Nov. 7, 1944. P. SCHULTZE 2,362,315

FUR FEEDING MACHINE

Filed March 17, 1942 5 Sheets-Sheet 1

Fig. 1.

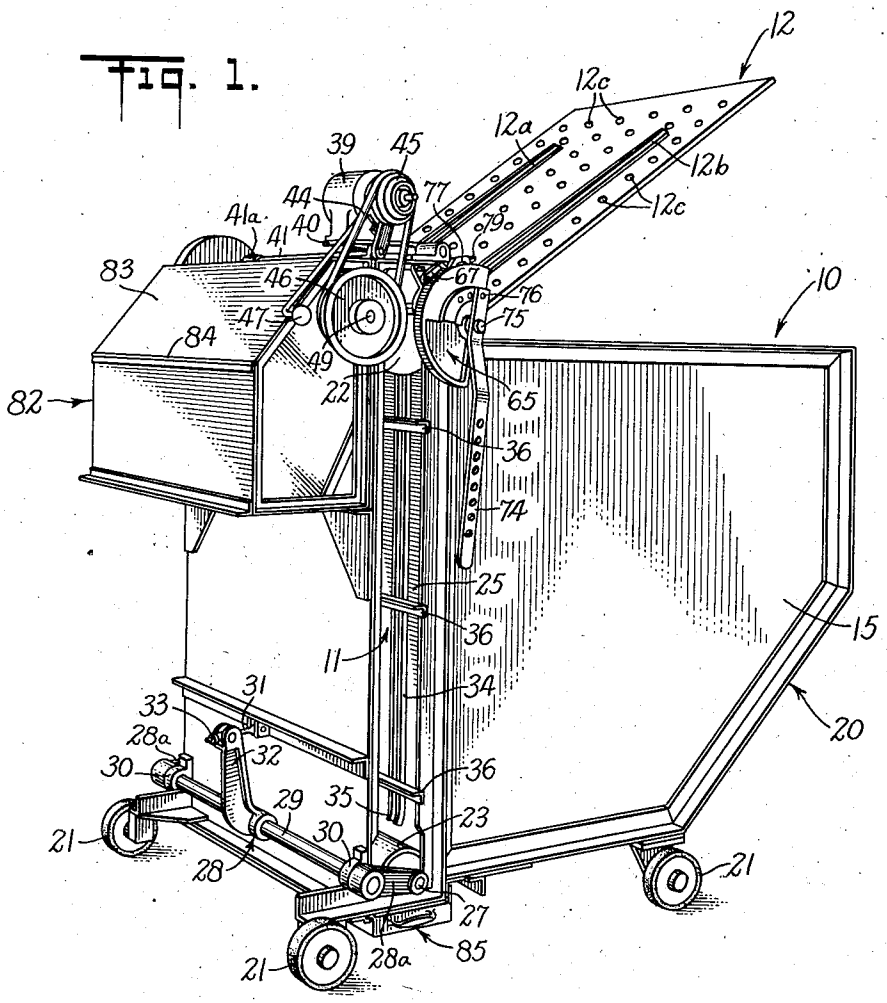
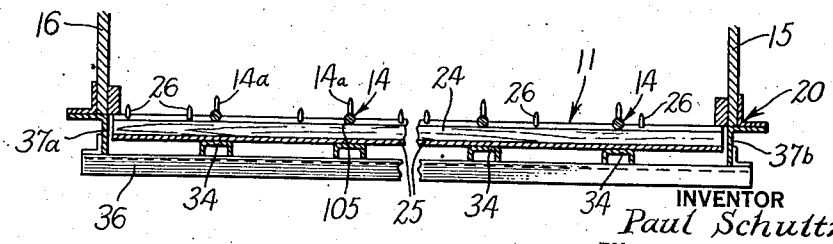


Fig. 9.



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Fig. 2.

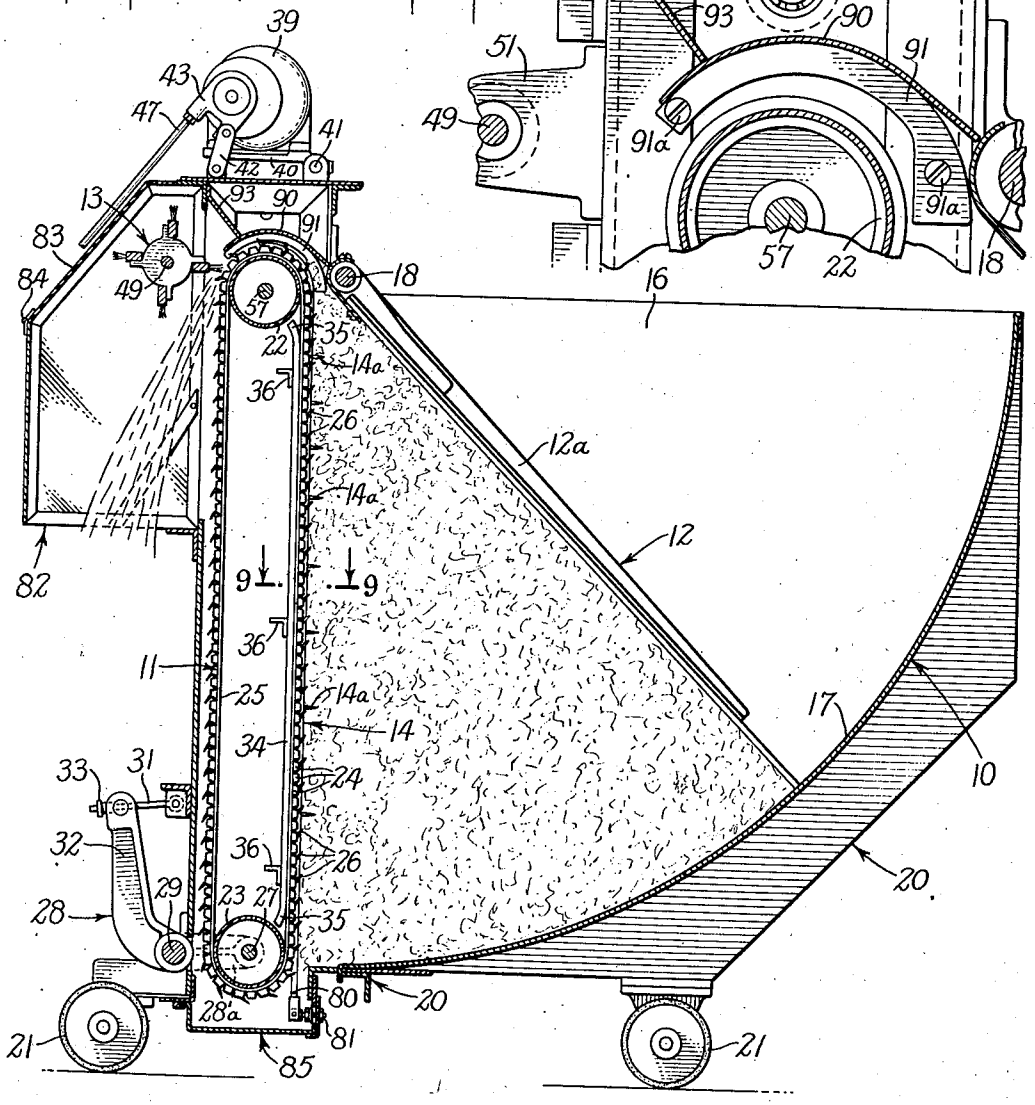


Fig. 3.

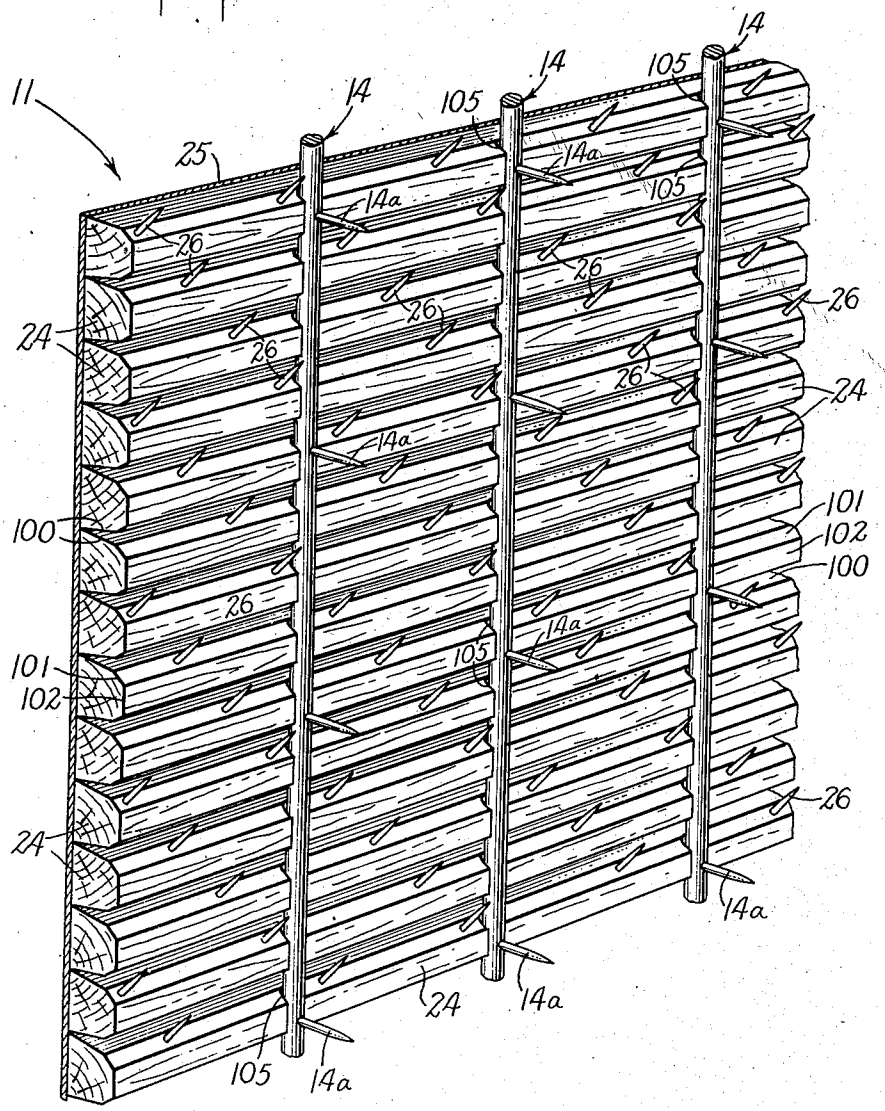
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FUR FEEDING MACHINE

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Fig. 4.



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FUR FEEDING MACHINE

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Fig. 5.

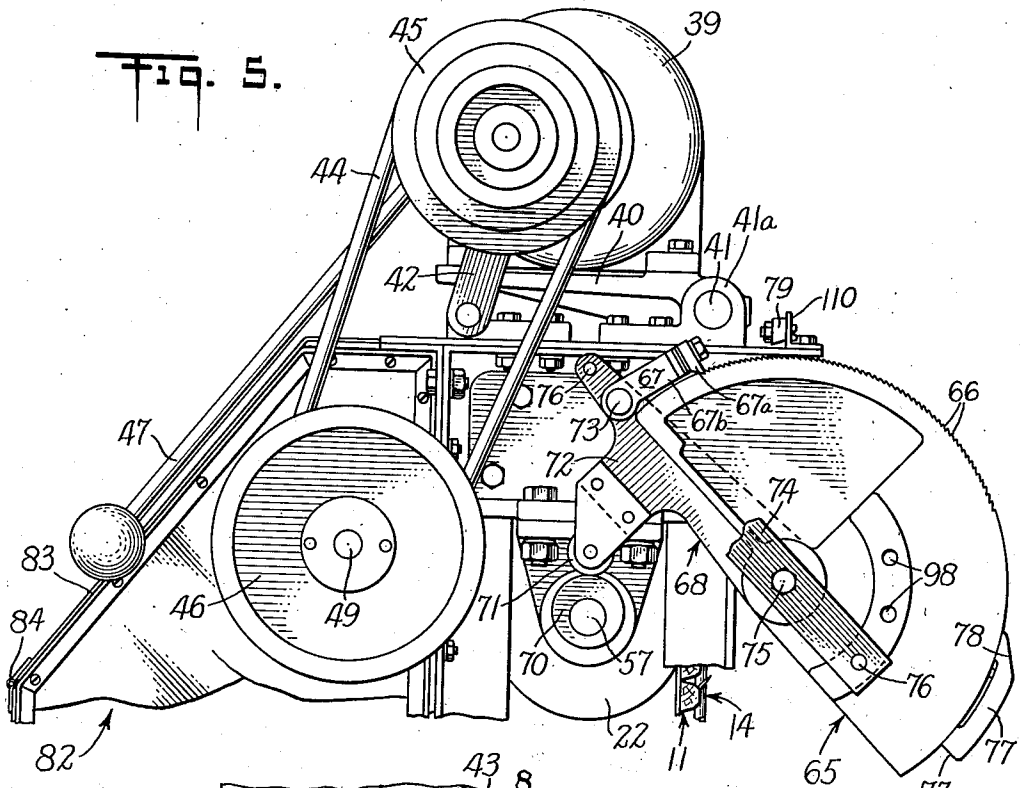
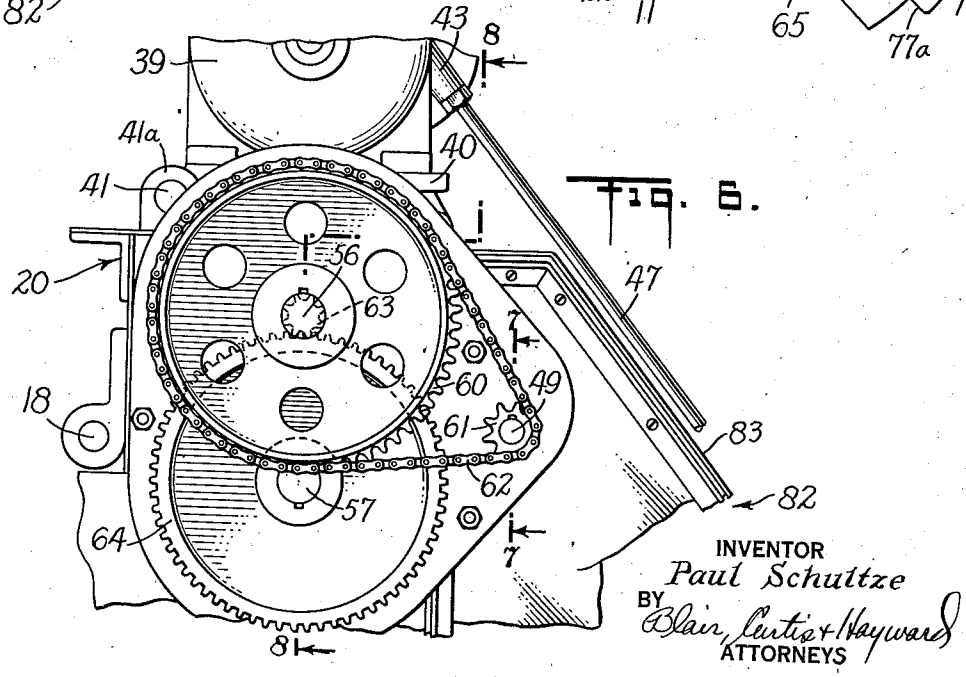


Fig. 6.



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FUR FEEDING MACHINE

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Fig. 7.

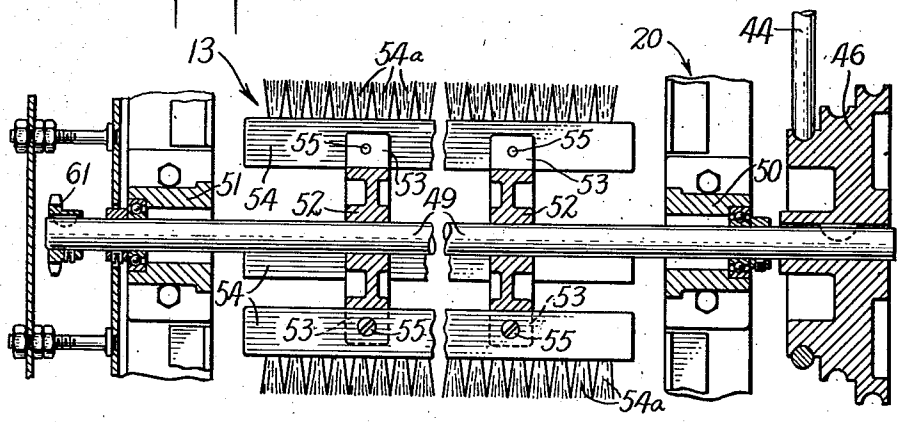
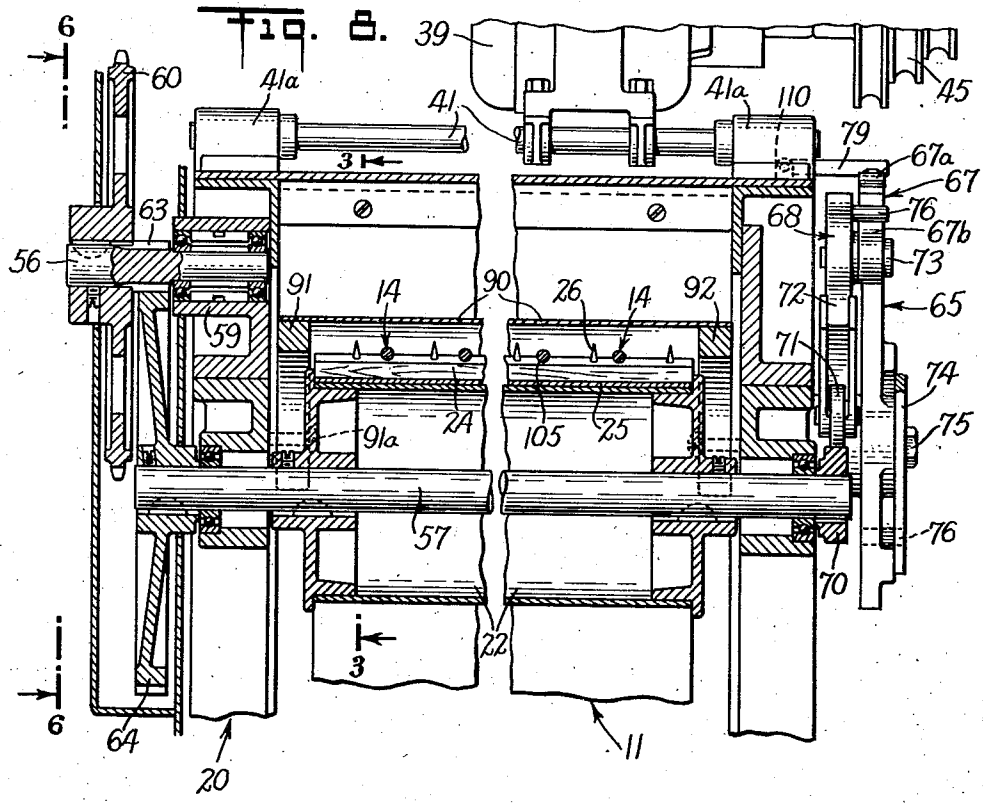


Fig. 8.



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Patented Nov. 7, 1944

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UNITED STATES PATENT OFFICE

2,362,315

FUR FEEDING MACHINE

Paul Schultze, Danbury, Conn., assignor to Doran Brothers Incorporated, Danbury, Conn.

Application March 17, 1942, Serial No. 435,060

16 Claims. (Cl. 19—78)

This invention relates to a fur feeding machine.

One of the objects of this invention is to provide a fur feeding machine which is simple, thoroughly practical, and durable in use. Another object of the above invention is to provide a device of the above character the manufacture of which will be economical, both from the standpoint of labor and material used. Another object is to provide a construction of the above character in which the circulation of the fur within the hopper of the machine is prevented. A further object is to provide a construction of the above character which will supply fur at a uniform and regular rate. A still further object is to provide a construction of the above character in which the fur in the hopper is prevented from matting into balls. Other objects will be in part obvious and in part pointed out hereinafter.

The invention accordingly consists in the features of construction, combinations of elements and arrangements of parts as will be exemplified in the structure to be hereinafter described and the scope of the application of which will be indicated in the following claims.

In the accompanying drawings in which is shown one of the various possible embodiments of this invention,

Figure 1 is a perspective view of the machine;

Figure 2 is a vertical section on a slightly enlarged scale, of the machine shown in Figure 1;

Figure 3 is a vertical section of a portion of the machine taken from the line 3—3 of Figure 8, the apron being removed;

Figure 4 is a perspective view, on an enlarged scale, of a portion of the fur feeding apron and certain parts associated therewith;

Figure 5 is a side elevation, on an enlarged scale, of portions of the side of the machine shown in Figure 1;

Figure 6 is a side elevation of a portion of the machine taken on the line 6—6 of Figure 8, the housing covering the sprocket gears being removed;

Figure 7 is a fragmentary vertical section, on an enlarged scale, taken on the line 7—7 of Figure 6 of portions of the wiper brush and its mounting upon the machine;

Figure 8 is a fragmentary vertical section taken on the line 8—8 of Figure 6 with parts of the machine being broken away; and,

Figure 9 is a horizontal section taken through the machine at the point indicated by line 9—9 on Figure 2.

Similar reference characters refer to similar parts throughout the several views of the drawings.

In order to set forth a more comprehensive understanding of certain features of this invention, it might here be pointed out that in the past many difficulties have been experienced with fur feeders of the type disclosed. One of the major difficulties has been circulation of the fur in the hopper of the machine caused by the apron which removes the fur therefrom. This circulation works the fur fibers together causing them to adhere to each other and form matted fur balls. In the past many different types of constructions have been used to prevent the feeding of these matted balls out of the hopper but these have not been successful as some of the smaller ones are always fed by the apron to the former or blower. The balls which are fed to the former or blower are not separated into loose fibers by the blower and result in the formation of lumps or different qualities of felt in various portions of the bat during formation thereof, causing the bat to lack uniformity of texture.

Further difficulty has been experienced because many of the constructions heretofore used to prevent the feeding of fur balls out of the hopper have interfered with the rate at which the fur is fed by the apron so that a uniform and even supply of fur is not fed to the blower or former. Another disadvantageous factor resulting from the circulation of the fur in the hopper is that there is a material loss of fur resulting from the formation of the fur balls. It is accordingly another object of this invention to provide a fur feeding machine which will overcome the above-mentioned difficulties, as well as others.

As best shown in Figures 1 and 2, the fur feeder includes a hopper, generally indicated at 10, the fur in which is pressed into contact with an apron, generally indicated at 11 (Figure 2), by a gate generally indicated at 12. Apron 11 is driven in a counterclockwise direction over a pair of rollers and is provided with a plurality of pins which carry the fur over the top roller to a wiper brush, generally indicated at 13, which removes the fur from the apron. A plurality of rods, generally indicated at 14 (Figures 2 and 4), having pins 14a therein coacts with the apron 11 and gate 12 to prevent the circulation of fur and the formation of matted balls of fur in the hopper, all as will be described fully hereinafter.

Referring now to Figures 1 and 2, the hopper has a pair of side walls 15 and 16 and an arcuate-shaped bottom 17. The side walls and bottom are secured to a framework, generally indicated

at 20, which preferably has wheels 21 secured to the lower portions thereof to permit movement of the machine as desired. Gate 12, which is flat and of heavy construction, has a pair of arm members 12a and 12b (Figures 1 and 2) secured to its top surface. The ends of these arm members are secured to shaft 18 in any suitable manner so that as shaft 18 is turned, gate 12 moves with it. Shaft 18 extends transversely across the machine and is rotatably mounted in bearings (not shown) secured to the framework of the machine. The gate is of slightly smaller size than the opening in the top of the hopper, and as the sides of the hopper are parallel to each other, and as the radius of the curve of the bottom is slightly greater than the legth of gate 12, gate 12 is free to move downwardly within the hopper to press the fur therein against apron 11. The area of gate 12, however, approximates that of the cross section of the hopper, and a plurality of small holes 12c extend through the gate to permit air to escape from beneath the gate and prevent fur from being blown around the edges of the gate as the gate moves downwardly into the hopper.

Apron 11 is of the endless type and is mounted on a pair of cylindrically shaped rollers 22 and 23 (Figures 2 and 8). The apron includes a plurality of wooden slats 24 (Figure 4) which extend transversely across and are individually secured to a flexible belt 25 in any suitable manner, such as by riveting. The juxtaposed sides 100 of the slats are tapered so that the outer transverse edges of the sides are spaced a substantial distance apart. This provides spaces between the slats when the belt is in a flat plane, thus preventing fur entering between the slats during operation of the machine from interfering with the movement of the slats with respect to each other. The edges 101 between the outer surfaces 102 of the slats and the sides 100 are beveled at substantially a 45° angle to outer surfaces 102. Pins are fitted into the beveled edges of the slats and are preferably perpendicular to these edges. The pins in successive slats are in staggered relation to each other, and each pin is in longitudinal alignment on the apron with pins in other slats. Thus, longitudinal rows of pins extend upwardly from the slats at acute angles to apron 11 during the travel of the apron upwardly through the hopper. Furthermore, the slats are so shaped that flexing of belt 25, as it moves over rollers 22 and 23 (Figure 2), is unimpeded.

Each slat has a series of grooves 105 (Figures 4 and 8) therein, the grooves in each slat being similarly positioned. These grooves provide recesses extending lengthwise of the apron into which a series of pin carrying rods 14 fit. As the rods 14 are all similar in construction, specific description of the rods will be limited to the one shown in Figure 2. This rod extends throughout the length of that portion of the apron facing the hopper and is secured at its lower end 80 to the framework 20 of the machine by a bolt 81. The axis of bolt 81 is horizontal, and the bolt is adjustable longitudinally by reason of lock nuts provided thereon to permit adjustment of rod 14 toward or away from the slot in the apron formed by the several aligned grooves in the slats. The upper end of the rod curves over and terminates adjacent the upper left-hand side of apron roller 22 (Figure 2). Because of the upper curved portion of the rod, movement of this portion of the rod to the right, as viewed in Figure 2, is prevented. Furthermore, movement of the rods in a plane transverse to the planes of the vertical portions of the apron is prevented because of their position in the recesses formed by the grooves in the slats.

Rods 14 carry pins 14a of substantially greater length than apron pins 26. These pins extend outwardly into the hopper substantially perpendicularly to the portion of the apron against which the fur is pressed and well beyond the plane in which the tips of the apron pins lie so that when the machine is in operation, they hold the stratum of fur adjacent the apron stationary and the apron pins shear the fur from this stratum. The pins in each rod 14 are preferably similarly positioned, and the pins 14a are progressively spaced closer together upwardly along the rods so that the pins adjacent the top of the hopper are considerably closer together than those at the bottom. This lessens the rate of feed of fur from the hopper progressively from the bottom to the top and insures the emptying of all portions of the hopper at the same time. This prevents the formation of an empty space in the top of the hopper within which fur might circulate.

The bottom apron roller 23 (Figure 2) is mounted upon shaft 27 (Figures 1 and 2) which is journaled on the ends of the arms 28a of a yoke generally indicated at 28. Arms 28a are secured to shaft 29 which forms the center portion of the yoke, and shaft 29 is pivotally mounted on the machine by bearings 30 (Figure 1) which are secured to framework 20. A lever member 32 is secured to the center portion of shaft 29 and extends upwardly therefrom. A bolt 31 pivotally connected to framework 20 extends through a slot in the upper end of lever member 32, and by tightening the nut 33 (Figure 2) on the outer end of bolt 31, lever member 32 is moved toward the machine. Because member 32 is secured to shaft 29, its movement rocks yoke 28 in bearings 30, and shaft 27 mounting roller 23 is moved downwardly. Thus, by tightening nut 33, the tension upon apron 11 exerted by roller 23 may be adjusted to any desired amount.

As may be seen in Figure 2, the portion of apron 11 positioned to the right of rollers 22 and 23 is pressed toward the left by the weight of the load of the fur in the hopper and by gate 12. To support the apron in a vertical position, a plurality of channel-shaped supports 34 (Figures 1, 2 and 9) are positioned adjacent the back of the belt. These supports extend longitudinally of the belt substantially from roller 22 to roller 23, their flat sides face the belt, and their ends 35 are bent upwardly (Figures 1 and 2) to prevent them from contacting the belt. The supports are secured to a series of angle bars 36 (Figures 1, 2 and 9) which extend transversely across the machine and are connected to uprights 37a and 37b (Figure 9) of framework 20 in any suitable manner. Thus, the supports form a longitudinal support for the portion of the apron against which gate 12 and the fur in the hopper press so that the portion of the apron upon which the load presses is maintained in a vertical plane regardless of the pressure exerted upon it.

Apron 11 is driven through roller 22 by motor 39 which is secured to platform 40 in any suitable manner (Figures 1, 2, and 5). The platform is connected to a shaft 41 which is mounted on a pair of bearings 41a (Figure 8) secured to the framework of the machine. Any suitable means

for raising and lowering platform 40 and motor 39 may be provided, such as rocker 43, toggle link 42, and handle 47. Handle 47 may be used to pivot rocker 43 on the shaft of motor 39, and this movement acting through toggle link 42, which is pivotally connected to rocker 43 and to the framework of the machine, serves to raise and lower the motor and its platform. By thus lowering and raising the motor, shifting of the belt 44 (Figures 1 and 5) between the various grooves (Figures 7 and 8) of pulleys 45 and 46 is permitted in order that the rate of drive of shaft 49 (Figure 5) to which pulley 46 is keyed may be easily and quickly changed to control the feed rate of the machine.

Referring now to Figures 1 and 7, shaft 49 extends transversely through the machine and is mounted in bearings 50 and 51 (Figure 7) secured to the framework thereof. The wiper brush 13 is mounted on the shaft and preferably consists of a pair of cylindrically shaped members 52 (Figures 1 and 7) which are secured to shaft 49 in any suitable manner. Each of these members has four wing-shaped portions 53 extending outwardly therefrom in quadrature, and brush carrying members 54 are detachably connected to the wing-shaped portions by screws 55 (Figure 7) so that the brush carrying members may be readily changed. The tufts 54*a* on these brush carrying members are so positioned that each tuft is in alignment with and acts upon a longitudinal row of apron pins 26. This insures the removal of all of the fur from each pin as it passes the wiper brush.

As best shown in Figures 6 and 8, a stud shaft 56 is journaled in the framework 20 of the machine directly above the shaft 57 to which apron roller 22 is keyed. Shaft 56 is mounted in bearing 59 and has a large sprocket gear 60 keyed to its outer end. Gear 60 (Figure 6) is driven by sprocket gear 61 keyed to the left-hand end of shaft 49, as viewed in Figure 7, through chain 62 (Figure 6). Stud shaft 56 has a pinion 63 (Figure 6) formed thereon which drives a gear 64 keyed to the left-hand end of the apron roller shaft 57, as viewed in Figure 8. Thus, in operation, the rate of drive of the wiper brush, which is driven through pulleys 46 by belt 44 and pulley 45, may be varied by shifting the position of belt 44 on pulleys 45 and 46. The reduction afforded by gears 60, 61, 63, and 64 (Figure 6) causes the apron drive shaft 57 to be driven at a much slower rate than the wiper brush shaft 49, and thus the wiper brush runs at a high rate of speed to insure removal of all of the fur from the apron while the apron moves at a slow rate.

As described hereinabove, gate 12 (Figure 2) is secured to shaft 18 which extends through bearings mounted on the framework 20. Thus, as shaft 18 is turned, the gate turns with it. Secured to the end of shaft 18 is a substantially flat semi-circular segment generally indicated at 65 (Figures 1, 5 and 8). This segment has a series of ratchet teeth 66 formed along a portion of its periphery which coact with a pawl, generally indicated at 67, pivotally mounted on a pawl carrying lever, generally indicated at 68, to press the gate downwardly on the fur in the hopper with a pulsating action, all as will be described hereinafter.

Pawl carrying lever 68 (Figure 6) is loosely mounted on the gate shaft 18, so as to be rotatable relative thereto, between the side of the machine and semi-circular segment 65 and has an arm 72 thereon mounting a follower roller 71 which rides the periphery of a cam 70 keyed to the end of apron drive shaft 57 (Figures 5 and 8). Roller 71 is held in contact with the cam through the weight of lever 68, and when the roller 71 follows the surface of cam 70, lever 68 moves upwardly and downwardly. Pawl 67, which is pivotally mounted on lever 68 by a pin 73 (Figure 5), coacts with ratchet teeth 66 to move semi-circular segment 65 in a clockwise direction as cam 70 moves lever 68 upward to press the gate down on the fur in the hopper. The head 67*a* of pawl 67 is preferably adjustable longitudinally with respect to the pawl's body 67*b*, thus permitting the ratchet engaging portion of the head to be properly aligned with the last tooth of the ratchet.

Gate 12 may be manually raised by a lever 74 (Figure 1) connected to the end of gate shaft 18 by a bolt 75, its inner end being secured to semi-circular segment 65 by a pin 76 (Figure 5) which may be inserted in any one of a series of holes 98 in segment 65. By adjusting pin 76, the lever 74 may be raised or lowered, permitting the adjustment of the lever to suit the height of the man operating the machine. To hold the gate in a raised position, semi-circular segment 65 has secured thereto a stop 77 provided with a cam surface 78 and an abument 77*a*. A bracket 110 is bolted on machine framework 20 and pivotally supports an arm 79 which extends to the right of the machine (Figure 8) into the path of stop 77 and coacts therewith as will be described. As gate 12 is raised, the cam surface 78 of stop 77 moves arm 79 upwardly so that it rides over the stop and then drops in behind abutment 77*a* (Figure 1). As both semi-circular segment 65 and the gate are connected to shaft 18, arm 79 and stop 77 hold the gate in the raised position shown in Figure 1.

Pawl carrying lever 68 (Figure 5) preferably extends upwardly above the connection of pawl 67 and has a pin 76 therein which extends to the right therefrom, as viewed in Figure 8, into the path of movement of pawl 67. Thus, pawl 67 may be manually pivoted counterclockwise, as viewed in Figure 5, and gravity holds it on pin 76 where it is out of engagement with ratchet teeth 66 to permit manual raising of the gate by lever 74 to the position shown in Figure 1.

Referring now to Figures 2, 3, and 8, a curved shield 90 is mounted on a pair of arcuate-shaped supports 91 and 92. These supports are secured to the framework of the machine in any suitable manner, such as by screws 91*a* (Figure 3) and close the spaces between the edges of apron 11 (Figure 8) and the sides of the machine to prevent fur from being fed by the apron through these spaces. The curved shield 90 is secured to the top surfaces of supports 91 and 92 in any suitable manner. A secondary shield 93 (Figure 3) extends from the top surface of the left-hand portion of shield 90, as viewed in Figure 3, to the framework 20 at the top of the machine. Secondary shield 93 thus closes the space between shield 90 and the top of the machine. These shields prevent fur from entering the top portion of the machine, and shield 90 guides the fur on the apron as it is fed over the top roller to the brush 13.

In operation, hopper 10 (Figure 1) is filled with fur, and pawl 67 is lowered into contact with the ratchet teeth on the periphery of lever 68. Then, when arm 79 is raised to clear abut-

ment 11a on stop 11 (Figure 5), the gate may be lowered by lever 14 (Figure 1) so that it rests on the top of the fur in the hopper. When the high portion of cam 10 (Figure 5) underrides roller 11, pawl 67 is moved in a clockwise direction, and acting through ratchet teeth 66, semi-circular segment 65, and shaft 18, presses gate 12 down on the fur to force the fur against apron 11 (Figure 2). When the pressure exerted through pawl 67 is relieved, the resilience of the fur forces the gate upwardly so that as the machine runs, the gate presses downwardly on the fur in the hopper with a pulsating action each time cam 10 revolves. As the apron removes the fur from the hopper, gravity pulls the gate downwardly, and thus when sufficient fur is removed from the hopper to relieve the upward bias of the fur against the gate, the gate does not move upwardly when the pressure thereon through the pawl and ratchet is released. Accordingly, when the lower portion of the cam underrides roller 11, pawl 67 ratchets over a ratchet tooth and engages another tooth of the ratchet to cause the gate to press the fur farther down into the hopper during the next revolution of cam 10. Thus, by this gate feed mechanism, the gate is pulsated by the ratchet and pawl mechanism as it is gravity fed downwardly until all of the fur is removed from the hopper by the apron.

As the fur is pressed toward the apron by the gate as described hereinabove, rod pins 14a, because they extend beyond apron pins 26 into the hopper, hold the stratum of fur adjacent the apron stationary. Thus, upward movement and consequently circulation of the fur in the hopper is prevented with the exception of the fur snagged by apron pins 26 from the inner surface of the stationary stratum of fur. As the apron is driven by the roller, the fur on these apron pins moves upwardly and over the top roller 22, and then the fur is brushed from the now downwardly directed apron pins by the brushes 54a of wiper brush 13. The fur is brushed into an exhaust box, generally indicated at 82, and passes out through the bottom thereof to the blower or former. The sides of this box may be made of glass so that the fur therein being brushed from the apron may be examined. This box preferably has a lid 83 hinged at 84 permitting access to the wiper brush and to the interior of the box. Below the bottom roller 23 is a tray, generally indicated at 85, which is slidably mounted on the framework of the machine. This tray serves to catch any fur dropped by the apron so that it may be readily returned to the hopper.

Thus, in operation, circulation of the fur and thus the formation of matted fur balls in the hopper is prevented. Furthermore, a fur feeder is disclosed which feeds fur at a uniform and regular rate. Accordingly, an efficient and practical fur feeder has been disclosed in which the objects hereinabove set forth, as well as many others, are accomplished.

As many possible embodiments may be made of the above invention and as many changes might be made in the embodiment above set forth, it is to be understood that all matter hereinbefore set forth, or shown in the accompanying drawings, is to be interpreted as illustrative and not in a limiting sense.

I claim:

1. In a fur feeder, in combination, a hopper having an open side, an apron closing said open side, means for driving said apron, means on said apron for removing fur from said hopper as said apron is driven, a plurality of stationary members extending longitudinally of and positioned next to said apron, and means formed on said stationary members extending outwardly with respect to said apron into the fur in said hopper, said last-mentioned means holding the stratum of fur adjacent said apron stationary as said fur removing means on said apron shears fur from the surface of this stratum.

2. In a fur feeder, in combination, a hopper having an open side, an apron closing said open side, means for driving said apron, a plurality of recesses formed in said apron extending longitudinally thereof, a plurality of stationary members fitting into the recesses of the portion of said apron facing said hopper, a plurality of pins mounted on said apron and extending in the direction in which said apron is driven, and a plurality of pins mounted on said stationary members extending outwardly into the fur in said hopper a substantially greater distance than the pins on said apron, whereby the pins on said stationary members hold the stratum of fur in which they are positioned stationary as said apron pins shear fur from the surface of said stratum adjacent said apron.

3. In a fur feeder, in combination, a hoper having an open side, an apron closing the open side of said hopper, said apron including an endless belt having a plurality of slats secured thereto and extending transversely thereacross, pin means mounted on said slats and extending therefrom at an acute angle to the portion of said apron traversing the open side of said hopper, said pins extending in the direction of movement of said apron, and a plurality of stationary members positioned adjacent to said apron having portions extending outwardly with respect to said apron into the hopper substantially perpendicularly to the portion of said belt traversing the open end of said hopper into the fur in said hopper, the outwardly extending portions of said stationary members extending into the fur in said hopper a substantially greater distance than the pins on said apron, whereby the outwardly extending portions of said stationary members hold the stratum of fur adjacent said apron stationary as said apron pins shear fur from the surface of said stratum adjacent said apron.

4. In a fur feeder, in combination, a hopper, an apron, means for driving said apron, means on said apron for removing fur from said hopper, a plurality of stationary members having portions extending outwardly with respect to said apron into the fur in said hopper positioned in the fur in said hopper next to said apron, means to press the fur in said hopper against said apron and said stationary members, and means pressing said last-mentioned means against the fur in said hopper with a pulsating action, said stationary members holding the fur in said hopper next to said apron stationary as said fur-removing means on said apron shears fur therefrom.

5. In a fur feeder, in combination, a hopper having an open side, an apron positioned in the open side of said hopper, means for driving said apron, a plurality of stationary members extending throughout the length of the open side of said hopper adjacent and extending longitudinally of said apron, a plurality of pins mounted on said stationary members extending outwardly into said hopper from said apron, the pins on said stationary members being positioned

in spaced relationship to each other throughout the length of each of said stationary members, and means on said apron for removing fur from said hopper, the pins on said stationary members holding the stratum of fur adjacent said apron stationary as the fur removing means on said apron shears fur from this stratum.

6. In a fur feeder, in combination, a hopper having an open side, an apron closing said open side, means for driving said apron, means on said apron for removing fur from said hopper as said apron is driven, means for removing fur from said apron, a plurality of stationary members positioned in said hopper extending longitudinally of and adjacent to said apron, means formed on said stationary members extending outwardly into the fur in said hopper, said hopper having an opening in the top thereof, and a gate positioned in said hopper, said gate through the force of gravity pressing said fur against said last-mentioned means and said apron.

7. In a fur feeder, in combination, a hopper having an open side, an apron closing said open side, means for driving said apron, a plurality of recesses formed in said apron extending longitudinally thereof, a plurality of stationary members fitting into the recesses of the portion of said apron facing said hopper, a plurality of pins mounted on said apron and extending in the direction in which the apron is driven, a plurality of pins mounted on said stationary members extending outwardly into the fur in said hopper a substantially greater distance than the pins on said apron, a gate positioned within said hopper, said gate acting through the force of gravity pressing the fur in said hopper against the pins on said stationary members and against the pins on said apron, and a wiper brush for removing fur from said apron.

8. In a fur feeder, in combination, a hopper having an open side, an apron of the endless type adapted to close said open side, means for driving said apron, a plurality of supports positioned behind the portion of said apron closing the open side of said hopper, said support supporting the portion of said apron facing said hopper, means on said apron for removing fur from said hopper, a plurality of stationary members positioned in the fur in said hopper adjacent said apron, said stationary members having portions extending outwardly into the fur in said hopper substantially perpendicularly to said apron, a gate, said gate pressing the fur in said hopper against the outwardly extending portions of said stationary members and said apron, and means to press said gate downwardly against the fur in said hoper with a pulsating action.

9. In a fur feeder, in combination, a hopper, an apron, means for driving said apron, means on said apron for removing fur from said hopper, a plurality of stationary members positioned in the fur adjacent said apron to prevent circulation of the fur in said hopper as said fur removing means on said apron removes fur from said hopper, a gate positioned in said hopper pressing the fur therein against said apron and said stationary members, a ratchet member operatively connected to said gate, and a reciprocating pawl member, said reciprocating pawl member pressing said gate downwardly in said hopper against the resilience of said fur with a pulsating action, said gate being caused by gravity to move downwardly as said fur is removed from said hopper at which time said pawl moves to another ratchet tooth in which position it again moves said gate with a pulsating action against the fur in said hopper.

10. In a fur feeder, in combination, a hopper, means for removing fur from said hopper, a plurality of members positioned in the fur next to said fur removing means, pin means mounted on said members extending outwardly with respect to said apron into the fur in said hopper substantially perpendicularly to said fur removing means, said pin means preventing the circulation of fur in said hopper as said fur removing means removes fur therefrom, and means to press the fur in said hopper toward said members and against said fur removing means.

11. In a fur feeder, in combination, a hopper having an open side, an apron closing said open side, means for driving said apron, means on said apron for removing fur from said hopper as said apron is driven, a plurality of stationary members extending longitudinally of and positioned next to said apron, and pin means formed on said stationary members extending outwardly into the fur in said hopper substantially at right angles to said apron, said last-mentioned means holding the stratum of fur adjacent said apron stationary as said fur removing means on said apron shears fur from the surface of this stratum.

12. In a fur feeder, in combination, a hopper having an open side, an apron closing said open side, means for driving said apron, means on said apron for removing fur from said hopper as said apron is driven, means for removing fur from said apron, a plurality of recesses formed in said apron extending longitudinally thereof, a plurality of members fitting into the recesses of the portion of said apron facing said hopper, means on said members extending outwardly into fur in said hopper, and means for pressing the fur in said hopper toward said last-mentioned means and against said apron.

13. In a fur feeder, in combination, a hopper having a substantially vertical open side, an apron closing said open side, means for driving said apron, means on said apron for removing fur from said hopper as said apron is driven, means for removing fur from said apron, a plurality of members positioned in said hopper extending longitudinally of and positioned adjacent to said apron, means on said members extending outwardly into the fur in said hopper, said hopper having an opening in the top thereof, and a gate positioned in said hopper, said gate being pivotally mounted adjacent the upper end of the open side of said hopper and acting through the force of gravity to press the fur in said hopper toward said last-mentioned means and against said apron.

14. In a fur feeder, in combination, a hopper, an apron, means for driving said apron, means on said apron for removing fur from said hopper, a plurality of members positioned in the fur next to said apron and extending longitudinally thereof, pin means on said members extending outwardly with respect to said apron into the fur in said hopper for preventing circulation of fur in said hopper as said fur removing means removes fur from said hopper, a gate positioned in said hopper and pressing the fur therein toward said pin means and against said apron, and means to press said gate against the fur in said hopper with a pulsating action.

15. In a fur feeder, in combination, a hopper, an apron, means for driving said apron, means on said apron for removing fur from said hop-

per, a plurality of members positioned in the fur in said hopper next to said apron, said members having portions extending outwardly with respect to said apron into the fur in said hopper, said last-mentioned portions holding the stratum of fur in which they are positioned stationary as said fur-removing means on said apron shears fur from the surface of said stratum next to said apron, means to press the fur in said hopper toward said apron, and means to remove fur from said apron.

16. In a fur feeder, in combination, a hopper, an apron, means for driving said apron, means on said apron for removing fur from said hopper, said hopper having an opening in the top portion, a gate positioned in the opening in the top of said hopper and pressing downwardly upon the fur in said hopper through the action of gravity, means to operate said gate with a pulsating action against the fur in said hopper, and a plurality of stationary members positioned in the fur in said hopper adjacent said apron to prevent circulation of the fur in said hopper as said means on said apron removes fur therefrom.

PAUL SCHULTZE.