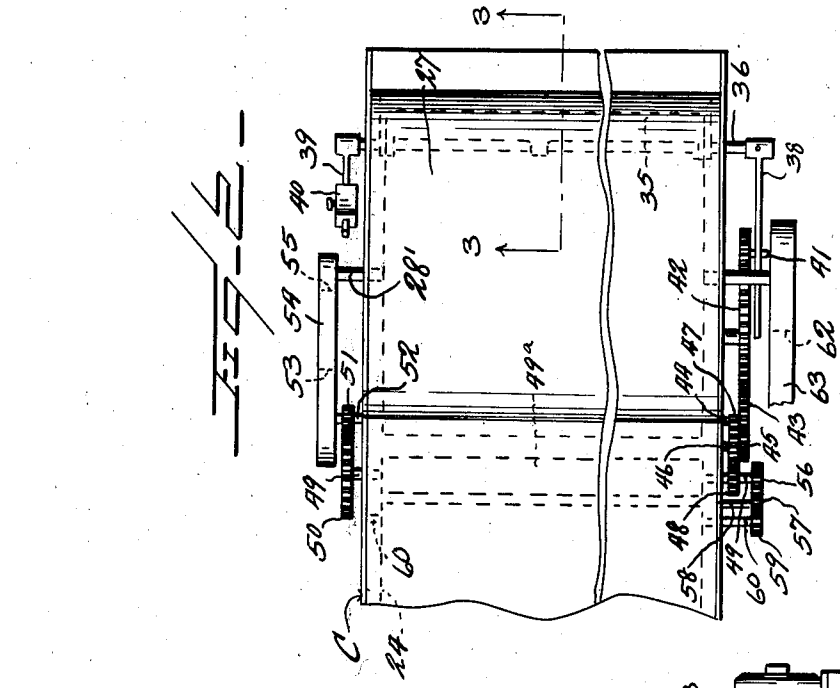
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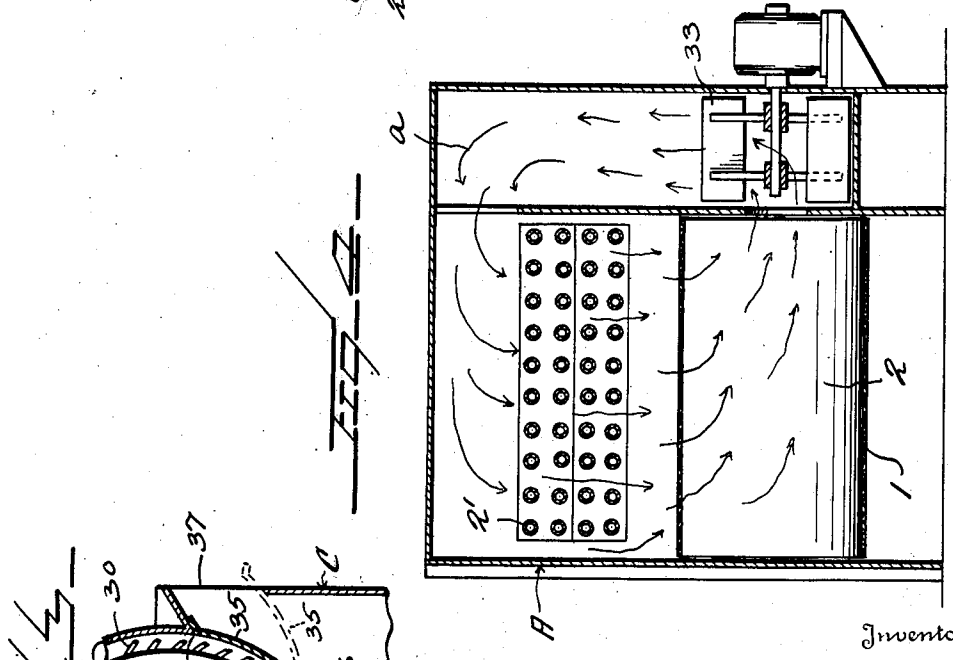
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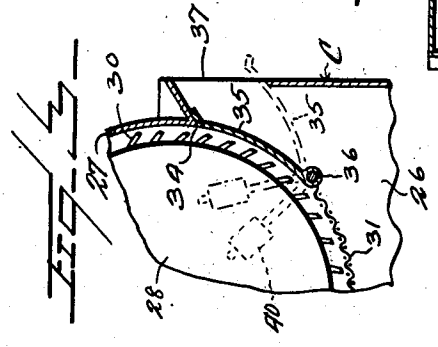
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PREPARING, FEEDING, AND DUSTING APPARATUS

Filed March 15, 1934 2 Sheets-Sheet 2







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UNITED STATES PATENT OFFICE

1,990,120

PREPARING, FEEDING, AND DUSTING APPARATUS

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1 Claim. (Cl. 19—92)

This invention relates to a preparing, feeding and dusting apparatus, and it is an object of the invention to provide an apparatus of this kind for use in connection with any fibrous material for preparing the material for treatment and later taking out of such material or stock foreign matter, such as burrs, shives, etc.

Another object of the invention is to provide an apparatus of this kind comprising a separating or cleaning unit together with means for delivering stock to said cleaning unit after being passed through a zone of desired temperature to thereby prepare the stock for further treatment, the separating or cleaning unit including a discharge door which is intermittently opened and closed and wherein a feeding unit positioned in advance of the separating or cleaning unit is also intermittently operated, said feeding unit being inactive during the period the discharge door of the separating or cleaning unit is open.

A still further object of the invention is to provide an apparatus of this kind including a separating or cleaning unit which may also be referred to as a "duster" and which unit includes a discharge opening under control of a normally closed door together with means operating automatically when said unit is at work for intermittently moving said door into open position and for maintaining said door open for a desired period of time.

An additional object of the invention is to provide an apparatus of this kind including a separating or cleaning unit comprising a screening element and a member movable from said element and carrying the stock to be treated and wherein pneumatic means may be provided for carrying off the foreign matter separated from the stock.

The invention consists in the details of construction and in the combination and arrangement of the several parts of my improved preparing, feeding and dusting apparatus whereby certain important advantages are attained and the device rendered simpler, less expensive and otherwise more convenient and advantageous for use, as will be hereinafter more fully set forth.

The novel features of my invention will hereinafter be definitely claimed.

In order that my invention may be the better understood, I will now proceed to describe the same with reference to the accompanying drawings, wherein:—

Figure 1 is a diagrammatic view partly in side elevation and partly in section illustrating an apparatus constructed in accordance with an embodiment of my invention;

Figure 2 is a view in top plan of the outer portion of the cleaning, separating or duster unit as herein embodied;

Figure 3 is a detailed sectional view taken substantially on the line 3—3 of Figure 2;

Figure 4 is a transverse sectional view taken through the preparing unit as herein embodied.

My improved apparatus as herein disclosed comprises three units, namely, a preparing unit A, a feeding unit B, and a separating, cleaning or duster unit C.

The preparing unit A comprises a housing of desired dimensions through which travels an endless apron 1 disposed around the guide drum 2 at the discharge end of the unit A and a similar drum preferably at the receiving end of said apparatus. The apron or conveyor 1 is of a perforated type so that a current of air, as indicated by *a* in Figure 4, may be caused to pass from above through the upper stretch of the apron or conveyor 1 and the stock thereon. As illustrated in Figure 4, the air in its circulation passes between and has contact with the pipes 2′ within the housing above the apron or conveyor 1. These pipes 2′ are adapted to have therein a medium such as may be necessary to secure the desired temperature within the unit A. If a high temperature is desired steam may be caused to flow through the pipes 2′ or if a low temperature is needed a suitable refrigerant may pass through said pipes. It is to be understood, therefore, that the temperature within the unit A may be high, low, temperate or otherwise in accordance with the necessities of practice so that the stock as it passes through the unit A will be effectively prepared to secure the desired separation therefrom of such foreign material as may be therein.

My improved apparatus as herein set forth is particularly adapted for use in connection with fibrous material, such as wool, cotton, rags, etc., and such material or stock may be in its natural state or after it has been treated by various processes.

Positioned immediately adjacent to the discharge end of the unit A or more particularly of the apron or conveyor 1 thereof is a feeding unit B. This unit B comprises a frame or supporting structure 3 and includes a substantially horizontally disposed endless conveyor 4 disposed around suitably positioned guide drums or rollers 5. This conveyor 4 underlies the discharge end of the conveyor 1 of the unit A and the upper stretch thereof directly receives thereon the stock or ma-

terial delivered from the unit A. This upper stretch of the conveyor 4 travels inwardly of the unit B, as indicated by the arrow *b*, and such conveyor travels at any preferred rate of speed. As particularly illustrated in Figure 1, the inner guide drum or roller 5 for the conveyor 4 has a shaft 6 extending exteriorly of the frame 3 and to said extended portion of the shaft 6 is fixed a gear 7 meshing with an idle gear 8 carried by the frame 3 and also exteriorly thereof. This idle gear 8 meshes with another gear 9, indicated by broken lines in Figure 1, rotating with the extended shaft 10 for the lower guide drum or pulley 11 of the upwardly disposed conveyor 12. This upwardly or vertically disposed conveyor 12 or apron as it may be termed, is directed at its top over a second guide drum or roller 14 rotatably supported by the frame 3 and having an extended shaft 15 which carries a gear 16. This gear 16 meshes with a smaller gear or pinion 17, indicated by broken lines in Figure 1, arranged exteriorly of the frame 3 and rotating with a pulley 18.

The pulley 18 and gear or pinion 17 are rotatably supported by the adjacent portion of the frame 3 and disposed around the pulley 18 is an endless belt 19 also directed around a smaller pulley 20 fixed to the extended shaft portion 21 of a doffing roll 22 positioned adjacent to the upper end of the conveyor or apron 12 and coacting with the descending stretch thereof to assure the knocking off of the stock or material from said descending stretch so that such material will be carried through the depending spout 23 to the receiving conveyor 24 of the separating, cleaning or duster unit C.

The belt or conveyor 12 has extending outwardly therefrom the prong-like members 12' to assure effective engagement with the stock or material and the carrying of the same upwardly with the outer stretch of the apron or conveyor 12 and hence the necessity of the doffing roll 22.

It is to be noted that the pulley 20 is of a radius materially less than the radius of the pulley 18 so that the doffing roll 22 will rotate at a peripheral speed considerably greater than the speed of the conveyor or apron 12 thus assuring the desired freeing of the stock or material from the descending stretch of said conveyor.

The conveyor 24 of the unit C is of an endless type and substantially horizontally disposed with the upper stretch of said conveyor, as indicated by the arrow *c*, travelling within a housing 25 extending outwardly from the upper portion of a housing 26. This housing 26 has a portion of its top wall, as indicated at 27 partly cylindrical so as to conform to the general contour of a cylindrical drum 28 rotatably supported by opposed walls of the housing 26 through the medium of a shaft 28'. The periphery of the member 28 has extending outwardly therefrom the prongs 30 or the like for effective engagement with the stock or material as delivered within the housing 26 so that said material may be carried around several times with the drum 28 and across or over the cleaning screen 31 underlying the drum 28. This action results in the effective separation of burrs, shives or other foreign matter from the stock or material and as said separated materials drop through the screen 31 into the lower portion of the housing 26 they are carried off by the blower 32 of a conventional type and which is diagrammatically illustrated in Figure 1. The fan of this blower may be driven in any desired manner but preferably in substantially the same fashion as the blower or fan 33 illustrated in Figure 4 for creating and maintaining the desired air circulation within the unit A.

The screen 31 terminates a desired distance from the rear of the portion 27 to provide a discharge opening 34 which is normally closed by a vertically swinging door 35 which, as illustrated in Figure 3, has its lower marginal portion hingedly connected, by a shaft or pintle 36, with the adjacent marginal portion of the screening element 31 and when this door 35 is in full open position, as indicated by broken lines, it constitutes a chute to facilitate the desired discharge of the stock or material through the delivery opening 37 in the adjacent wall of the housing 26 of the unit C.

The hinge or pintle 36 for the door 35 forms a shaft, one end portion of which extends exteriorly of the housing 26 of the unit C and to said extended portion is fixed an elongated rock arm 38. The opposite end of the rod or shaft 36 is also extended and carries a second rock arm 39 upon which is ajdustably engaged the weighted member 40. This arm 39, extends upwardly and inwardly of the housing 26 and carries the weighted member 40 which serves to normally maintain the door 35 in its closed position, with the arm 38 disposed in substantially a horizontal position and intersecting the path of travel of an outwardly and laterally disposed pin 41 arranged adjacent to the periphery of a relatively large gear 42.

This gear 42 is supported for rotation by the adjacent side wall of the housing 26 and meshes with the idle gear 43 carried by the stub shaft 44 extending from the adjacent wall of the housing. This gear 43 meshes with a pinion 45 mounted on a stub shaft 46 projecting from the adjacent wall of the housing. Rotating with pinion 45 is a larger gear 47 meshing with a gear 48 carried by an extended end portion of a shaft 49. This shaft 49 extends transversely of the housing 26 and within the housing carries a roller 49a which is positioned closely adjacent to the discharge or delivery end of the upper stretch of the conveyor 24 hereinbefore referred to.

The opposite end portion of the shaft 49 carries a relatively large gear 50 meshing with a smaller gear 51 mounted on a stub shaft 52 carried by the adjacent portion of the housing 26. Rotating with the gear 51 is a pulley 53 connected by the endless belt 54 with a pulley 55 on an end portion of the shaft 28' of the drum 28.

The shaft 49 outwardly of the gear 48 carries another gear 56 meshing with an idle gear 57 mounted on a stub shaft 58 carried by the adjacent portion of the housing 26. This idle gear 57 meshes with a gear 59 carried by an end portion of a shaft 60 of one of the guide rolls 61 for the conveyor 24. It will thus be seen that upon rotation of the member 28 the conveyor 24 will be caused to travel at a desired speed and at the same time the gear 42 will be caused to rotate at a desired peripheral speed.

The shaft 28' of the member 28 also carries a second pulley 62 which is in driven connection by an endless belt 63 with a prime mover 64 such as an electric motor.

The roller 49' coacts with a second roller 49a within the housing 26 and immediately above the roller 49'. These rollers 49' and 49a constitute feed rollers which assure the desired delivery of the material or stock from the upper stretch of the conveyor 24 upon the screening element 31 hereinbefore referred to.

The shaft 10 for the lower guide roller 11 of the conveyor 12 has rotating therewith a pulley 65 in driven connection by the endless member or belt 66 with an electric motor 67. This motor 67 has its operating circuit connected in parallel with the operating circuit for the motor 64 so that the operation of both of the motors 64 and 67 will be under control of the main switch M.

Interposed in a leg of the operating circuit for the motor 67 is a circuit maker and breaker comprising a substantially stationary contact 68 and a spring contact 69. The spring contact 69 has coacting therewith a rotating cam member 70 having opposed recesses within which the spring contact is adapted to drop which is adapted to be operated by a "Telechron" motor or otherwise at a certain rate of peripheral speed within a given period of time. As diagrammatically illustrated in Figure 1, upon a single revolution of the cam member 70 the circuit through the contacts 68 and 69 will be twice closed for a desired period.

The periods when these contact members 68 and 69 are closed are adjusted or regulated to occur during the period that the door 35 of the unit C is closed so that during such times the unit B will operate to deliver the material or stock to the unit C. While the apparatus is in service the unit C is in continuous operation but at substantially the moment the door 35 begins to open, which is the instant shown in Fig. 1, the operating circuit for the motor 67 is broken to stop the unit B and this action of the unit B continues until substantially the time the door 35 is fully closed. This intermittent operation of the unit B is to prevent choking or other interference with the operation of the unit C and also to assure desired effective treatment of the material by the unit C to accomplish the desired separation of the foreign matter from the material or stock.

In the operation of the unit C the gear wheel 42 rotates in the direction of the arrow *d* with the result that the pin or member 41 engages the arm 38 from below. As the gear or wheel 42 continues to rotate, this arm 38 is moved upwardly resulting in an outward and downward swinging movement of the door 35 into open position. The arm 38 is of a length to assure the door 35 being maintained open for a required period of time and as the member or pin 41 passes beyond the free end of the arm 38 the weighted arm 39 will immediately return the door 35 to its normally closed position. The rotation of the drum 28 which is counterclockwise and upward toward the door 35 as indicated by the arrow *e*, will assure the desired discharge of the material or stock out through the delivery opening 37 when the door 35 is in its open position.

It is to be noted that the housing 3 for the conveyor 4 and for the elevator 12, has a length equal to that of the conveyor 4 and that the sides of this housing are relatively high. Thus when the motor 67 is cut off and the feed unit is out of operation, the material passing from the drying or preparing conveyor 1 may pile up within the housing 3 upon the conveyor 4 until such time as that unit again starts operating which is of course when the door 35 has closed.

From the foregoing description it is thought to be obvious that a preparing, feeding and dusting apparatus constructed in accordance with my invention is particularly well adapted for use by reason of the convenience and facility with which it may be assembled and operated, and it will also be obvious that my invention is susceptible of some change and modification without departing from the principles and spirit thereof and for this reason I do not wish to be understood as limiting myself to the precise arrangement and formation of the several parts herein shown in carrying out my invention in practice except as hereinafter claimed.

I claim:—

In an apparatus of the character described, a separating unit having a housing provided with a discharge opening at one point and at an approximately diametrical point having a feed opening, a door for said discharge opening, feed rolls located at the feed opening and discharging into the housing, the housing being extended horizontally outward from said feed rolls, a conveyor in said extension acting to deliver material into the housing, a feeding unit including an upwardly extending elevator in advance of the housing extension and having its upper end overhanging said conveyor, a horizontally disposed conveyor delivering material to the elevator, a housing for the last named conveyor and for the elevator, the housing extending forward of the elevator and upward from the conveyor whereby to permit a large amount of material to collect on the last named conveyor, a constantly operating separating unit discharging onto the last named conveyor, and means for automatically stopping the feed unit conveyor and the elevator in timed relation to the opening of the door of the separator housing and during the period when the door is opened, and automatically starting up the conveyor and elevator of the feed unit at the time when said door has been closed.

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