

Feb. 15, 1955

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2,702,177

APPARATUS FOR FEEDING FIBROUS STOCK TO TEXTILE MACHINES

Filed April 4, 1951

5 Sheets-Sheet 1

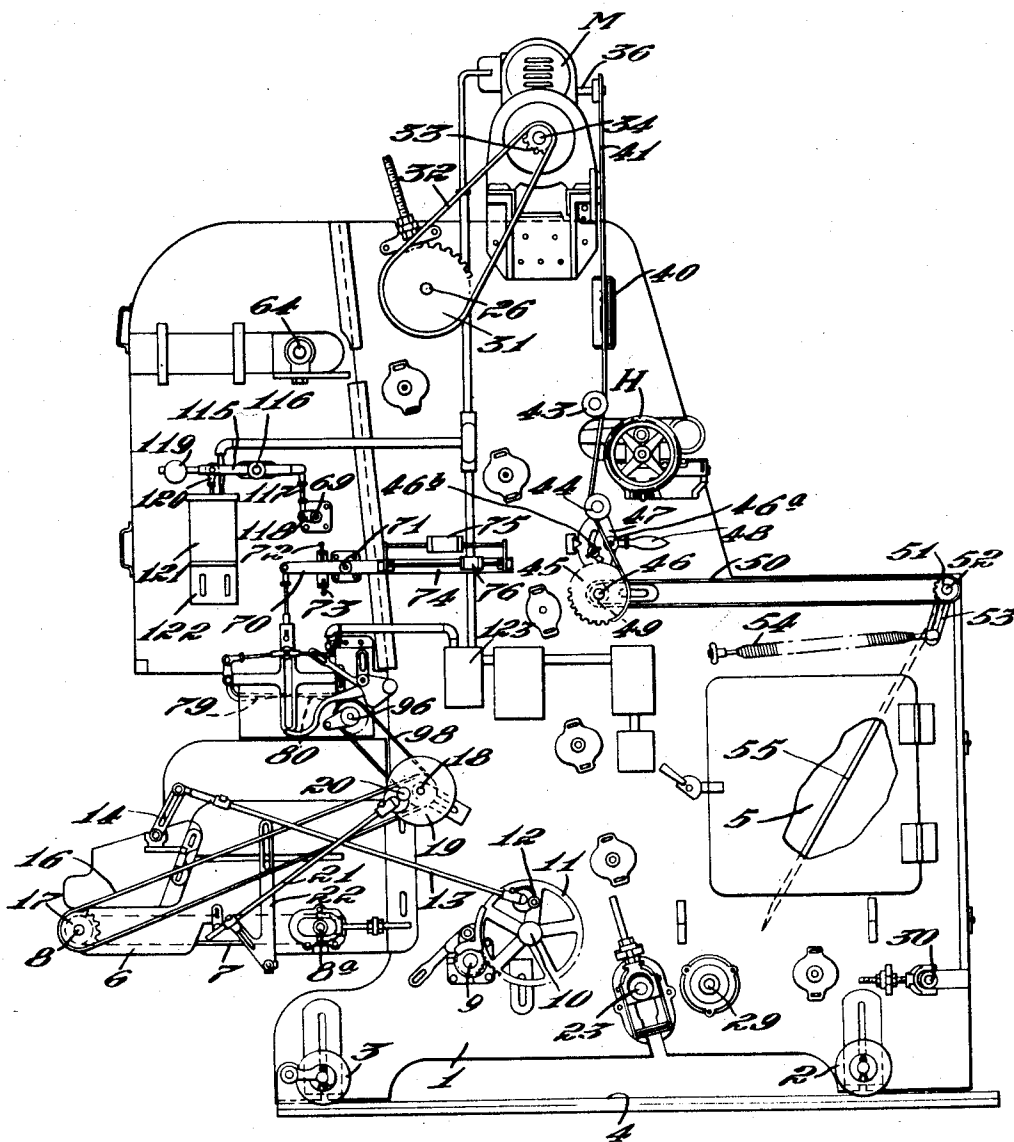


Fig. 1

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5 Sheets-Sheet 2

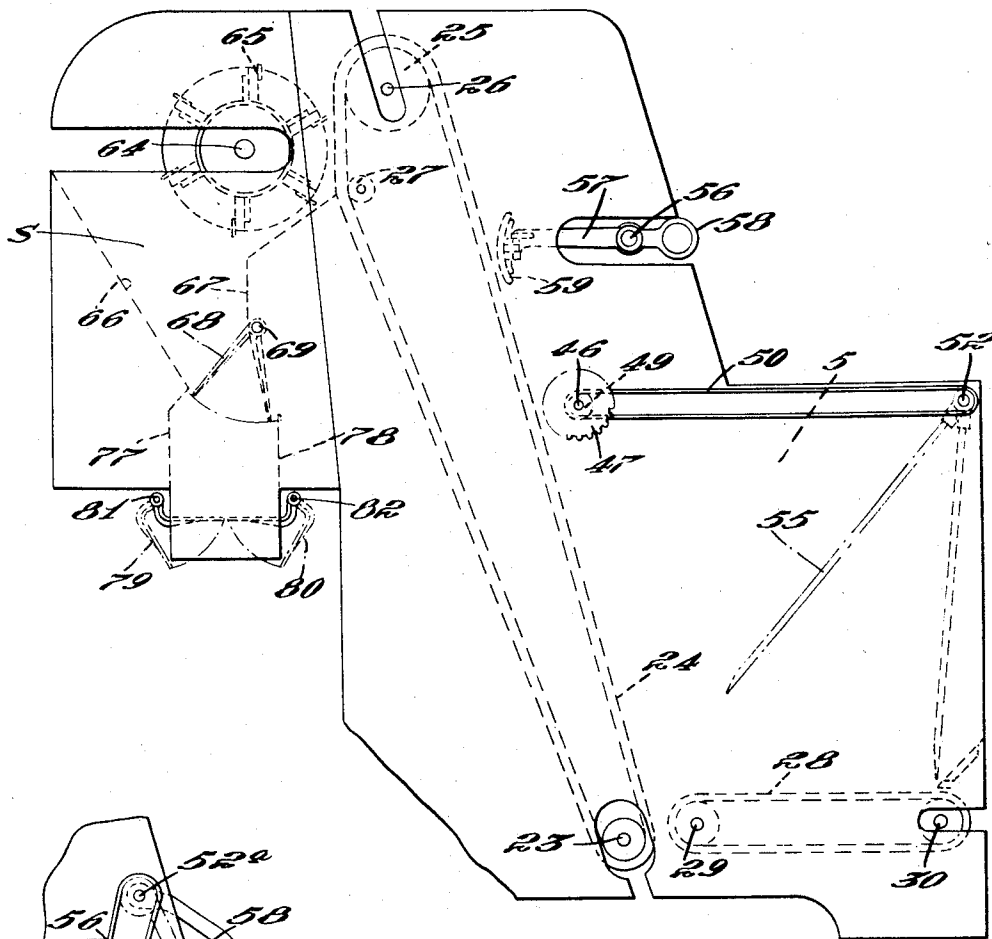


Fig. 2

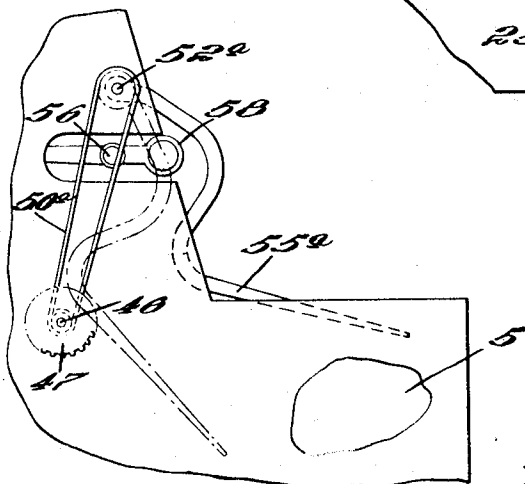


Fig. 3

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5 Sheets-Sheet 3

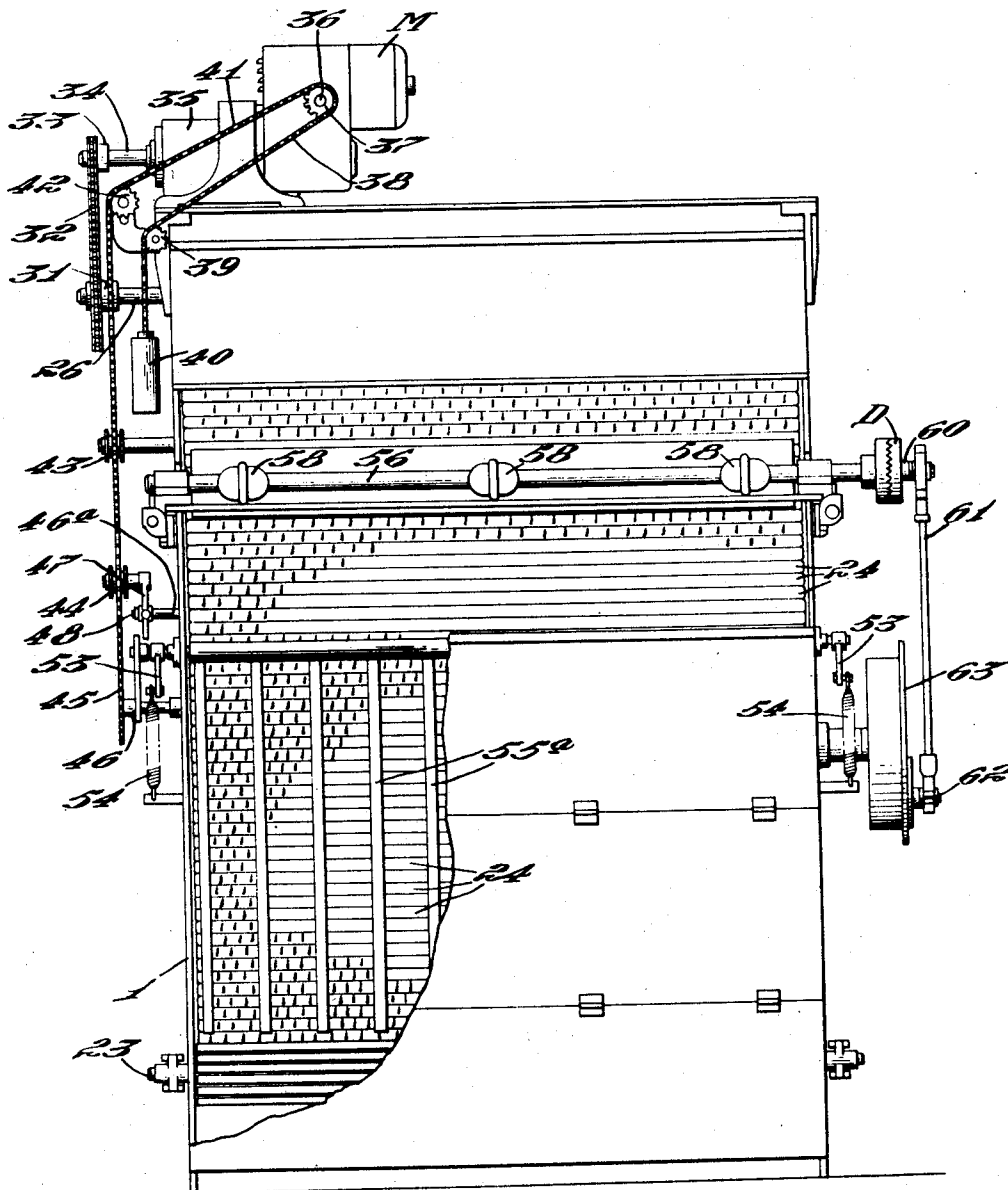


Fig. 4

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5 Sheets-Sheet 4

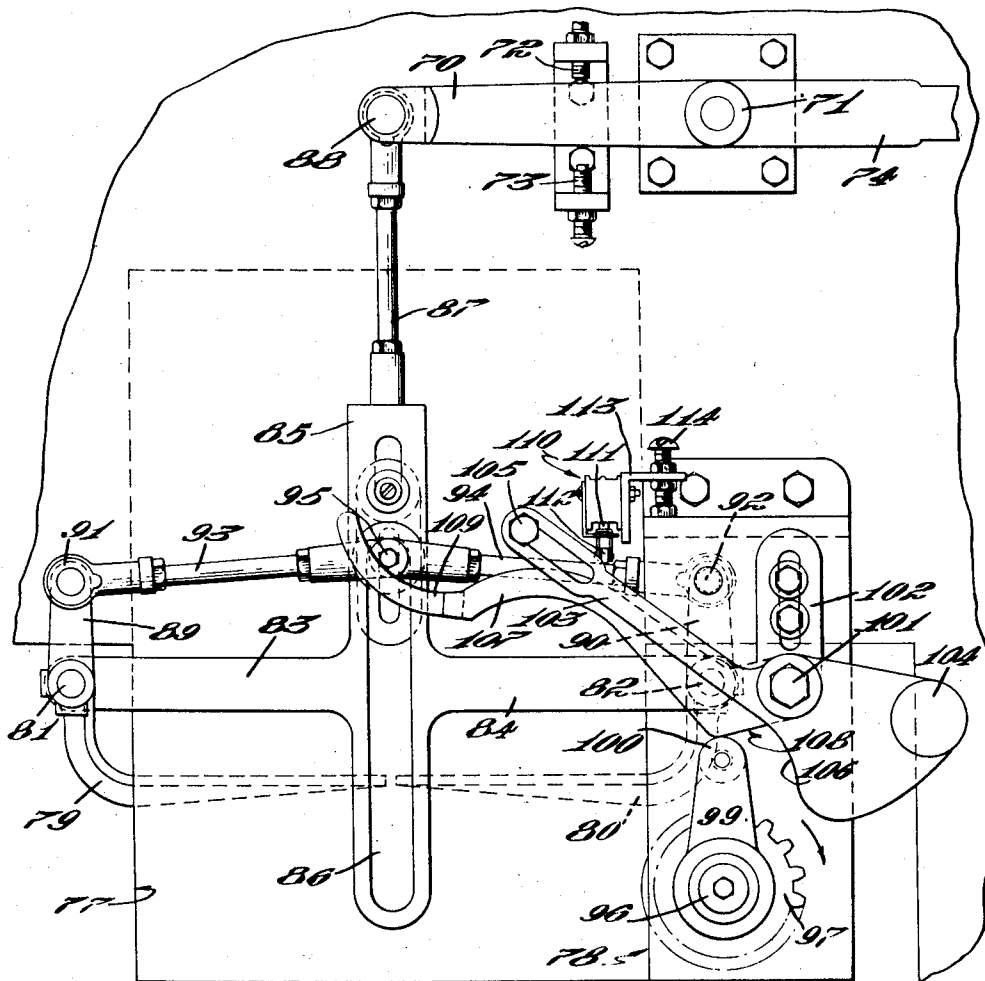


Fig. 5

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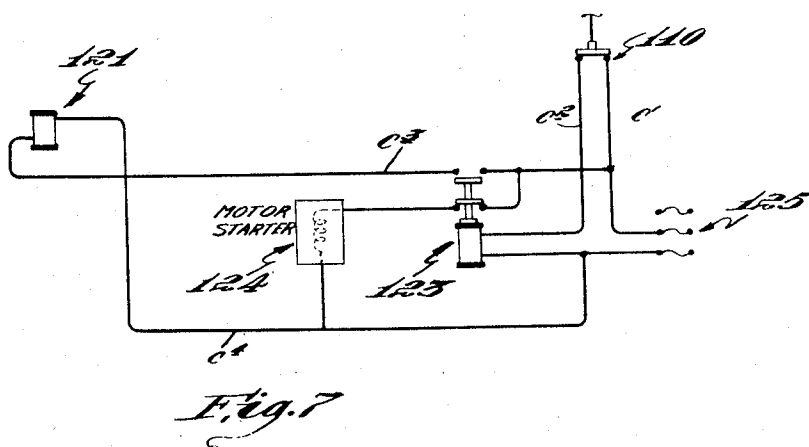
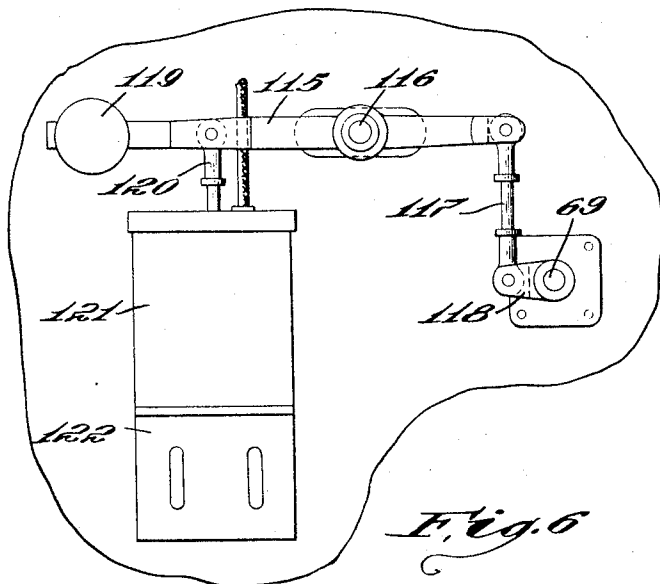
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APPARATUS FOR FEEDING FIBROUS STOCK TO TEXTILE MACHINES

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5 Sheets-Sheet 5



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2,702,177

APPARATUS FOR FEEDING FIBROUS STOCK TO TEXTILE MACHINES

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Application April 4, 1951, Serial No. 219,276

3 Claims. (Cl. 249-4)

This invention pertains to textiles and more particularly to apparatus for feeding fibrous textile stock, including fur, etc., to a machine for processing the fiber, for example, a carding machine.

Customarily, in such apparatus, the raw stock is placed loosely in a large bin or hopper, one effective wall of which is formed by an upwardly moving run of an endless conveyor commonly referred to as a spike apron, comprising flexibly united, transversely extending slats, each with projecting pins or spikes which pull off portions of the fibrous material from the mass in the bin, delivering the material thus picked up to a weighing device, comprising a scale beam whose tipping, in response to a predetermined weight of fiber in the scale pan, results in a temporary stopping of the conveyor with concomitant temporary cessation of delivery of fibrous material into the scale pan. The principal purpose of feeding apparatus of this general type is to deliver the stock at a uniform rate to the carding machine or other apparatus with which the feeder is associated.

It was early observed in the operation of such feeders that the amount of stock picked up and delivered by the spike apron per unit of time gradually decreased as the quantity of material in the bin decreased, and since this affected the rate at which the material was delivered to the carding machine or other apparatus, efforts were made to overcome this non-uniform action of the spike apron. Among other proposals was that of providing a movable rear wall for the bin biased by springs or weights to move bodily toward the spike apron and thus to maintain a constant pressure against the spike apron regardless of the actual amount of stock in the bin. Another proposal was to provide a movable floor (usually an endless belt) for the bin, the upper run of the belt being caused to move toward the spike apron and thus tending to carry the lower layer, at least, of the fibrous material toward the up-going run of the spike apron, thus positively feeding the stock to the spike apron. While these prior proposals have been widely adopted and are in daily use in the mills, neither of them nor other prior proposed constructions have fully and adequately solved the problem of insuring a uniform delivery of stock by the spike apron regardless of the amount of material in the bin. The present invention has for one of its objects the provision of novel means for insuring a substantially uniform delivery of fibrous material by the spike apron whether the bin be full or nearly empty. A further object is to provide means whereby uniformity of delivery is obtained by varying the speed of the spike apron (while it is operating) substantially inversely to the quantity of fiber in the bin. A further object is to provide means whereby the basic speed of the spike apron may be determined manually, and, if desired, while it is running. A further object is to provide simple means for varying the speed of the spike apron and which is applicable, if desired, to existing feeders for cards, garnetts or other apparatus with which the feeder is associated without substantial modification of the other parts. A further object is to provide automatic means for varying the speed of the spike apron in such ratio to the decreasing volume of fibrous material in the bin as to insure a constant and uniform delivery of fibrous material by the spike apron while the latter is running. A further object is to provide improved feeding apparatus wherein some, at least, of the operating instrumentalities are electrically controlled. Other and further objects and advantages of the invention will be pointed out in the

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following more detailed description and by reference to the accompanying drawings wherein:

Fig. 1 is a side elevation, showing the left-hand side of a card feeder embodying the present invention;

Fig. 2 is a fragmentary, diagrammatic, left side elevation, to larger scale than Fig. 1, showing details of the bin and detector device;

Fig. 3 is a fragmentary side view, showing a modification of the arrangement of Fig. 2;

Fig. 4 is a rear view of the apparatus of Fig. 1, partly broken away;

Fig. 5 is a fragmentary side elevation, to larger scale than Fig. 1, showing details of the weighing device;

Fig. 6 is a fragmentary side elevation, to larger scale than Fig. 1, showing details of the catch-pan actuating devices; and

Fig. 7 is a wiring diagram.

The invention is herein disclosed as embodied in apparatus having a hopper or bin for the reception of fibrous stock in bulk and designed automatically to weigh out a succession of substantially equal quantities of the fiber and to deliver these weighings in the form of a continuous batt of loose fibers of substantially uniform depth to a textile processing machine, for example a woolen or worsted card, a garnett machine, a picker, or the like. Conventional features customarily in card feeders of the Bramwell type are not, in all instances, illustrated.

Referring to the drawings, the numeral 1 indicates one side plate of the frame of a card feeder of the Bramwell type, it being understood that the apparatus comprises a similar side frame plate at its opposite side, and that appropriate transversely extending parts are operative to keep the side frame plates in properly spaced relation. As here illustrated (Fig. 1), each side frame plate 1 is provided with vertically adjustable rollers or wheels 2 and 3 designed to rest upon tracks 4 to facilitate the adjustment of the apparatus from front to rear. The rear end portion of the apparatus is so designed as to provide a bin or hopper 5 into which the loose fibrous material is loaded and from which the fibrous material is withdrawn and presented to the weighing mechanism. At the forward portion of the apparatus brackets 6, secured to the respective side frame members 1, support an endless delivery apron 7 which is entrained about rollers carried by shafts 8 and 8^a, respectively, mounted in bearings in the brackets 6, the shaft 8^a being horizontally adjustable. The shaft 8 is provided with a gear or other driving means (not shown) which customarily receives its motion from the processing machine to which the fibrous material is delivered by the apron 7.

A driven shaft 9 (Fig. 1), having bearings at its opposite ends in the side frame members 1, is provided with a pinion which meshes with a gear on a shaft 10, the gear being provided with a crank arm 12 which is connected to one end of a rod 13 which actuates a rocker 14 to which the usual paddle board is connected.

An endless chain 16 is entrained about a sprocket wheel 17 on the shaft 8 and about a sprocket wheel on a shaft 18, the latter sprocket wheel being connected to a crank disk 19 carrying a crank 20 which actuates a rod 21 connected to a rock arm 22 which operates the usual push board.

A shaft 23 (Figs. 1 and 2), extending transversely across the machine and having its ends arranged in adjustable bearings, carries a roller about which is entrained the endless spike apron 24, the rear run of this spike apron extending upwardly and forwardly from the lower part of the bin 5 to the upper part of the machine, the spike apron being entrained about a roller 25 on a shaft 26 whose ends turn in bearings in the upper parts of frame members 1. Preferably the forward run of the spike apron engages a roll 27 so arranged that the upper portion of the forward run of the spike apron is substantially vertical.

Shafts 29 and 30 (Figs. 1 and 2), turning in bearings in the lower rear parts of the side frame members, support rolls about which is entrained the bottom apron 28, the bearings for the shaft 30 preferably being horizontally adjustable. One of these shafts, for example, the shaft 29, is provided at one end with a ratchet wheel, rotation of which is effected by a reciprocating pawl (not

shown) whereby the shaft is driven, thus moving the bottom apron 28 so that its upper run moves forwardly and toward the rear run of the spike apron 24 so as to carry the fibrous stock in the bin toward the spike apron.

The shaft 26, which drives the spike apron, is provided at one end with a sprocket wheel 31 (Fig. 1) about which is entrained an endless chain 32 which passes about a sprocket wheel 33 on a shaft 34 (Figs. 1 and 4). This shaft 34 is the output shaft of a speed reduction gearing 35 which may be of any conventional type and which is driven by an electric motor M. A shaft 36 constitutes a speed control element. Thus, if the motor M be of variable speed type, the shaft 36 may operate a potentiometer in circuit with the motor. If a constant speed motor be used, shaft 36 may control speed varying connections of mechanical type, for example, a drive comprising pulleys of variable effective diameter. A sprocket wheel 37 is fixed to the shaft 36, and about this sprocket wheel is entrained a chain 38, one portion of which passes down about an idler sprocket 39. A weight 40 is secured to this end of the chain 38, the weight being arranged at the outer side of the frame member 1 and tending at all times to turn the shaft 36 in a clockwise direction. The chain 38 also comprises a run 41 which extends downwardly and outwardly and over an idler sprocket 42, and thence vertically downwardly (Fig. 1) and to the rear of an idler pulley or sprocket 43, and then down in position to be engaged by an idler pulley or sprocket 44. This end portion of the chain wraps partially around and is secured to the periphery of a sprocket wheel 45 mounted to turn on a stub shaft 46. A lever 47 is mounted to rock on the stub shaft 46^a and is provided with a handle 48 for rocking it. The idler pulley or sprocket 44 is mounted on a stub shaft carried by the upper end of the lever 47, and, by rocking the lever 47 (assuming that the sprocket wheel 45 is stationary), the effective length of the chain 38 may be varied, thereby raising or lowering the weight 40 and thus initially adjusting the position of the speed varying shaft 36. The lower basic speed adjustment is that which obtains when the pulley or sprocket 44 is out of contact with chain 38, the latter then comprising a vertical run below pulley or sprocket 43 and the weight 40 will be in the lowest position. Suitable locking or detent means 46^b is provided for retaining the lever 47 in the desired position of adjustment. The basic speed of the spike apron may thus be adjusted for any particular loading of the bin. Moreover, adjustment of the basic speed may be made while the spike apron is running, which is advantageous, for example, in experimentally determining the optimum speed with respect to stock of the kind employed.

A sprocket wheel 49 is fixed to the sprocket wheel 45 and a sprocket chain 50 is entrained about this wheel 49 and about another sprocket wheel 51 fixed to a shaft 52 which turns in bearings in the side frame plates. As illustrated in Figs. 1 and 2, the axis of the shaft 52 is near the open top edge and the rear wall of the hopper or bin 5.

Crank arms 53 (Figs. 1 and 4) are secured to the shaft 52 at its opposite ends, respectively, and tension springs 54 (Fig. 4) are attached near the lower ends of these crank arms, the springs being so arranged as to tend to turn the crank arms in a clockwise direction. Such movement of the crank arms so moves the chain 50 as to tend to wind up the chain 38 about the sprocket wheel 45, thus turning the speed changing shaft 36 to increase the speed of the motor M. Reverse movement of the crank arms 53 will decrease the speed of the motor.

A detector device 55 (Figs. 1 and 2) is secured to the shaft 52. The detector, as here illustrated, comprises a series of spaced fingers 55^a (Fig. 4) which are of such length that when in vertical position they reach substantially from the shaft 52 to near the upper run of the bottom apron 28. When the bin 5 is filled with the fibrous stock, the detector 55 is forced back by the mass of fiber to the dotted line position shown in Fig. 2. When the bin is full, to the normal predetermined level, the detector acts, through the connections above described, to adjust the motor control device so that the motor runs at slow speed.

A shaft 56 is arranged above the forward portion of the bin 5, the bearings for this shaft being adjustable horizontally. This shaft carries a plurality of rock arms 57 having counterbalances 58 at their rear ends and car-

rying a comb 59 at their forward ends so adjusted with reference to the up-going rear run of the spike apron 24 as to knock off unduly large lumps or masses of the fibrous material carried upwardly by the spike apron. The shaft 56 is provided at one end (Fig. 4) with a part D carrying a crank pin 60 to which is pivoted the upper end of a rod 61, the lower end of which is pivotally connected to a crank 62 carried by a pulley 63 mounted on a shaft projecting from one of the side frame members, the pulley receiving its motion from a pulley or equivalent drive element (not shown) on shaft 9.

A shaft 64 (Figs. 1 and 2), having its opposite ends mounted in horizontally adjustable bearings carried by the side frame members, supports a roll provided with radially extending lags 65. The shaft 64 is rotated so that the lags 65 move downwardly closely adjacent to the vertical portion of the forward run of the spike apron, the lags acting to knock or fan off the fiber from the spike apron so that this fiber will be delivered into the catch pan S. This catch pan (Fig. 2) is defined by front and rear stationary walls 66 and 67, and stationary end walls which may be the side frame plates, the catch pan having a movable floor consisting of a gate 68 carried by a horizontal rock shaft 69. This gate 68 may move in a clockwise direction from a substantially vertical position in which it leaves the bottom of the catch pan fully open, to a forwardly and downwardly inclined position where it closes the outlet from the catch pan.

The weighing mechanism (Figs. 1 and 5) comprises a beam, consisting of a pair of levers 70, one arranged at each side of the machine (only one being shown), and each pivoted to turn on a shaft 71, the latter being journaled in anti-friction bearings, the motion of the forward arms of these levers being limited by adjustable stop screws 72 and 73. Each lever has a rearwardly extending arm 74 which carries adjustable weights 75 and 76.

The scale pan has stationary, spaced, front and rear walls 77 and 78 (Fig. 2) and stationary end walls which may be the side frame members 1, the bottom of this scale pan being constituted by two doors 79 and 80. When in the horizontal position, these doors form the floor of the scale pan, but when the doors are swung downwardly the contents of the scale pan may escape, the parts being so arranged that when the doors 79 and 80 are open, the contents of the pan fall onto the delivery apron 7.

The shafts 81 and 82 which support the doors 79 and 80 are mounted in bearings in a carrier comprising the horizontal arms 83 and 84 of suspension members, one disposed on each side of the machine, the one which is here illustrated, at the left-hand side of the machine, being cruciform. Each of these suspension members comprises a vertical part 85 suspended by a rod 87 from the forward arm of the corresponding lever 70. The part 85, of cruciform shape, at the left-hand side has an elongate, vertical slot 86. A suitable anti-friction bearing 88 is interposed between the upper end of the rod 87 and the arm 70.

Each of the shafts 81 and 82 is provided with an up-standing arm 89 and 90, respectively, whose upper ends are connected by pivot bearings 91 and 92 with the ends of toggle link members 93 and 94, respectively, the proximate ends of said levers being pivotally connected to a pin 95 which projects outwardly through the slot 86 in the member 85. When the axis of the pin 95 is above a line joining the axes of the pivot members 91 and 92, the gates 79 and 80 are held in closed position by the toggle action of the links 93 and 94, thus keeping the scale pan closed.

A horizontal stub shaft 96 (Fig. 5) carries a sprocket wheel 97 about which is entrained an endless sprocket chain 98 (Fig. 1) which also embraces a sprocket wheel fixed to the disk 19 which is driven by the sprocket chain 16. A crank arm 99 (Fig. 5) fixed to the sprocket wheel 97, carries a cam follower roll 100. A stub shaft 101, parallel to the shaft 96, is mounted on a bracket 102 and supports a rock lever 103 having a counterweight 104 which tends to turn it in a clockwise direction, the lever being provided at its forward end with a pin 105 which overlies the toggle link 94. The counterweight 104 is provided with a cam surface 106 which at times is engaged by the cam follower roll 100.

A second lever 107 (Fig. 5) is mounted on the shaft 101, this lever 107 having a cam surface 108 which at times is engaged by the roll 100, the lever 107 also having a forward portion 109 which underlies the pin

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95 which connects the toggle links 93 and 94.

A snap switch 110 (Figs. 5 and 7), which may be of any conventional type and which has a vertically movable actuating pin 111 (provided with a contact roll 112 overlying the toggle link 94) is supported by a bracket 113 which is vertically adjustable by a screw 114.

A lever 115 (Figs. 1 and 6), mounted to rock on a stub shaft 116 carried by one of the frame plates 1, is connected by a rod 117 to a crank arm 118 fixed to the shaft 69 on which the floor 68 of the catch pan is mounted. The counterbalance weight 119 at the forward end of the lever 115 is so adjusted as partially to offset the effective weight of the floor 68 when the latter is in its vertical, inoperative position, thereby to reduce its resistance to the action of the solenoid and to aid the downward pull of the solenoid when the latter is energized. A rod 120, pivotally connected to the lever 115, is connected at its lower end to the core of a solenoid 121 carried by a bracket 122. When the solenoid is energized the core is moved downwardly, thus swinging the lever 115 in a counterclockwise direction and thus moving the member 68 upwardly so as to close the bottom of the catch pan.

In a modified construction, shown in Fig. 3, the detector or feeler rack 55^a, corresponding in function to detector 55, is carried by a shaft 52^a located above the shaft 56 which carries the comb 59, the shaft 52^a having fixed to it a sprocket which drives the chain 50^a corresponding in function to chain 50.

The electrical circuit (Fig. 7) for controlling the operations of the various parts as here illustrated comprises the snap switch 110 above referred to, the solenoid 121, relay 123 designed in one position to close one circuit and in another position to close a second circuit, a motor starter 124, and a circuit breaker 125.

Operation

The counterbalance weights 75 and 76 are first adjusted so that when no stock lies upon the doors 79 and 80, the forward portions of scale arms 70 are in contact with stop screws 72; and toggle link 94 is in contact with the actuating roll 112 of snap action switch 110 so that the electric circuit through conduits C¹ and C² is closed (Fig. 7), thus energizing motor M whose variable speed output shaft 34 drives the top spike apron driving roll 25 by the chain 32, and thus driving spike apron 24 so that its lifting run moves upward.

The spikes on the lifting run of the spike apron pick up fibers from the mass of stock in hopper 5 whose bottom apron 28 moves the stock forward toward the spike apron. Reciprocating comb 59 removes and returns to the hopper 5 excessively large lumps or masses of stock so that the upper portion of the up-going run of the apron carries a substantially uniform load of stock which passes up over the spike apron driving roll 25 and down toward the hold-out idler roll 27. Lags 65, mounted in the outside circumference of the doffing cylinder (which rotates in the opposite direction to the spike apron rolls) knock or fan the fibers from the spike apron so that the fiber drops between the walls 66 and 67, thence between the walls 77 and 78, and then onto the closed doors 79 and 80 of the scale (the gate 68 now being vertical). (Various types of doffing assemblies can be used other than a doffing cylinder.)

When substantially exactly the desired weight of stock has accumulated upon the bottom members 79 and 80 of the scale pan corresponding to that for which counterbalance weights 75 and 76 were originally set, the bottom members 79 and 80 will move down (while still in the closed position), together with part 83 and the toggle linkage 93, 94). As link 94 moves down, it leaves the roll 112 of the snap switch 110, whereupon the switch snaps so as to break the electric circuit in conduits C¹ and C² and thus deenergize motor M, and so as to activate relay 123 instantaneously and thus instantaneously close the electric circuit in conduits C³ and C⁴. When the circuit in conduits C³ and C⁴ is closed, solenoid 121 is energized so as to pull down the forward portion of lever 115 which is pivotally mounted on stub shaft 116. Thus, the rear portion of lever 115, through connecting link 117, forcibly and quickly lifts lever 118 and turns catch pan shaft 69 so that catch pan floor 68 moves from its vertical, idle position (hitherto maintained by gravity) into its closed position represented by the broken lines in Fig. 2. In this position the lower edge of the catch

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pan floor 68 is forcibly held in contact with the wall 66 so that any stock fibers dropping from the doffing cylinder will be caught and held in the space (catch pan) defined by the walls 66 and 67, the side frames 1, and the catch pan floor 68 until such time as the solenoid becomes de-energized. Thus, any appreciable surplus stock, over and above the predetermined weight necessary to tip the weighing scale, is prevented from dropping into the scale pan containing the quantity of stock which constitutes the predetermined weight.

As above described, the chain 16 is continuously driven, so that the sprocket wheel 97 (Fig. 5) and arm 99 constantly rotate. Thus, at regular intervals, the roll 100, by engagement with cam surface 106, swings arm 103 so that the pin 105 moves down against toggle link 94 with the result that the joint between it and toggle link 93 is broken downward so that the upper ends of arms 89 and 90 are drawn toward one another, turning the shafts upon which they are mounted, and thus swinging the doors 79 and 80 to open position as represented by the broken lines in Fig. 2, thereby dumping their weighed load of stock onto delivery apron 7.

As arm 99 continues to turn, its roller pin 100 strikes upwardly against the cam surface 108 of arm 107 so that arm 107 is raised to move its end 109 into contact with the pin 95 which unites toggle links 93 and 94 and lifts them into self-locking position, thereby re-closing doors 79 and 80; at the same time moving scale arms 70 into normal load-receiving position where they contact with stop screws 72; and bringing toggle link 94 into contact with roller 112 of switch 110 so as to close circuit C¹, C² and open circuit C³, C⁴. Thus, motor M and spike apron 24 start moving again, solenoid 121 is de-energized so that catch pan floor 68 drops down by gravity into its idle, vertical position; and stock once again commences to be delivered so as to drop down upon the closed doors 79 and 80 of the scale pan.

Still further turning of arm 99 allows arm 107 to lower itself by gravity out of contact with toggle pin 95 and into its normal idle position. The timing of the arm 99 and the apron 7 is such that the front edge of each dumping of fiber from the scale pan will fall snugly against the rear edge of its predecessor.

Since the doors 79 and 80 are thus mechanically opened at regular time intervals (for example, three times per minute), spike apron 24 must be so speeded and comb 59 must be so set relative to the lifting run of the spike apron that the predetermined weight of stock is delivered into the scale pan each time in ample season before the pin 100 makes contact with cam 106. Adjustment of comb 59 is made by means of a handwheel H (Fig. 1).

Adjustment of the spike apron speed is basically established by manual adjustment of lever 47 and is thereafter automatically controlled by the feeler or detector 55.

When stock is loaded through the top aperture of hopper 5, feeler rack 55 is progressively depressed (swung back), the farthest point of depression being represented as that which would result from the hopper being full. Depression of feeler rack 55 turns sprocket 51 counterclockwise and turns levers 53 so as to stretch springs 54. As the feeler rack 55 moves to this position (the dotted line position of Fig. 2), the chain 50 turns sprocket 45 and thus unwinds chain 38, thereby turning shaft 36, causing shaft 34 to be driven at slow speed. As stock is gradually removed from hopper 5 by spike apron 24, springs 54 cause the feeler rack 55 progressively to move from the dotted line position (Fig. 2) toward the broken line position. This causes sprocket 51 to turn clockwise, thus moving chain 50 so as gradually to wind chain 38 about sprocket 45, causing weight 40 to move up and turning shaft 36 so that the speed of shaft 34 gradually increases.

Thus, the spike apron travels at an increasing surface speed sufficient to offset the diminishing ability of each individual spike to pick up fibers as the quantity and density of stock in the hopper gradually decreases. This is effective in enabling the spike apron, as a whole, to pick up and deliver stock at a substantially constant rate per second, regardless of the quantity of stock in the bin.

The modified arrangement of feeler, as shown at 55^a (Fig. 3), is primarily intended (although of broader application) for use in a reserve hopper type of feeder,

wherein the feeler is swung upwardly from its lower, fast speed position (broken lines, Fig. 3) into its upper slow speed position (dotted lines, Fig. 3) by virtue of stock coming into the working hopper from behind and at a low level, and then piling up beneath the comb so as to exert backward and upward pressure against the feeler rack.

While certain desirable embodiments of the invention have been illustrated and described, it is to be understood that the invention is broadly inclusive of any and all modifications falling within the scope of the appended claims.

We claim:

1. A card or garnett feeder comprising in combination a hopper, an endless conveyor constituting a wall of the hopper and discharging stock therefrom, a balanced scale pan receiving stock from the conveyor, a catch pan gate, and connections responsive to tipping of the scale pan for closing said gate to shut off receipt of stock by the scale pan from the conveyor, said connections being such that an interval of time elapses between beginning of tipping of the scale pan and the complete shutting off of receipt of the stock by the scale pan, means responsive to tipping of the scale pan for temporarily stopping the conveyor, a movable feeler in the hopper whose position varies with the amount of stock in the hopper, a variable speed drive for the conveyor, and connections actuable by the feeler for controlling the variable speed drive automatically so as to cause the conveyor, when in motion, to advance stock toward the scale pan at a linear rate which varies generally inversely to the amount of stock in the hopper, thereby tending to maintain equal the amount of stock received by the scale pan after each beginning of tipping notwithstanding differences in amount of stock in the hopper.

2. A card or garnett feeder comprising in combination a hopper, an endless conveyor constituting a wall of the hopper and discharging stock therefrom, a balanced scale pan receiving stock from the conveyor, a catch pan gate, and connections responsive to tipping of the scale pan for closing said gate to shut off receipt of stock by the scale pan from the conveyor, said connections being such that an interval of time elapses between beginning of tipping of the scale pan and the complete shutting off of receipt of the stock by the scale pan, means responsive to tipping of the scale pan for temporarily stopping the conveyor, a movable feeler in the hopper whose position varies with the amount of stock in the hopper, a variable speed drive for the conveyor, connections actuable by the feeler for controlling

the variable speed drive automatically so as to cause the conveyor, when in motion, to advance stock toward the scale pan at a linear rate which varies generally inversely to the amount of stock in the hopper, thereby tending to maintain equal the amount of stock received by the scale pan after each beginning of tipping notwithstanding differences in amount of stock in the hopper, and manually actuable means for exercising a control over the variable speed drive additional to the control thereof by said feeler, so as to determine a basic speed to be modified by action of the feeler.

3. A card or garnett feeder comprising in combination a hopper, an endless conveyor constituting a wall of the hopper and discharging stock therefrom, a balanced scale pan receiving stock from the conveyor, a catch pan gate, and connections responsive to tipping of the scale pan for closing said gate to shut off receipt of stock by the scale pan from the conveyor, said connections being such that an interval of time elapses between beginning of tipping of the scale pan and the complete shutting off of receipt of the stock by the scale pan, means responsive to tipping of the scale pan for temporarily stopping the conveyor, a movable feeler in the hopper whose position varies with the amount of stock in the hopper, a variable speed drive for the conveyor, and connections actuable by the feeler for controlling the variable speed drive automatically so as to cause the conveyor, when in motion, to advance stock toward the scale pan at a linear rate which varies generally inversely to the amount of stock in the hopper, the said connections including a sprocket wheel and a chain engaging the sprocket wheel and which moves in response to the movement of the feeler, and a manually actuable device adapted to deflect the chain thereby to change its effective length and so to determine the basic speed of the conveyor.

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