Feb. 5, 1924. 1,483,049

T. J. STURTEVANT

MACHINE FOR FLUFFING FIBERS

Filed April 19, 1923 5 Sheets-Sheet 1

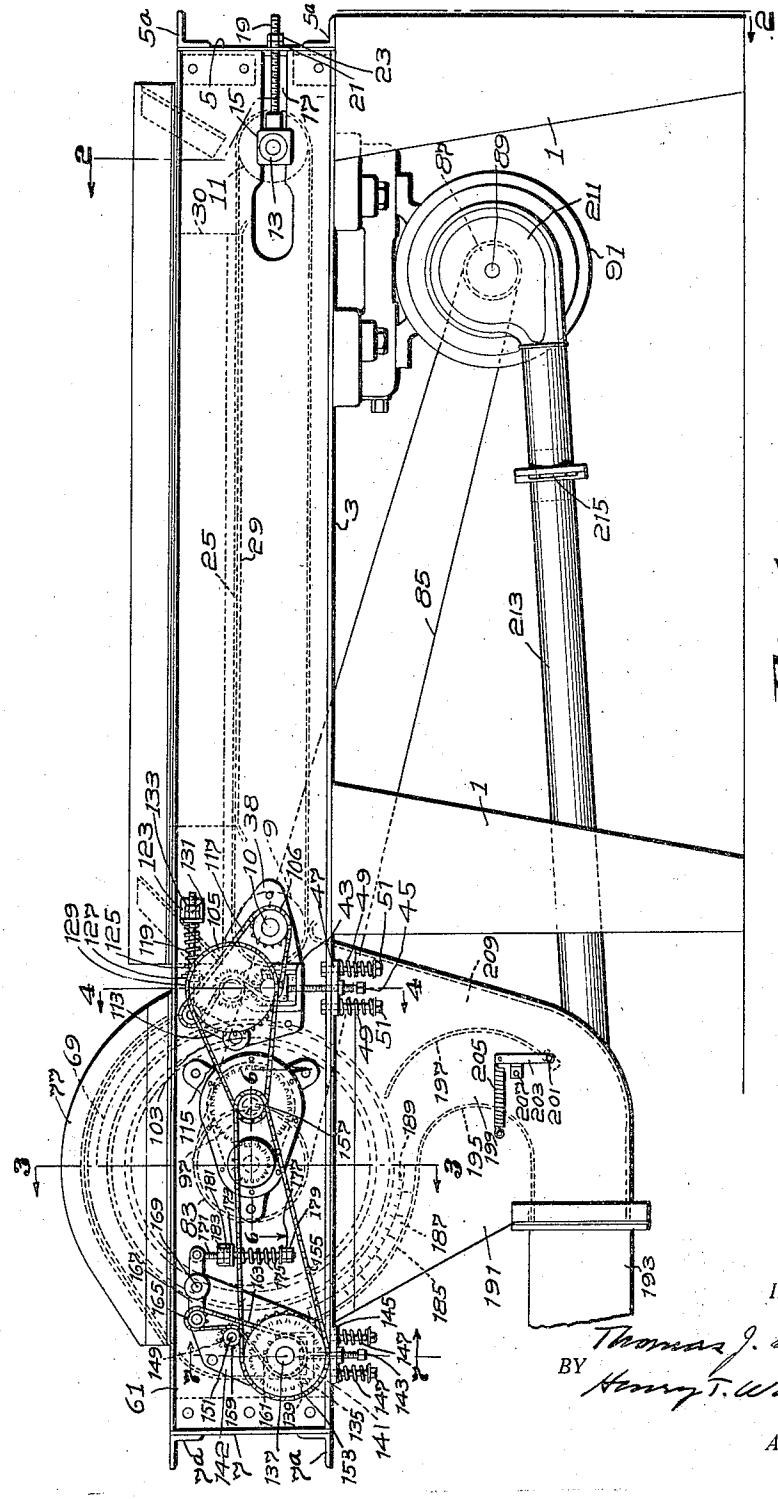

Fig. 1

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Filed April 19, 1923 5 Sheets-Sheet 2

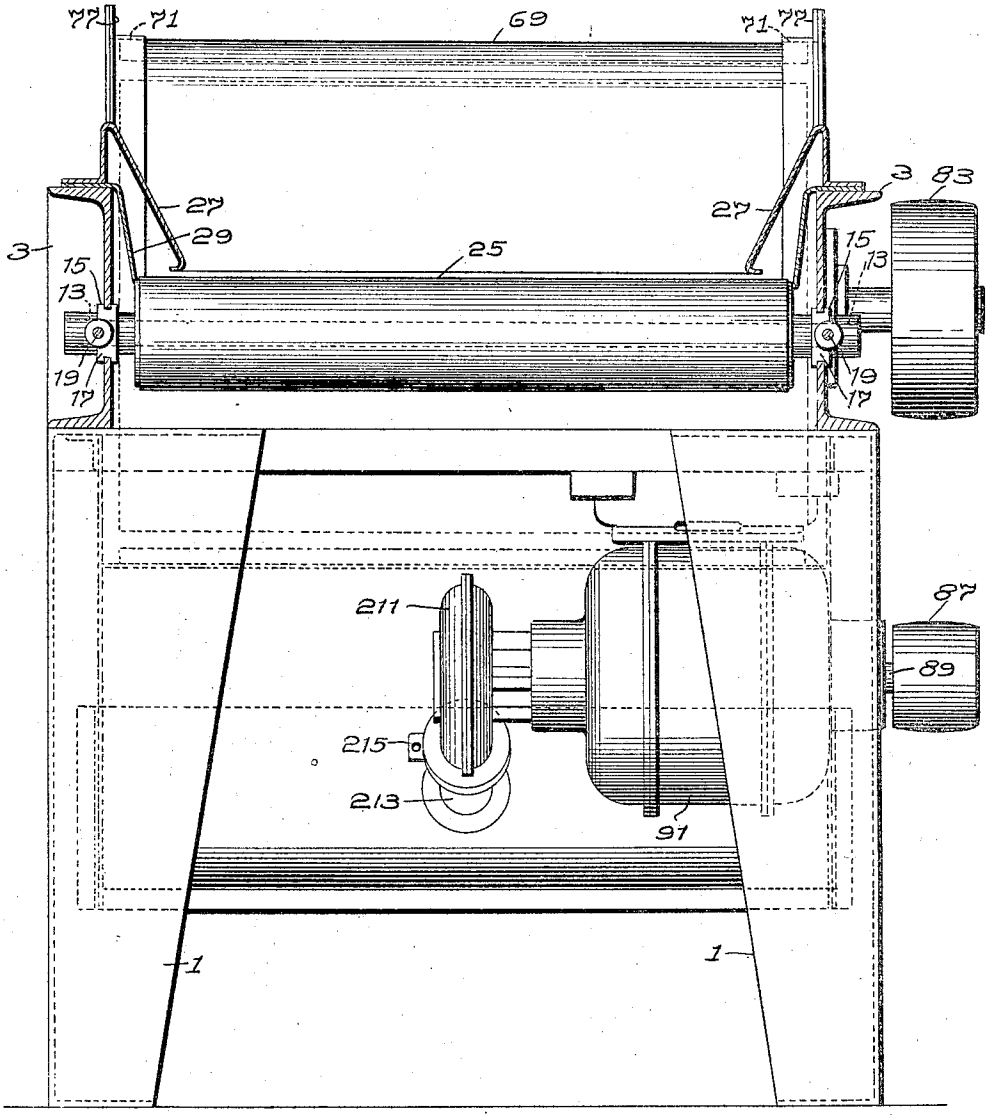


Fig. 2

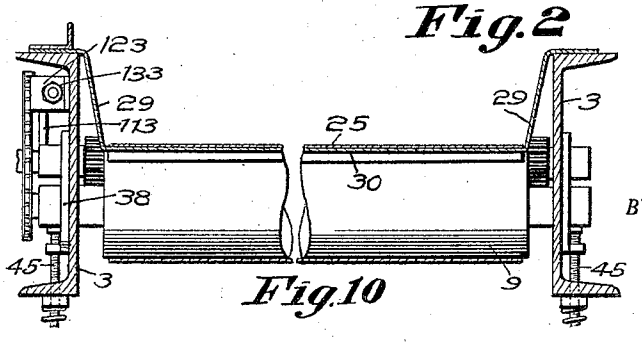


Fig. 10

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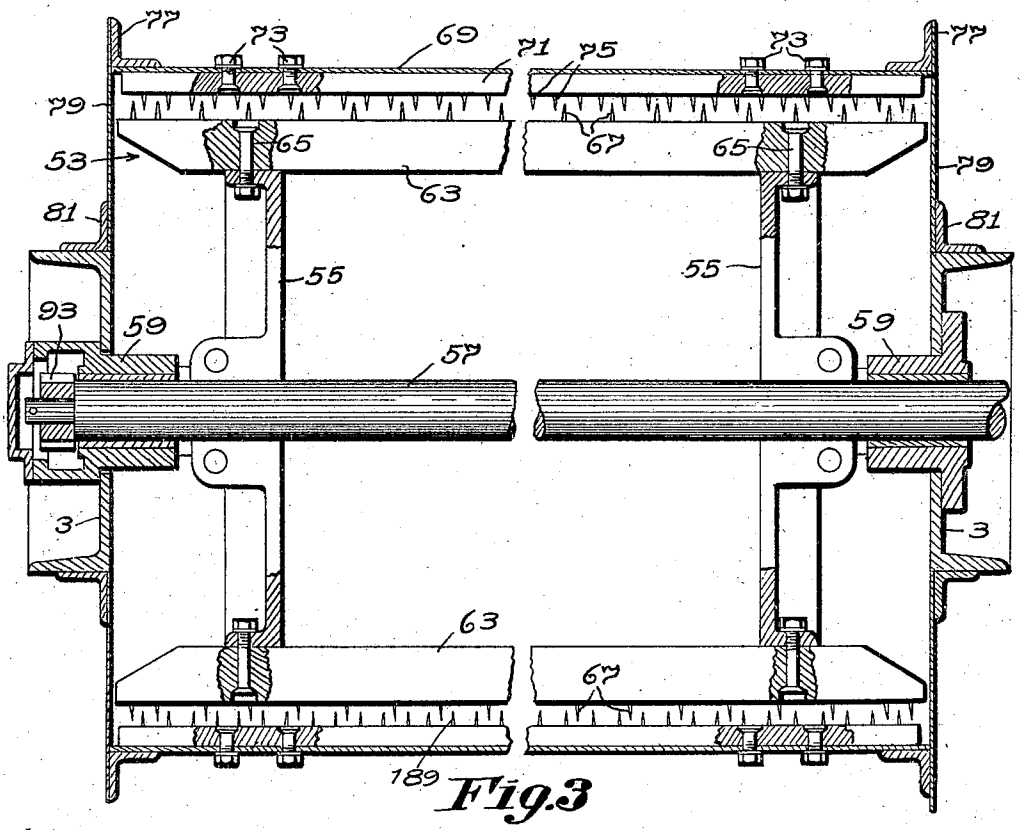


Fig.3

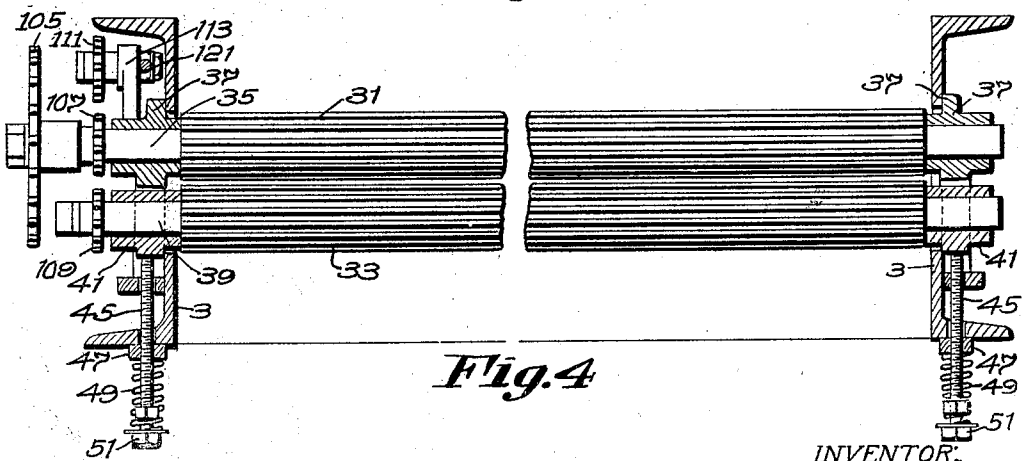


Fig.4

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MACHINE FOR FLUFFING FIBERS

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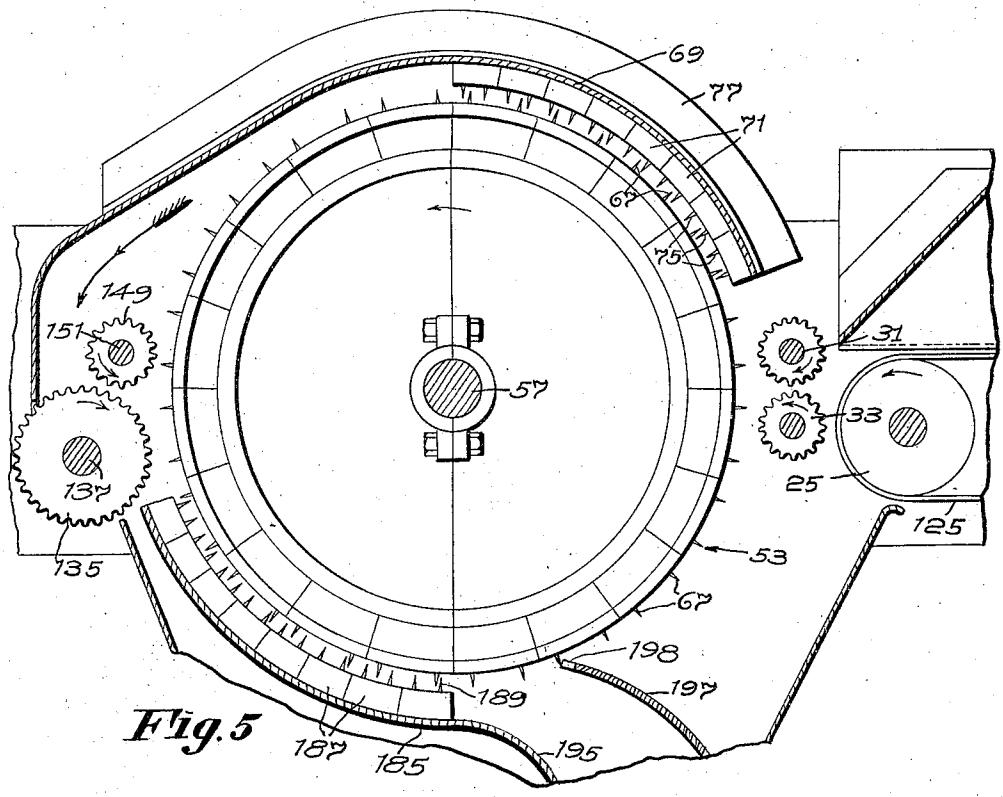


Fig. 5

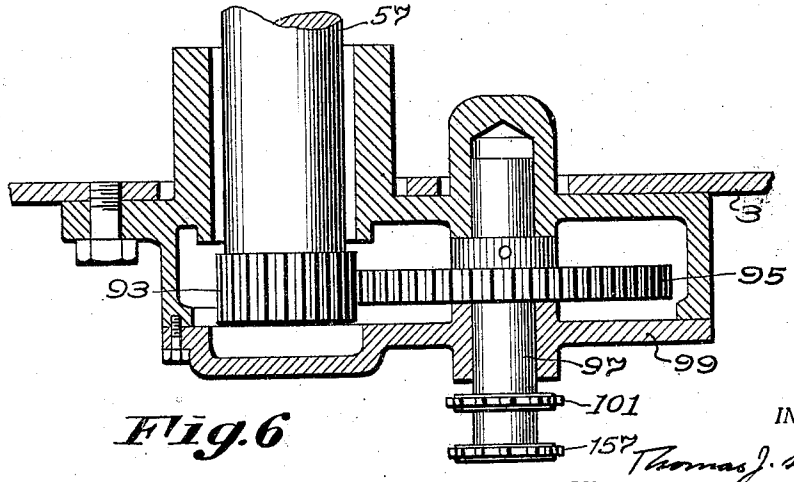


Fig. 6

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MACHINE FOR FLUFFING FIBERS

Filed April 19, 1923 5 Sheets-Sheet 5

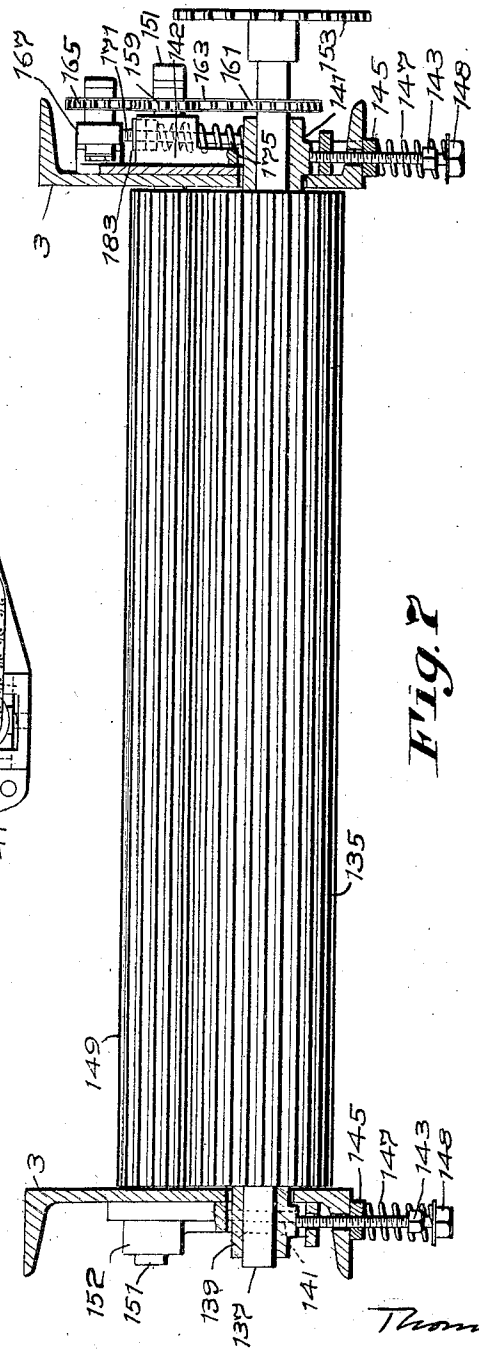


Fig. 2

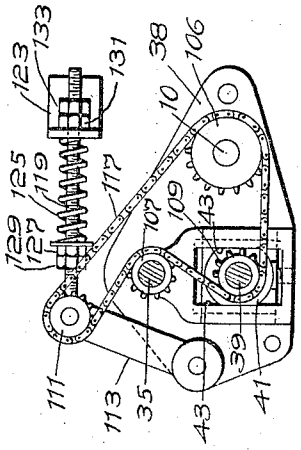


Fig. 9

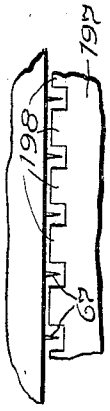


Fig. 8

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Patented Feb. 5, 1924. 1,483,049

# UNITED STATES PATENT OFFICE.

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## MACHINE FOR FLUFFING FIBERS.

Application filed April 19, 1923. Serial No. 633,317.

*To all whom it may concern:*

Be it known that I, THOMAS J. STURTEVANT, a citizen of the United States, residing at Wellesley, in the county of Norfolk and State of Massachusetts, have invented certain new and useful Improvements in Machines for Fluffing Fibers, of which the following is a specification.

The invention to be hereinafter described relates to machines for fluffing or separating fibers.

To strengthen plaster and mortar, it is customary to introduce fragments of old rope, hair or other fibrous material therein. To prepare the fibers for this purpose, it is necessary that they should be fluffed or opened up into a finely divided state.

Heretofore, a machine for this purpose has been provided comprising a conveyer on which the mass of fibrous material is dumped, and the fibers are fed by the conveyer to and beneath a roll at one end of the conveyer. Adjacent the roll and the end of the conveyer is a cylinder provided with pins which open and fluff the fibers delivered thereto. Opposed to the cylinder is a shield having fixed pins adjacent the cylinder pins. The fibers separated from the sheet are swept by the cylinder pins past the fixed pins which further separates the fibers, and the fibers thus fluffed up are delivered through a chute from the machine.

Heretofore, it has been found necessary to provide a second machine similar to that already described, further to fluff or open up the materials, in order that they may be in a sufficiently divided state for introduction into mortar.

One of the purposes of the present invention is to provide a simple and efficient machine for fluffing fibers, which is so constructed and arranged that it can do practically the work of two of the machines which heretofore have been required. As a consequence, there is a saving in the cost of the machine required for the purpose, a saving in floor space required, and a saving in the cost of labor necessary to tend the machine. Also, the fibrous materials may be brought into the desired finely divided state in shorter time than required in the use of previous machines.

The character of the invention will be best understood by reference to the following description of one good form thereof shown in the accompanying drawings, wherein:

Fig. 1 is a side elevation of a machine embodying the invention;

Fig. 2 is a vertical section taken on line 2—2 of Fig. 1;

Fig. 3 on an enlarged scale is a vertical section taken on line 3—3 of Fig. 1;

Fig. 4 on an enlarged scale is a vertical section taken on line 4—4 of Fig. 1;

Fig. 5 on an enlarged scale is a vertical section through the fluffing cylinder and devices cooperating therewith;

Fig. 6 is a horizontal sectional detail of a portion of the driving mechanism of the machine taken on line 6—6 of Fig. 1;

Fig. 7 on an enlarged scale is a vertical section taken on line 7—7 of Fig. 1;

Fig. 8 is a detail to be referred to;

Fig. 9 is a detail view showing a portion of the driving mechanism for the feed rolls for delivering the fibers from the conveyer to the cylinder; and

Fig. 10 is a vertical transverse section through the side channels, conveyer, and the table for contributing to the support of the upper run of the conveyer.

Referring to the drawings, the machine shown therein as one good form of the invention, may be provided with a suitable support, in the present instance, comprising feet 1 on which are mounted side channels 3 connected by a front end plate 5 stiffened by angle bars $5^a$, and connected by a rear plate 7 stiffened by angle bars $7^a$.

Mounted on the channels is a suitable conveyer, in the present instance, comprising a roller 9 having a shaft 10 journalled in bearings mounted in the channel, and a roller 11 having a shaft 13 journalled in boxes 15 which may be adjusted in guideways 17 by screws 19 connected to the boxes and entered through holes in the end plate 5, and provided with adjusting nuts 21 and lock nuts 23. A conveyer belt 25 of canvas of other suitable material is supported on the rollers 9 and 11, and the tension of said belt may be varied by adjusting the boxes 15 in the guideways 17.

The fibers to receive the fluffing treatment are thrown on the conveyer, and the latter is driven by means to be described to feed the fibers toward the left (Fig. 1). To prevent the fibers from escaping over

the side edges of the conveyer, inclined plates 27 may be mounted on the side channels 3 and extend downward almost to the upper run of the conveyer. To prevent the upper run of the conveyer from sagging and to guide the edges thereof, a table 29 may be provided beneath the upper run of the conveyer and have flanges 30 projecting upward and secured to the side channels.

In the present instance of the invention, upper and lower fluted rolls 31 and 33 are provided adjacent the delivery end of the conveyer. The upper roll 31 has a shaft 35 journalled in bearings 37 in castings 38 secured to the side channels 3, and the lower roll 33 has a shaft 39 journalled in boxes 41 adapted to slide in guideways 43 in said castings. It is desirable yieldingly to sustain the lower roll. To this end screws 45 engage the boxes 41, and extend down through holes in the castings and holes in the lower flanges of the side channels. These screws are threaded into bars 47 which are pressed toward the channel flanges by coil springs 49 encircling screw bolts 51 depending from the channel flanges, said springs 49 being confined between the heads of said screw bolts and the bars 47.

The construction is such that the lower roll is pressed by the coil springs 49 toward the upper roll so that the rolls may grip the mass of fibers between them. The upward movement of the lower roll will be limited by engagement of the bars 47 with the channel flanges. The spacing relation of the rolls when the lower roll is at its upward limit of movement may be varied by adjusting the screws 45.

Suitable means may be provided to pull out, separate and fluff up the fibers emerging from between the rolls 31 and 33. This means, in the present instance of the invention, comprises a cylinder 53 having heads 55 mounted on a shaft 57 journalled in bearings 59 carried by portions 61 of the side channels 3 which project outward a substantial distance beyond the feet 1 at the left of the machine (Fig. 1). Cleats 63 are secured by bolts 65 to the heads 55, and each cleat is provided with two rows of sharp pointed pins 67 projecting outward therefrom.

Opposed to the cylinder is an upper shield 69 having cleats 71 secured by bolts 73 thereto, each of said cleats being provided with two rows of sharp pointed pins 75. Preferably the shield pins 75 project inwardly a sufficient distance somewhat to overlap the cylinder pins 67. The shield is connected by angle bars 77 with side plates 79 connected in turn by angle bars 81 with the top flanges of the side channels.

The cylinder shaft 57 extends outward beyond one of its bearings, and carries a pulley 83 connected by a belt 85 with a smaller pulley 87 on the shaft 89 of an electric motor 91 which is secured to and depends from the side channels 3 adjacent the front end of the machine.

It is desirable that the conveyer and the fluted rolls 31 and 33 shall be driven at a slower speed than the cylinder. Suitable transmission means may be provided to accomplish this, in the present instance, comprising a pinion 93 (Figs. 1, 3 and 6) on the cylinder shaft 57 meshing with a gear 95 on a stub shaft 97 journalled in bearings in a casing 99 mounted on and secured to one of the side channels 3, said casing being formed also to enclose the pinion 93.

Also mounted on the stub shaft 97 is a sprocket wheel 101 connected by a chain 103 with a larger sprocket wheel 105 fast on the shaft 35 of the upper fluted roll 31. To drive the lower fluted roll 33 from the shaft for the upper fluted roll and allow the yielding up and down movement of the lower fluted roll, and also to drive the conveyer, a sprocket wheel 106 may be mounted on the conveyer roller shaft 10 referred to, a sprocket wheel 107 may be mounted on the upper roll shaft 35, a sprocket wheel 109 may be mounted on the lower roll shaft 39, and an idler sprocket wheel 111 may be mounted on a stub shaft carried by the upper end of an arm 113 adapted to swing on a bolt 115 mounted on one of the side castings 38.

A sprocket chain 117 passes about the sprocket wheels 106, 107, 109 and 111, as shown in Fig. 1. The slack in the sprocket chain may be taken up by suitable means, in the present instance, comprising a bolt 119 having an eye 121 on the stub shaft for the sprocket wheel 111, said bolt being extended through a hole in a bracket 123 mounted on one of the side channels. A coil spring 125 encircles the bolt 119, and is confined between the bracket 123 and an adjusting nut 127 secured by a lock nut 129. On the portion of the bolt which projects beyond the bracket is an adjusting nut 131 secured by a lock nut 133.

The construction is such that the spring 25 tends to shift the bolt to the left (Fig. 1), thereby causing the idler sprocket wheel 111 to take up the slack in the sprocket chain 117.

The fibrous material thrown on the conveyer will be fed thereby to and between the rolls 31 and 33. As the material emerges from said rolls, it meets the cylinder which is rotated more rapidly than said rolls. The pins on the cylinder will pick or pull and separate fibers from the mass of fibers which may be more or less restrained by said rolls. The pins on the cylinder will sweep the fibers on past the

pins on the shield 69, and as a result, the fibers will be further separated and opened up.

It is desirable that the fibers shall be still further divided. To accomplish this, in the present instance of the invention, a large fluted roll 135 may be provided having a shaft 137 journalled in bearings in boxes 139 adapted to slide up and down in guideways 141 in castings 142 secured to the side channels.

Said boxes rest on adjusting screw bolts 143 entered through holes in said castings and holes in the lower flanges of the channels. These bolts are threaded into bars 145 at the lower flanges of the side channels, and the bars are yieldingly sustained by coil springs 147 encircling screw bolts 148 depending from the lower flanges of the side channels, said springs being confined between said bars 145 and the heads of the screw bolts.

Above and cooperating with the roll 135 is a smaller fluted roll 149 having a shaft 151 journalled in bearings 152 in the castings 142.

The construction is such that the roll 135 is pressed by the coil springs 147 toward the upper roll, so that the rolls may grip the mass of fibers fed between the rolls. To vary the elevation of the lower roll with respect to said bars, the screw bolts 143 may be adjusted up or down relatively to said bars.

To drive the roll shaft 137, a sprocket wheel 153 may be mounted fast thereon, and may be connected by a sprocket chain 155 with a smaller sprocket wheel 157 on the stub shaft 97 referred to.

To rotate the shaft 151 of the upper fluted roll 149, a sprocket wheel 159 may be mounted on said shaft, and a sprocket wheel 161 may be mounted on the shaft of the large roll, said sprocket wheels being connected by a sprocket chain 163. This sprocket chain passes over an idler sprocket wheel 165 carried by a lever 167 fulcrumed on a pin 169 mounted on one of the castings 142. Attached to the opposite end of the lever is a bolt 171 projecting through a hole in a bracket 173 mounted on one of the side plates. A coil spring 175 encircles the bolt, and is confined between the bracket and an adjusting nut 177 secured by a lock nut 179. Also, a nut 181 is on the screw bolt secured by a lock nut 183.

The construction is such that the coil spring 175 will operate through the bolt 171 to rock the lever 167 and cause the idler sprocket wheel 165 to take up slack in the sprocket chain 163. The downward movement of the bolt 171 will be limited by engagement of the nut 181 with the bracket 175, thereby to avoid placing the sprocket 163 under too great tension.

The fibers will be thrown by the cylinder down onto the large roll 135, and the latter will feed the fibers to the bight between the rolls 135 and 151. Since these rolls are rotated at a slower speed than the cylinder, the pins on the latter will catch the fibers emerging from between said rolls, and separate the same.

Beneath the cylinder is a lower shield 185 having cleats 187 secured thereto, each provided with two rows of pins 189. The pins of the cylinder will sweep past the shield pins, and the fibers will be further separated. The construction is such that when the fibers leave the lower shield 185, they will be in the desired finely divided state.

Suitable means may be provided to conduct the fibers from the fluffing mechanism to the mortar mixing machine. This means, in the present instance, comprises a casing or chute 191 beneath the cylinder, said casing being connected to a pipe 193 which may be of suitable length to reach the mortar mixing machine. Within the casing is a curved wall 195, and opposed thereto is a curved wall 197, said walls providing a passage 199 for directing the fibers to the pipe 193.

The curved wall 197 projects upward nearly to the cylinder and has projections 198 (Fig. 8) adapted to enter between the cylinder pins to doff and deflect the fibers from the cylinder. To avoid injury to the pins, the wall may be movably mounted, and in the present instance, the lower end thereof is attached to a rock shaft 201 mounted in the casing 191. Fast on said shaft is an arm 203. A coil spring 205 has one end connected to the arm, and its other arm anchored on the casing. Movement of the arm 203 to the left (Fig. 1) is limited by the stop 207. The construction is such that the wall 197 is yieldable and susceptible of movement toward the right (Fig. 1) against the opposition of the coil spring 205.

At one side of the wall 197 is a passage 209 which may serve to conduct toward the pipe 193 any fibers or dust escaping from the delivery end of the conveyer, or from the fluted rolls 31 and 33.

A blower 211 is carried by the motor casing and driven by the motor. Since this blower may be of well known construction, it is unnecessary to show and describe the same in detail herein. A pipe 213 extends from the blower to the casing 191, and communicates with the latter at a point in line with the pipe 193. The draft may be regulated by a usual slide or valve 215 in the pipe 213. The construction is such that the fibers in their finely divided state may be fed pneumatically through the pipe 193 to the mortar mixing machine.

By my invention there is provided a simple and efficient machine which will desir-

ably serve efficiently to fluff up fibers and bring them in the finely divided state required for introduction into the mortar. One and the same cylinder may cooperate with the fluted rolls at opposite sides of the cylinder, and may cooperate with the upper and lower pin shields, thereby to produce practically double the fluffing effect which hitherto has been accomplished by one machine.

It will be understood that the invention is not limited to the specific embodiment shown, and that various deviations may be made therefrom without departing from the spirit and scope of the appended claims.

What is claimed is:—

1. A machine for fluffing fibers comprising, in combination, a cylinder having pins on the periphery thereof, means to feed a mass of fibers to the cylinder, members having pins projecting toward the cylinder, said members being spaced circumferentially of the cylinder, a pair of rolls adjacent the cylinder and intermediate said members for feeding fibers to the cylinder, and means to rotate said cylinder, thereby to cause its pins to sweep past said feeding means, members and rolls, thereby to pick the fibers from the feeding means and rolls and fluff up the fibers.

2. A machine for fluffing fibers comprising, in combination, a cylinder having pins on the periphery thereof, a pair of feed rolls adjacent the cylinder for feeding a mass of fibers to the cylinder, a member opposed to the cylinder and having pins projecting toward the same that the cylinder may sweep fibers from the feed rolls past said member, another pair of feed rolls adjacent the cylinder for receiving the fibers swept past said member and for feeding the fibers to the cylinder, and another member opposed to the cylinder and having pins projecting toward the same, that the fibers delivered by the second pair of feed rolls may be swept by the cylinder past the latter member.

3. A machine for fluffing fibers comprising, in combination, a cylinder having pins on the periphery thereof, pairs of feed rolls adjacent the cylinder for feeding a mass of fibers to the latter, members opposed to the cylinder and having pins projecting therefrom, said members being located intermediate the pairs of feed rolls, driving means for the cylinder and feed rolls having provision for rotating the cylinder more rapidly than the feed rolls, thereby to cause its pins to sweep past said feed rolls and members to pick the fibers from the feed rolls and fluff up the same, and means cooperating with the cylinder for guiding the fibers in their passage between the pairs of feed rolls.

4. A machine for fluffing fibers comprising, in combination, a cylinder having pins on the periphery thereof, pairs of feed rolls adjacent to the cylinder and spaced circumferentially thereof for feeding a mass of fibers to the cylinder, a shield adjacent the cylinder and extending between the pairs of feed rolls, means between the shield and the cylinder having pins projecting toward the cylinder, a second shield opposed to the cylinder and located between the pairs of feed rolls in opposition to the first-named shield, means between the second-named shield and the cylinder having pins projecting toward the latter, and means for rotating the cylinder more rapidly than the feed rolls, thereby to cause its pins to sweep fibers from one pair of the feed rolls between the first-named shield and the cylinder to the second pair of feed rolls, and to sweep the fibers from the latter between the second-named shield and the cylinder.

5. A machine for fluffing fibers, comprising, in combination, a cylinder having pins on the periphery thereof, a pair of rollers, a conveyor belt on said rollers for feeding a mass of fibers toward the cylinder, a pair of feed rolls for delivering the fibers from the conveyor belt to the cylinder, a sprocket wheel for one of said rollers, sprocket wheels for the feed rolls, means yieldingly to support one of the feed rolls that it may move toward and from the other feed roll according to the thickness of the mass of fibers fed between the feed rolls, a movable support, a sprocket wheel carried by said support, a sprocket chain engaging all of the aforesaid sprocket wheels, and means cooperating with the sprocket wheel on the support automatically to take up slack in the chain as the yieldable feed roll moves toward the other feed roll.

6. A machine for fluffing fibers comprising, in combination, a cylinder having pins on the periphery thereof, pairs of feed rolls adjacent the cylinder and spaced circumferentially thereof for feeding fibers to the cylinder, each of said pairs of feed rolls having one roll provided with fixed bearings and the other roll provided with yieldable movable bearings, a guide between the pairs of feed rolls and spaced from the cylinder, that the cylinder may sweep fibers from one pair of feed rolls to the other pair of feed rolls, and driving means for rotating the cylinder more rapidly than the feed rolls including sprocket wheels for the pairs of feed rolls, sprocket chains for said sprocket wheels, and means automatically to take up slack in said sprocket chains as the yieldable feed rolls move toward the other feed rolls.

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