D. C. FISHER.

AUTOMATIC WEIGHING AND FEEDING MACHINE FOR TEXTILE FIBERS.

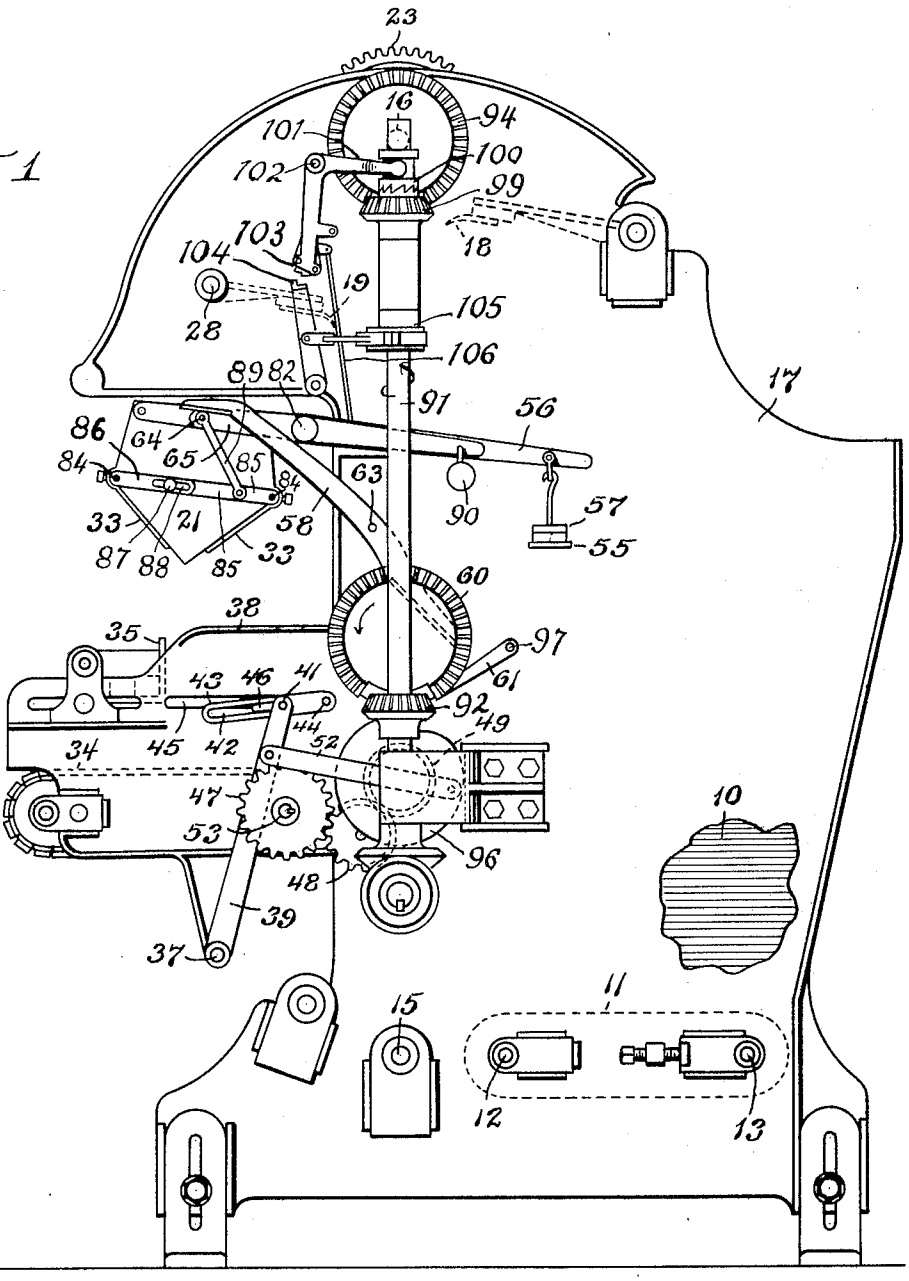
APPLICATION FILED JULY 20, 1908.

1,055,391.

Patented Mar. 11, 1913.

3 SHEETS—SHEET 1.

Fig. 1.



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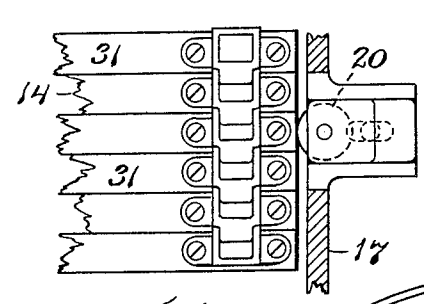

Fig. 4

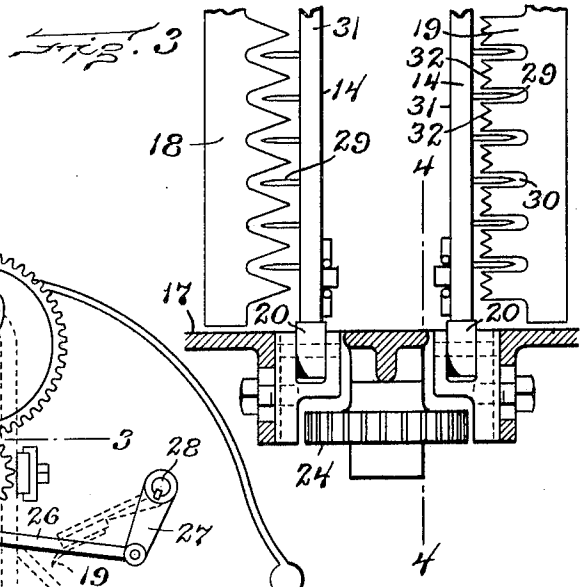

Fig. 3

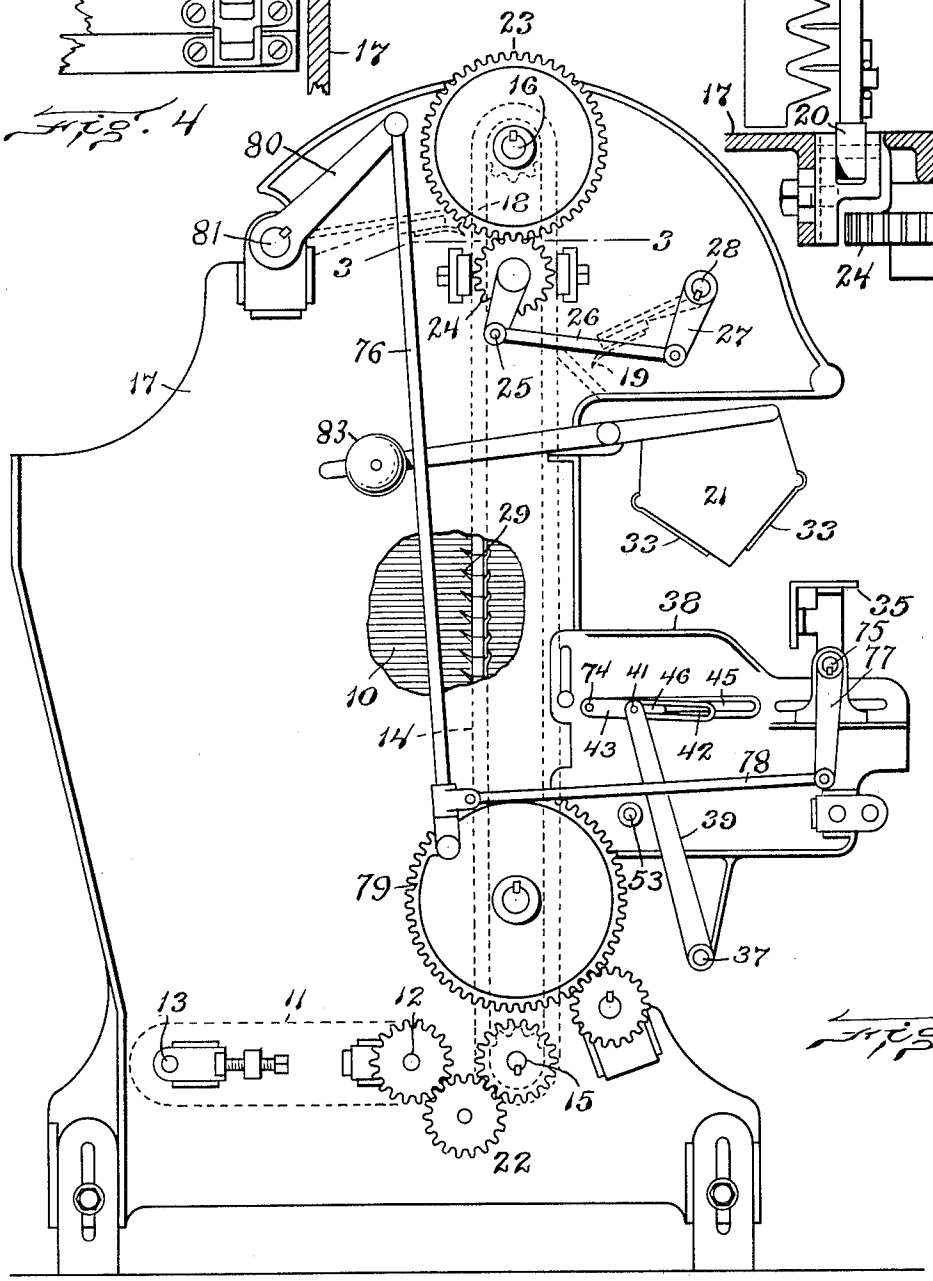

Fig. 2

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3 SHEETS—SHEET 3.

Fig. 7

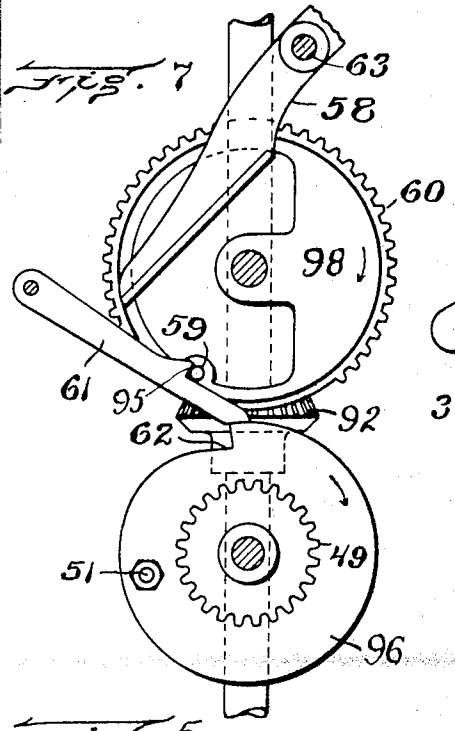


Fig. 8

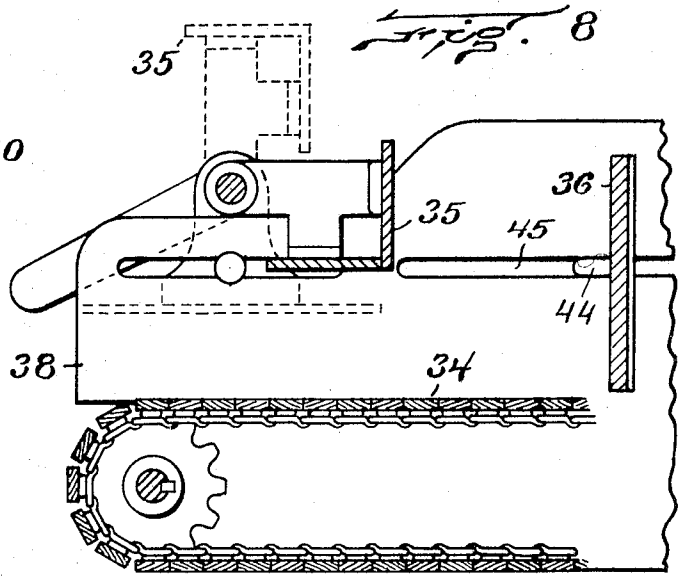


Fig. 5

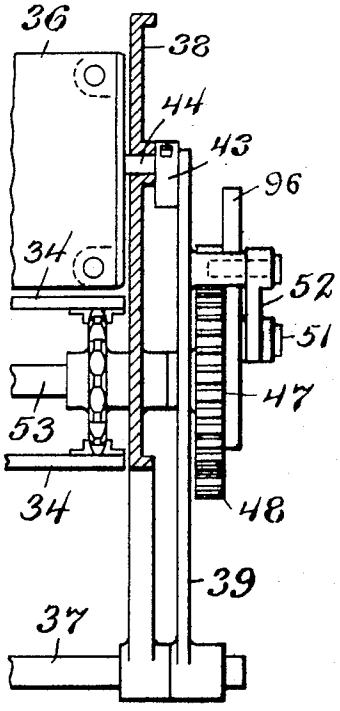
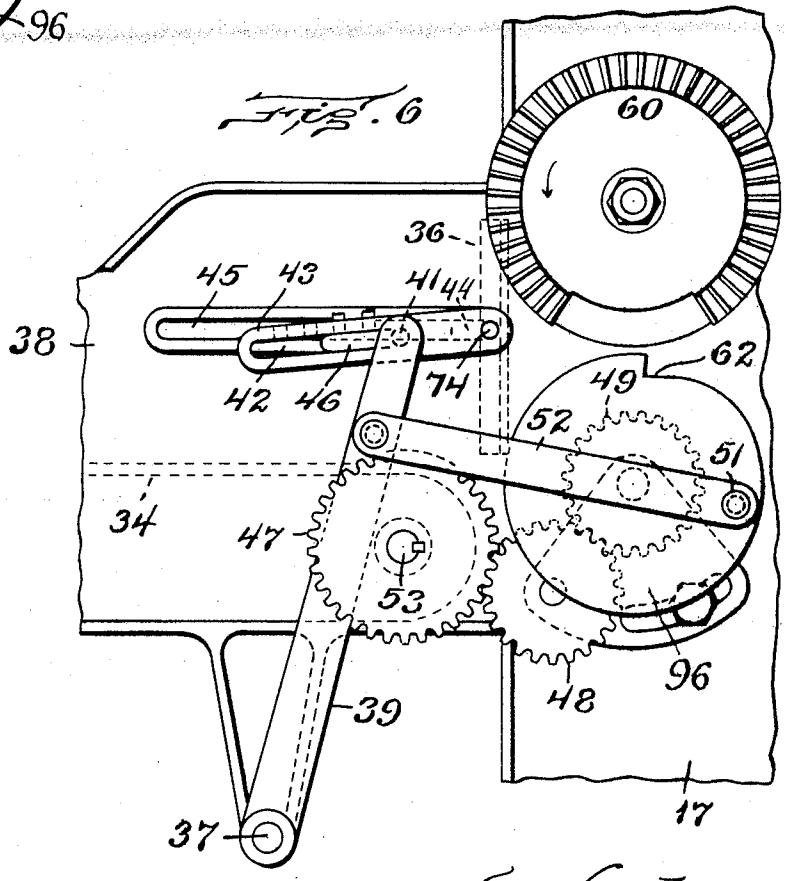


Fig. 6



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UNITED STATES PATENT OFFICE.

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AUTOMATIC WEIGHING AND FEEDING MACHINE FOR TEXTILE FIBERS.

1,055,391. Specification of Letters Patent. Patented Mar. 11, 1913.

Application filed July 20, 1908. Serial No. 444,319.

To all whom it may concern:

Be it known that I, DANIEL C. FISHER, of Boston, in the county of Suffolk and State of Massachusetts, have invented certain new and useful Improvements in Automatic Weighing and Feeding Machines for Textile Fibers, of which the following is a specification.

This invention relates to that class of machinery used for the automatic weighing, preparation and feeding of fibrous material to other machinery such as carding engines, pickers and similar machinery used in the preparation of fibrous materials.

It frequently happens that the manufacturer finds it advisable or necessary to combine in different or varying proportions several different kinds of material, such as cotton, wool and shoddy in the manufacture of yarn, and in order to do this successfully it is highly important that the feeding machine shall have the property of amalgamating or mixing the different fibers so that the proportions that have been predetermined shall be distributed uniformly. Machines for this purpose in a more or less effective construction are well known and have been in use for many years. In practice it has been shown that no one of these machines has developed the capacity of treating different classes and conditions of the several fibers named uniformly with satisfactory results; in consequence of which the builders have found it necessary to construct special machinery to suit the requirements of the manufacturer who buys his invention, and it has been found necessary to make a wide variation in the construction of the best known and most popular of this class of machinery.

The use of widely divergent fibers in the manufacture of textile fabrics has become general because of the change of styles in materials demanded by the trade from one season to another, has made it necessary for the manufacturer to have machinery that will handle different classes of fibers equally well and with uniform results. It therefore becomes important to the manufacturer who is obliged to use this class of machinery, that he shall be able to buy a machine that can be made to suit the varying conditions that his trade may impose upon him; and the object of this invention is to supply a machine that will fulfil the requirements of the manufacturer without regard to conditions which have heretofore compelled him to replace a machine which he may have in use, by another machine of any make that has been constructed to meet the changed conditions, which represent the different lengths of fiber of the new styles which are constantly recurring in his business, as well as the quantity of work to be performed that will make his production successful. Any machine which will preserve the blending of these materials would be of great value to him. Experience has shown that after a period of nearly 30 years in the use of automatic feeding machinery, the machines in use have failed to perform this work satisfactorily, and the separation of these fibers in more or less degree has resulted from the use of automatic feeding machinery. Up to the present time the feeding machines have saved the manufacturer labor cost, but have been of questionable value in the handling of material. In the machine hereinafter described and claimed the defects heretofore observed in machinery of this type are eliminated.

In the accompanying drawings,—Figure 1 shows the left side elevation of the machine. Fig. 2 represents the right side elevation. Fig. 3 represents top plan and section of pin apron, anti-friction guide rolls and combs. Fig. 4 represents rear elevation of apron and anti-friction guide rolls. Fig. 5 represents transverse section of left wing and pushboard mechanism. Fig. 6 represents left side elevation of the gearing mechanism, levers and connecting rod and slotted links for the operation of the pushboard, and the releasing mechanism for opening and shutting the weighing scale. Fig. 7 is a rear elevation of the releasing mechanism of the scale pan. Fig. 8 represents longitudinal section of feed apron, matter, and pushboard.

The same letters of reference indicate the same parts in all of the figures.

It will be seen from the foregoing description and sheets of illustration that I use in this construction a machine with a large receiving chamber 10 where the material is placed that is to be fed. At the bottom of this receiving chamber 10 is located an apron 11 suspended between two shafts

12, 13. The receiving chamber 10 is also supplied with a transferring apron 14 suspended between two shafts 15, 16, which hold it in position and furnish power to revolve it. Mounted in this receiving chamber 10 on either side from 17, 17, by suitable journals is a preparing comb 18 to assist in the preparation and spreading of the fibers brought forward by the transferring apron. On the downward stretch of the transferring apron 14 I have located a comb 19 for the purpose of clearing by vibration the fibers from the surface of the transferring apron. The formation and purposes of these several appliances are fully described in my patent of December 3, 1907, Number 872,719. The frames 17 on this machine are provided with adjustable anti-friction guide rolls 20, that are located in the transverse planes of both stretches of the apron 14, so as to preserve alinement of the pins 29 with the spaces between the teeth of the combs 18 and 19. These anti-friction rolls 20 are designed to retain the apron in exact alinement, which prevents undesirable contact and wear of the apron against the stationary sides 17 of the machine, and permits of a close adjustment of the opening comb 18 located in the receiving chamber 10, also of the stripping comb 19 which clears the fibers from the transferring apron and deposits them in the weighing scale 21. By these several mechanisms I am able to use a much longer pin in the transferring apron which transfers a greater amount of fibers with a very material reduction in speed, and a consequent saving of staple, and a preservation of the mixes. Owing to the fact that the transferring apron is composed of slats, the said apron as a whole is laterally inflexible. Therefore the guide rolls 20 positively prevent the liability of any portion of the apron from moving laterally so as to lose the accurate alinement of the points of the pins carried by the apron with the recesses between the comb teeth. This is clearly illustrated in Fig. 3.

The apron 11 at the bottom of the receiving chamber is operated by gearing 22 shown in Fig. 2 attached to the two shafts 12, 15 of the adjacent aprons. The stripping comb 19 is actuated by means of a gear 23 fastened to the upper shaft 16 of the transferring apron 14. The gear 23 meshes into a crank gear 24 of smaller diameter, which revolves much more rapidly, and by means of a stud 25 attached to its surface and a link 26 connecting the stud to a lever 27 that is fastened to the shaft 28 that supports the comb 19, and by this means imparting vibration of the stripping comb over the surface of the transferring apron and serves to operate the clearing comb only during the rotation of the transferring apron, and thereby effectually preventing the discharge of fibers from the transferring apron at the instant of the arrest of the rotation of the transferring apron, shown in Fig. 2.

The stripping comb 19 is constructed so as to fill the spaces between the pins on the transferring apron 14 and may be set at an angle or curved to prevent the fibers from following the comb on the return stroke. It is constructed of a thin blade of steel or other metal with recesses deep enough and wide enough to permit of the pins 29 on the transferring apron passing through the recesses 30, as shown in Fig. 3. The broad surface of the comb, which is in perfect alinement with the slats 31 of the transferring apron, is cut into fine teeth 32, which engage with the fibers that are impaled on the pins 29 and adhere to the surface of the transferring apron, enabling it to take these fibers absolutely clear of the pins and the surface of the apron. It has been found in practice that strips of leather or other material have never been able to keep these pins clean, and it becomes necessary for the operator to frequently stop the machine and clear the pins of fibers that adhere to them, as they are frequently filled to half their length, reducing their efficiency to about that proportion.

The scale 21 is of the usual proportions and formation, the two wings 33 being operated as hereinafter explained.

The mechanism for stopping and starting the transferring apron 14, as shown in Fig. 1, is fully described and illustrated in my patent of December 3, 1907, Number 872,719, as is also the mechanism for opening the scale. The feed apron 34, the matter 35, and the pushboard 36 are shown in Fig. 8. The actuating mechanism of the pushboard 36 is shown in Fig. 6. The pushboard is designed to move diagonally, or can be adjusted so as to move in direct line with the surface of the feed apron 34 by means which I now proceed to describe.

As shown by Figs. 5 and 8, each end of the pushboard is provided with an elongated boss 44 which is adapted to slide in a slot 45 in the corresponding wing 38. The bosses 44 prevent tilting of the pushboard, and from them extend cylindrical ends 74 with which are connected links 43. The links are formed with elongated slots 42 into which projections 41 extend from a pair of arms 39 rigidly mounted upon opposite ends of a shaft 37. In order to vary the amount of lost motion of the projections 41 in the slots 42, so as to vary the throw or amount of reciprocation of the pushboard, the slots 42 are provided with blocks 46 which may be secured in any desired position by means of set screws. As shown in Fig. 6 however, said blocks 46 may be set up close to prevent lost motion. These blocks 46 may of course be so shaped and

secured as to provide for lost motion at either or both ends of the slot 42 and consequently impart just the desired amount of reciprocations to the pusher or push board. The matter 35 serves to impart an even shape to the bulk of material accumulated by the pushboard, and for this purpose it is affixed upon a rock shaft 75 which receives its motion from a rod 76 through an arm 77 and link 78 (see Fig. 2). The rod 76 is that which serves to transmit motion from a crank gear 79 to an arm 80 on the shaft 81 which carries the comb 18. The actuating mechanism of the pushboard imparts a reciprocatory motion by which the pushboard is made to coöperate with the apron 34 in feeding the deposited mass of fibers toward the carding engine. In conjunction therewith, the matter 35, by repeatedly descending upon the mass so fed, preserves substantially uniform density thereof notwithstanding the gradual decrease of the mass as it is taken by the carding engine.

A series of three gears 47, 48, 49, are located on the side of the frame as shown in Fig. 1. To one of these gears 49 is attached a stud 51, and to this stud is attached a link 52, and the opposite end of this link is attached to one of the levers 39 which actuates the pushboard 36. The stud 51 constitutes a crank by which the arms 39 are oscillated. Motion is communicated to the gear 49 by the gear 47 mounted on feed apron shaft 53 and the intermediate gear 48, a change of speeds being effected by removing the gear 47 mounted on the apron shaft and substituting a larger or a smaller gear. The relative speeds of the feed apron and the pushboard have been fixed in all previous machines, and no change has been provided for or considered necessary, as in practice it has been customary to increase or decrease the quantity of fibers desired in the scale or weighing apparatus. This has resulted in very uneven and imperfect work from the feeder.

It will be seen from the illustration in the drawings of the several patents granted on this class of machines, that there is only one fulcrum on the scale, and any shifting of the material in the recess of the scale pan results in uneven weighing of the fibers in the scale. Said recess is approximately 10 inches wide. Unless the space is filled so that the fibers occupy practically the entire space in the weighing apparatus, said fibers are liable to shift their distance from the fulcrum to such an extent as to materially affect the value of the weighing device as to accuracy. For the above-named reasons I have made provision for the speed changes represented in the accompanying drawings in the gearing and provided slotted mechanism, which enables me to fill the weighing scale practically full at all times and under all conditions; and by reason of the beforenamed gears, levers, and slotted connecting links, I am able to change the distance traversed upon the apron by the pushboard and consequently am able to distribute the same amount of fibers over any surface distance or area of the feed apron that may be suggested by the requirements of the work being done.

Having provided the means for definitely distributing the fibers upon the surface of the feed apron, it is highly important that the fibers shall be accurately weighed, and it has been found desirable that the operator be provided with the means of definitely determining the amount of fibers that are being weighed. Heretofore, the scale beams on this class of machinery have been marked or graduated more or less accurately, and a sliding weight has been used in practice to change the amount of fibers weighed by the scale. The value of the graduations and the distance of the weight from the fulcrum represents nothing definite in machines commonly in use, and variations therein can only be the result of guess work on the part of the operator, often resulting in loss of time and uneven work. I have, therefore, provided a pendant weight 55 suspended from one of the scale beams 56 of the apparatus at a fixed point on the scale beam, so that when the scale has been properly balanced after the manner of commercial weighing machines in common use, given weights 57 representing actual weights of fibers to be weighed, can be attached in the usual way to the pendant 55 provided for that purpose.

Having described the mechanism for weighing certain quantities of fiber, and the spreading of this certain quantity of fiber over a given area of the feed apron 34, which is attached to a carding engine, or other similar machinery, by the usual gearing, and is driven at a uniform speed, I proceed with a description of the means for the opening and shutting of the scale pan at regular intervals.

The scale beams 56 which embrace opposite ends of the scale pan 21 are mounted upon fulcrums at 82. One beam 56 has the pendant weight 55 hereinbefore mentioned, and the other beam has a weight 83 which is adjustable toward and from the fulcrum. The weights 55 and 83 together, overbalance the pan 21 when empty. An auxiliary beam 65 at one end of the pan 21 is also mounted on a fulcrum at 82 and serves to normally close the wings 33 which constitute the bottom of the pan. The wings which are hinged at 84 have arms 85 and 86, one rigidly connected to each wing, and adapted to overlap the other. The arm 85 has a stud 87 which occupies a slot 88 in the other

arm and which thereby couples the wings so that they may be moved in unison. The arm 85 is connected by a link 89 with a pin 64 extending from one end of the beam 65. A weight 90 on the other end of the beam 65 is adapted to normally close the wings 33 whether the pan be empty or full.

A lever 58 mounted on a fulcrum at 63 is actuated at regular intervals so as to cause one end, which overlies the pin 64, to depress the same and so separate the wings and discharge the contents of the pan. The means for actuating the lever 58 derives its power from an upstanding shaft 91 which revolves continuously in the direction indicated by an arrow in Fig. 1. The shaft 91 is provided with a bevel pinion 92 which is adapted to intermesh with a bevel gear 60 of which a portion of the teeth are omitted, as shown by Figs. 1, 6, and 7. When the blank space caused by the omission of the teeth is at the lowest position, as shown by these figures, there is no engagement with the pinion 92. In this position the gear may be held by means which include a pin 59 on the back face of the gear 60, a stop arm 61 having a shoulder 95, and the periphery of the crank disk 96. The arm 61 is pivotally mounted on a stud 97 and its free end lies upon the periphery of the crank disk, which, excepting at the point where the depression 62 is located, supports it so that the shoulder 95 lies in the path of rotation of the pin 59. The gear 60 is formed, as shown by Fig. 7, with a weighted portion 98 which tends to move it in the direction of the arrow when the pin 59 lies against the stop 95. One end of the lever 58 intersects the path of rotation of the pin 59 and is adapted to be actuated thereby for the purpose of opening the scale pan.

The operation is as follows: The disk 96, which is driven by the feed apron 34, during the greater part of its movement, holds the stop arm 61 in operative position, but when the depression 62 registers with the free end of the arm, the latter drops, thereby releasing the pin 59. The gear 60 thereupon turns in the direction of the arrow, because of its uneven distribution of weight, thereby moving into engagement with the continuously driven pinion 92 which then drives it in the same direction. The pin 59 engages and actuates the lever 58, opening the scale pan, and the stop arm 61 is meanwhile restored to operative position. The driving of the gear 60 continues until it is disengaged, by the absence of teeth, from the pinion 92, and it is then arrested by engagement of the pin 59 with the stop 95.

In order that the delivery of fibers to the scale pan may be suspended upon the accumulation therein of the desired weight, means are provided for controlling the action of the apron 14 so that the apron shall be rendered motionless during those periods when the scale pan is depressed to its lower position. A brief description of such controlling means will be sufficient at this time inasmuch as similar means for the same purpose are illustrated and described in detail in my Patent 872,719.

The shaft 16 which drives the apron 14 has a bevel gear 94 intermeshing with a pinion 99 loosely mounted upon the upstanding shaft 91. The pinion is provided with clutch teeth and is adapted to be clutched to its shaft by an axially movable clutch member 100 secured upon the shaft by a spline. The member 100 has a peripheral groove which receives the forked end of a bell-crank lever 101 whose fulcrum is at 102. The other end of the lever 101 is equipped with suitable tripping mechanism 103 by which it may be moved so as to disengage the normally operative clutch member 100. For the purpose of moving the lever 101, I provide an actuator 104 in the form of an inverted pendulum, and an eccentric 105 on the shaft 91, with suitable connection between the eccentric and the actuator. The tripping mechanism 103 is connected by a rod 106 to one of the scale beams 56 in such a manner that when the scale pan is elevated the tripping mechanism is retracted from the path of the swinging actuator 104, but when the scale pan is at its lower position, the tripping mechanism is in the path of the actuator so that it may be thereby moved, and so disengage the clutch 100. A suitable detent (not shown) may be employed to hold the tripping mechanism in the latter position notwithstanding the repeated movements of the actuator.

In reviewing the weighing and discharging operations, it may be seen that the fibers are weighed in equal quantities and discharged at equal intervals of time. The means for causing the discharge of the scale pan, while initially inactive, is rendered active at equal intervals by the constantly driven feed apron.

It is to be understood that the thickness of the layer automatically deposited by the scale pan is varied intentionally at times by the position of the weights. The present machine enables such variation to be compensated for by means of the slotted and adjustable connections with the pusher and by means of the change gears described. A thin layer of stock, for instance, needs either a faster speed of reciprocation or a greater distance of travel. Heretofore so far as I am aware, no means have been provided whereby the speed of the pusher could be varied relatively to the speed of the apron.

Having now described my invention, what I claim is:—

1. In an automatic weighing and feeding

machine for fibrous materials, a chamber for containing a relatively large quantity of such material in bulk, a transferring apron having projecting points to engage and lift the fibrous material, a comb having recesses for the passage of said apron points, the relationship of the apron and comb being such that their points intersect, and means whereby the paths of travel of said points relatively to the sides of said recesses may be adjusted.

2. In an automatic weighing and feeding machine for fibrous material, a chamber for containing a relatively large quantity of such material in bulk, a transferring apron having projecting points to engage and lift the fibrous material, a comb having recesses for the passage of said apron points, and adjustably mounted rolls engaging the sides of the apron to control the paths of travel of said points relatively to the sides of said recesses.

3. In an automatic weighing and feeding machine for fibrous materials, a chamber for containing a relatively large quantity of such material in bulk, a transferring apron composed of a series of transverse laterally inflexible slats having chain link connections, said slats having projecting points adapted to engage and lift the fibrous material, and adjustable guide-rolls mounted on the opposite walls of said chamber so as to engage the ends of the apron slats.

4. In an automatic weighing and feeding machine for fibrous materials, a chamber for containing a relatively large quantity of such material in bulk, an endless transferring laterally inflexible apron, a comb bodily movable in a curved path approximately tangent to the surface of the apron and having its teeth extending toward the same, a plurality of series of points projecting outwardly from the apron, each series being adapted to pass between two adjacent teeth of the comb, and guide-rolls adjustably mounted in the walls of said chamber and adapted to engage the edges of the apron and guide it so as to cause the series of points to accurately register with the spaces between the comb teeth.

5. In an automatic weighing and feeding machine for fibrous materials, a chamber for containing a relatively large quantity of such material in bulk, a transferring apron mounted upon a pair of rotatable shafts and forming one wall of the chamber, an oscillatory comb mounted in said chamber and adapted to coöperate with one stretch of the apron, an oscillatory stripping comb adapted to coöperate with the other stretch of the apron, adjustable guide rolls for accurately guiding the apron relatively to the comb, and means operable by one of said shafts for oscillating the stripping comb.

6. A machine of the character described, comprising a feed apron, a reciprocatory pusher movable in a path adjacent and substantially parallel to the feed surface of the apron, a pair of reciprocatory members movable in unison in paths adjacent the ends of the pusher, slotted members connecting each reciprocatory member with one end of the pusher, means adjustably secured in said slotted members so as to impart more or less movement to the pusher, and means for providing for lost motion at either or both ends of the movement of the pusher.

7. A machine of the character described, comprising a feed apron, a reciprocatory pusher movable in a path adjacent and substantially parallel to the feed surface of the apron, a transversely extending rock-shaft, a pair of levers affixed to the shaft, means driven by the apron and connected to one of said levers for oscillating the same, and adjustable means connecting the free end of each lever with one end of the pusher and adapted to impart all or a part of the movement of the levers to the pusher.

8. A machine of the character described comprising an endless feed apron mounted on rotatable shafts, a reciprocatory pushboard movable in a path adjacent and substantially parallel to the feed surface of the apron, a driving gear on one shaft of the apron, a driven gear adjustably mounted to accommodate driving gears of various sizes, a pair of rock arms connected so as to be movable in unison and each connected to one end of the pushboard, and means connecting said driven gear and one of said rock arms for imparting reciprocatory movement to the latter.

9. A machine of the character described, comprising a uniform speed feed apron, a reciprocatory pushboard movable in a path adjacent and substantially parallel to the feed surface of the apron, a driving gear movable in unison with the apron, a driven gear adjustably mounted to accommodate driving gears of various sizes, a pair of rock arms movable in unison, means actuated by the driven gear for reciprocating the rock arms, and means connecting each rock arm with one end of the pushboard and adapted to be adjusted so as to impart thereto movement equal to or less than that of the rock arms.

10. A machine of the character described, comprising a feed apron, a matting device, a reciprocatory pusher, means including a lost motion connection for actuating the pusher, and means for varying or preventing such lost motion.

11. A machine of the character described, comprising a feed apron, a weighing receptacle adapted to discharge its contents upon the apron, initially inactive means for discharging the receptacle, and controlling means operated by the apron for rendering

the discharging means active at equal intervals.

12. A machine of the character described, comprising a feed apron, a weighing receptacle adapted to discharge its contents upon the apron, initially inactive means for discharging the receptacle, a reciprocable pusher, and controlling means operated by the apron for rendering the discharging means active at equal intervals.

In testimony whereof I have affixed my signature, in presence of two witnesses.

DANIEL C. FISHER.

Witnesses:
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P. W. PEZZETTI.