F. GRAF, SR.

FIBER DRESSING MACHINE.

APPLICATION FILED DEC. 29, 1919.

1,351,749.

Patented Sept. 7, 1920.

3 SHEETS—SHEET 1.

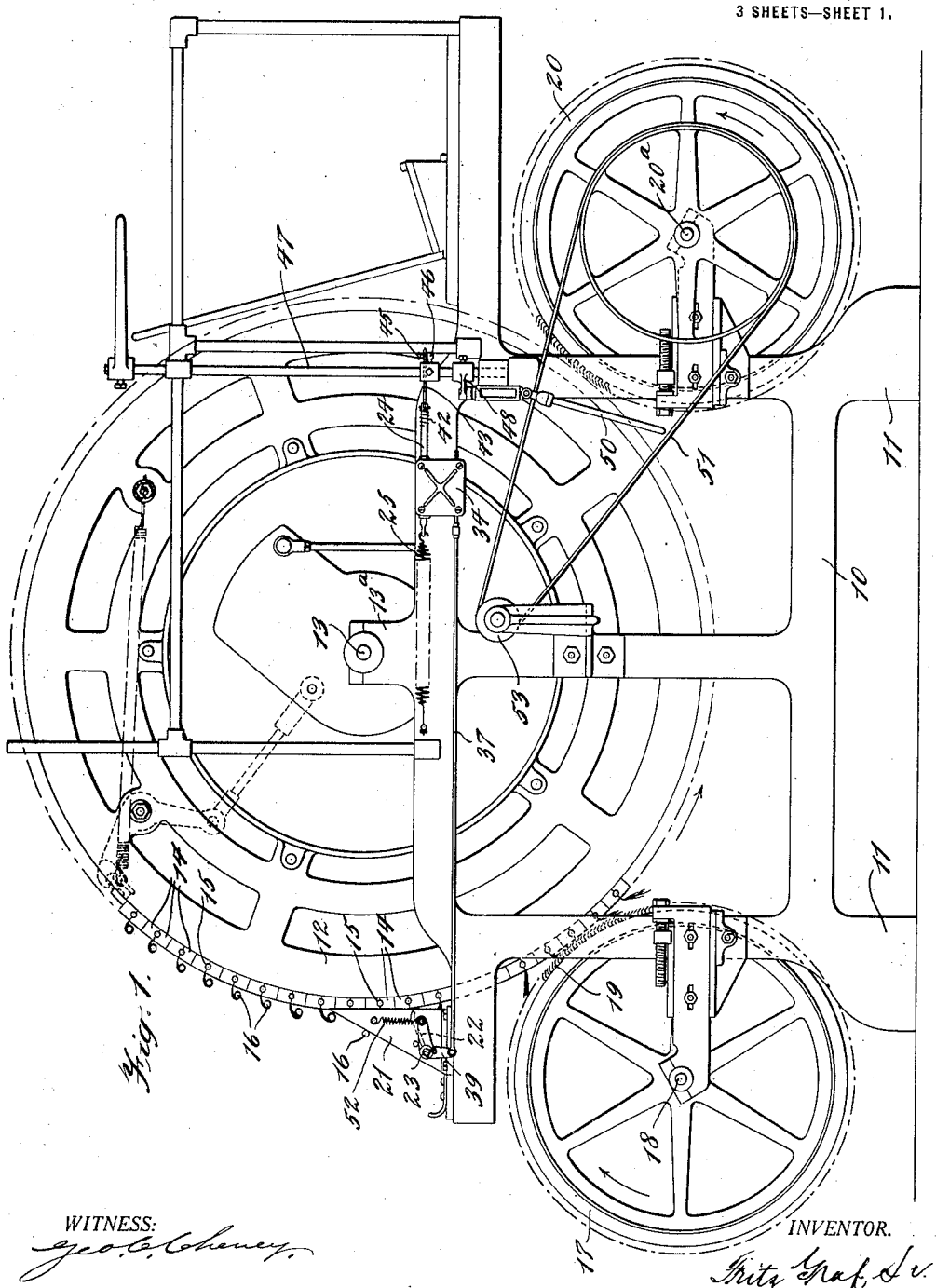


Fig. 1.

WITNESS:
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INVENTOR.
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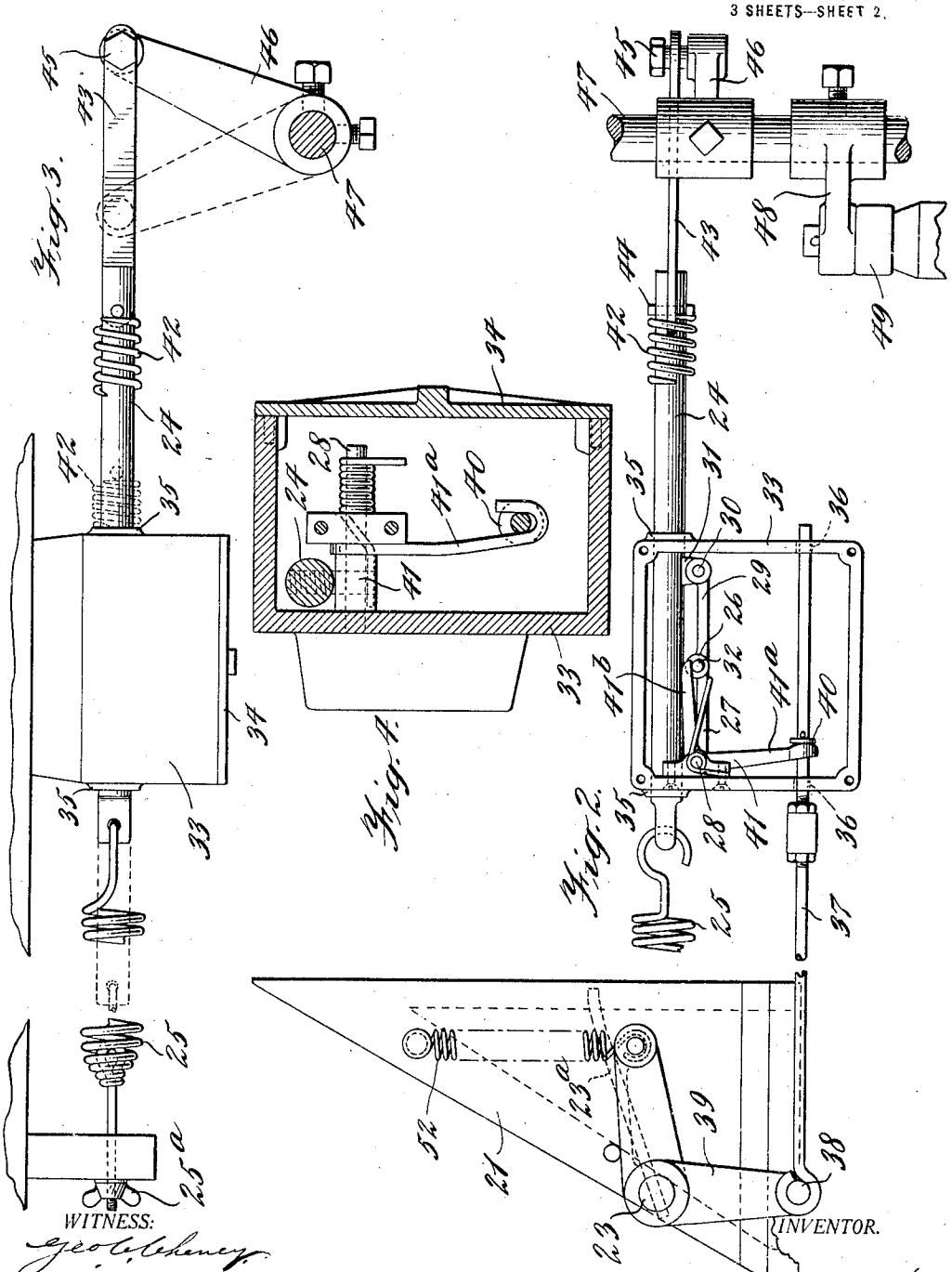
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3 SHEETS—SHEET 2.



WITNESS:

INVENTOR.

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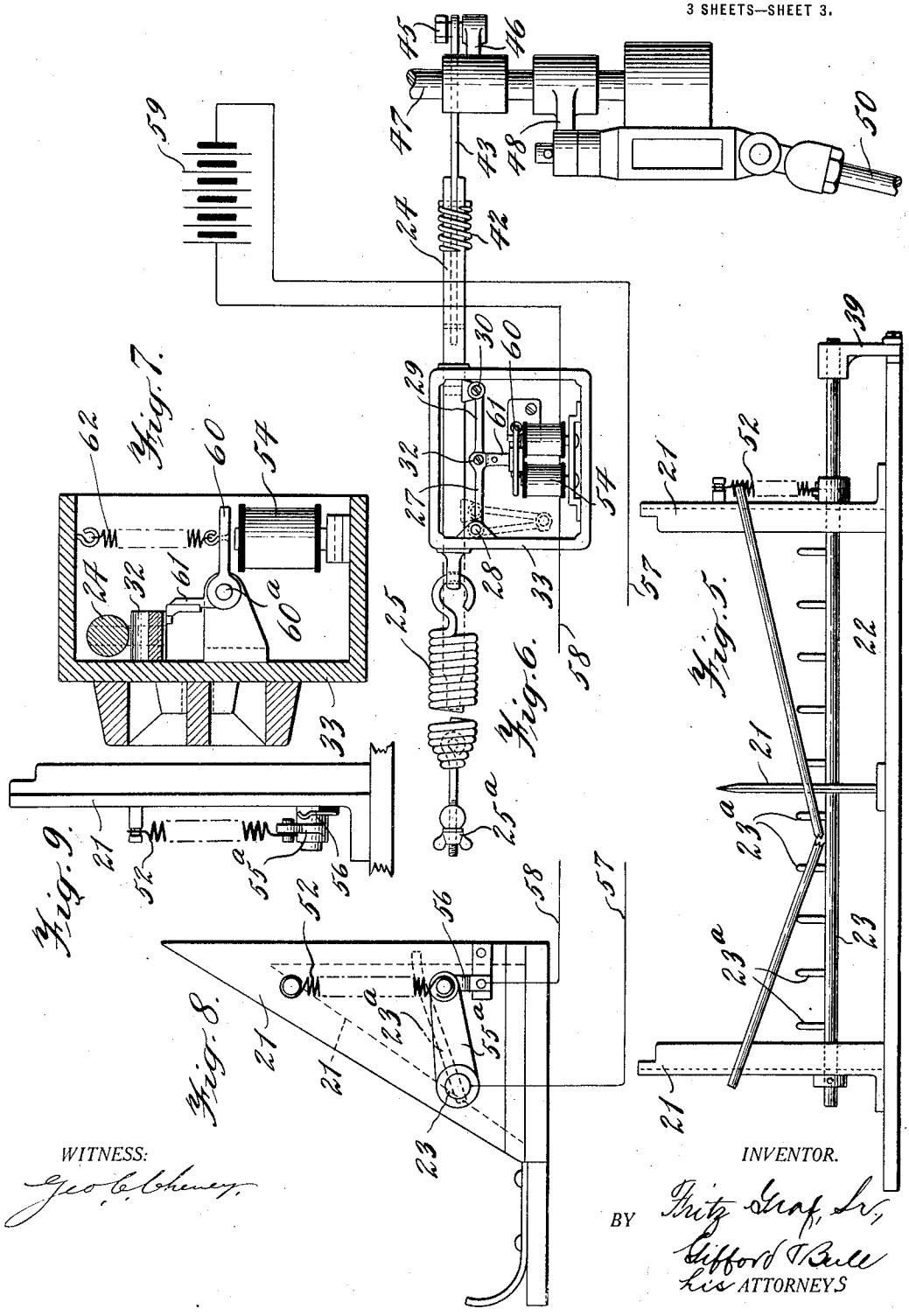
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3 SHEETS—SHEET 3.



WITNESS:

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UNITED STATES PATENT OFFICE.

FRITZ GRAF, SR., OF COLLINGDALE, PENNSYLVANIA.

FIBER-DRESSING MACHINE.

1,351,749. Specification of Letters Patent. Patented Sept. 7, 1920.

Application filed December 29, 1919. Serial No. 348,237.

To all whom it may concern:

Be it known that I, FRITZ GRAF, Sr., a citizen of Switzerland, residing at Collingdale, in the county of Delaware and State of Pennsylvania, have invented certain new and useful Improvements in Fiber-Dressing Machines, of which the following is a specification.

My invention more particularly relates to a machine which is especially applicable to the treatment of silk waste, though it will, of course, be understood that my invention is not limited to this particular use.

The spun silk industry utilizes what is known as "waste" silk, which comes from the following sources:

1. Waste silk obtained in reeling silk cocoons.

2. Cocoons which, because of worm holes or other causes, are not suitable for reeling.

3. The waste produced in winding, throwing and weaving silk.

The waste silk so obtained is first passed through what is known as a "lapping" machine, which comprises a drum provided with a card sheet, which arranges the fibers in a more or less parallel relation and forms a "lap" or "mat" which is more or less uniform in thickness. The "lap" so formed is passed through a filling machine, which comprises a cylinder placed back of two feeding rolls through which the lap is passed and provided with a number of banks of hooked teeth which pull out the threads and form loops around the hooks. The threads between the banks of teeth are then cut, the free ends of the threads wound on sticks, and the loops removed from the hooks, leaving the looped ends of the silk extending from the sticks. These sticks, which are now called "filled" sticks, are placed in a dressing machine with the loops extending outwardly, the object of the dressing machine being to comb the silk fibers and arrange them in parallel relation and sort the fibers according to length. It is the dressing machine with which my present invention is concerned.

My invention will best be understood by reference to the accompanying drawings, in which Figure 1 is a side elevation of a silk dressing machine embodying my invention; Fig. 2 is a side elevation of the particular portion of the machine embodying my invention; Fig. 3 is a plan view of the bar or plunger and associated parts by which the stoppage of the machine is brought about; Fig. 4 is a cross section through the casing shown in Fig. 3; Fig. 5 is an end view from the left of Fig. 2; Fig. 6 is a side elevation similar to Fig. 2 showing a modified form of my invention; Fig. 7 is a cross section through the casing of Fig. 6; Fig. 8 is a side view of a member movable by a broken stick which brings about the operation of the device shown in Fig. 6, and Fig. 9 is a detail view of the contacts shown in Fig. 8.

Referring, now, to the drawings, in which like reference characters indicate like parts, 10 is the frame of the machine supported on pedestals 11. A circular frame 12 is mounted on a shaft 13 which has its bearings, at 13^a, in the frame of the machine. This frame preferably comprises two spaced, annular members, only one of which is shown in the drawings. On the periphery of the drum are secured a plurality of boards 14, technically known as "sliders," which may consist of wooden pieces of the form shown in end elevation in Fig. 1, and extending transversely across the circular frame. Each "slider" is provided with a semi-circular groove 15, which forms, with the complementary groove of an adjacent "slider," a circular opening in which a filled stick 16, prepared in the manner described above, is received, a section of "sliders" and filled sticks being clamped in position by mechanism well known in the art and which, therefore, need not here be described. The looped ends of the silk threads which project from the dressing frame are first combed from one side by a coarse dressing drum 17 mounted on a shaft 18 having its bearings in the frame of the machine and provided on its periphery with a card sheet 19. The fibers are combed from the other side by a fine dressing drum 20 mounted on a shaft 20^a, also having its bearings in the frame of the machine. After the projecting silk threads have been combed from both sides by the two dressing cylinders, the operator reverses the positions of the sticks and the threads wound thereon—that is to say, what were before the projecting ends of the silk threads are now clamped between the "sliders," leaving the sticks and the ends of the silk threads wound thereon projecting from the circular frame, as indicated in Fig. 1. These sticks are automatically unwound

from the silk and removed from the machine before the silk is brought to the first dressing roll. These sticks are removed, under normal conditions and preparatory to the second combing, by angular plates 21, which are here shown as three in number, the middle plate (see Fig. 5) preferably being shorter than the two end plates. The plates are arranged as best shown in Fig. 1, the upper edges of the plates being placed adjacent the circular frame so that their edges come behind the sticks as the latter are lowered due to the rotation of the circular frame, and as the sticks ride downwardly over the inclined edges of the plates, the sticks are unwound, under normal conditions, from the silk threads and are then removed from the machine. It frequently happens, however, when the silk has been improperly wound upon the sticks, that loops are formed which prevent the silk from unwinding from the sticks. Under these circumstances the stick is broken, as indicated in Fig. 5, and with a machine such as hitherto made, the broken stick falls between the large circular frame and the coarse dressing drum and results in injury to the card sheet of the latter. If the coarse dressing drum is further used without replacing the injured card sheet, it operates less efficiently and produces an inferior silk, and when eventually renewed, the machine must be stopped and there is a corresponding decrease in production. The card sheets are expensive and the frequent renewals of the same, required in machines hitherto used, have added materially to the cost of silk manufacture.

In accordance with my present invention, means are provided for automatically stopping the machine when a stick is broken, thereby giving the operator knowledge of the presence in the machine of a broken stick and enabling him to remove the same from the machine before it has had a chance to injure the card sheet. In the form of my invention here shown, a movable member, which preferably has the form of a head of a rake and which I have indicated in general by the reference character 22 (see Fig. 5), is so arranged as to be moved by a broken stick and to bring about the stoppage of the machine. The member 22 comprises a rotatable shaft 23 having its bearings in the frame of the machine. Teeth 23ª project from the shaft 23 into the path taken by a broken stick, as shown in Figs. 2 and 5. Under normal conditions, when the sticks are properly unwound from the silk fibers, they do not engage the teeth 23ª, but when a stick is broken, the teeth are engaged, the force exerted by the broken stick causing the shaft 23 to be rotated.

In the form of my invention here illustrated, the machine is stopped by shifting the driving belt to an idle pulley, and as this operation requires a considerable amount of mechanical work, I preferably employ a member, moved by a spring or the like, which is sufficiently powerful to perform the belt shifting or other operation, and which is tripped and released by the member operated by the broken stick. In the form here shown, the stoppage of the machine is brought about by movement of a bar or plunger 24 which is moved to the left, as viewed in Fig. 2, when released, by a coil spring 25, which may be made adjustable by a nut 25ª. The bar 24 is normally held in a position to the right, as indicated in Figs. 2 and 3, by a toggle 26, one arm 27 of which is mounted on a stationary pivot 28, while the other arm 29 is pivoted at 30 in a collar or lug 31 secured to the rod 24, the pivotal connection 32 of the two arms forming a floating pivot. The toggle and associated parts are preferably housed in a casing 33 having a removable cover 34 (Fig. 4). The casing provides, at 35, a convenient guide and bearing for the plunger 24, and at 36, in the form of my invention illustrated in Figs. 2 to 4, for an adjustable bar 37, which is pivoted at 38 to the end of an arm 39 secured on the shaft 23 of the rake 22. The rod 37 is provided with a collar 40 which engages one arm 41ª of a bell-crank 41, the other arm 41ᵇ of which engages the pivot joint 32 of the two arms of the toggle. When any of the teeth 23ª are moved downwardly by a broken stick, the shaft 23 is rotated clockwise, as viewed in Fig. 2, the arm 39 and the bar 37 connected thereto are moved to the left, the bell-crank 41 is rotated clockwise, the arm 41ᵇ engaging and lowering the pivotal joint of the toggle 26. As soon as the pivotal point passes the center line of the toggle, the toggle at once collapses, permitting the spring 25 to move the bar 24 to the left, the shock due to the movement of the bar preferably being taken up by a coil spring 42 surrounding the bar and engaging a member secured thereon. A link 43 is pivoted at 44 to the end of the bar 24, the opposite end of the link being pivoted at 45 to the end of an arm 46 secured on a shaft 47. A second arm 48 is secured on the shaft 47, and to its outer end is attached a member 49, to which is connected a shift fork 50, which, in the form of my invention here shown, shifts the driving belt 51 for the machine to an idle pulley. When the parts are manually restored to the position shown in Fig. 2, the comb 22 and associated parts are returned to their normal position by a coil spring 52 (see Fig. 2) acting on an arm 55 secured to the shaft 23.

I have not deemed it necessary to show completely the driving connections, as the same constitute no part of my invention, it

being understood that the circular frame and the coarse and fine dressing rolls are rotated in the directions indicated by the arrows. The large circular frame is driven from the shaft 20ª by means of the belt 51, which engages a pulley 53. The motion may be transmitted from the pulley 53 to the circular frame by means of suitable worm wheels and internal gears, the details of which are not here shown.

In Figs. 6, 7, 8 and 9 I have shown a modified form of my invention, in which the collapse of the toggle 26 is brought about by a magnet 54, the circuit of which is closed on a movement of the shaft 23. The arm 55ª (Fig. 8) constitutes a movable contact, which coöperates with a stationary contact 56. The respective contacts are connected through conductors 57 and 58 to the magnet 54, a suitable source of electric energy, such as the battery 59, being included in the circuit. When the magnet 54 is energized it attracts an armature 60, which forms one arm of a bell-crank pivoted at 60ª, the other arm 61 of which engages beneath the pivotal joint of the toggle 26, thereby normally keeping the toggle straight and restraining the member 24. When the armature 60 is attracted, the end of the arm 61 is disengaged from the toggle thereby permitting the toggle to collapse to the dotted line position shown in Fig. 6, and permits the spring 25 to pull the arm 24 to the left and bring about the stoppage of the machine, in the same manner as described in connection with Figs. 2 to 4, it being understood that the pivotal joint of the toggle is in this case beneath the center line, the toggle thereby collapsing as soon as the arm 61 is withdrawn from beneath the toggle. The armature is returned to its normal position by a spring 62.

It will, of course, readily be understood that various means may be provided for stopping the machine in response to the movement of the member which is actuated by a broken stick.

The present improvement of stopping means could be applied with the same effect to other types of carding or dressing machines for treating fibers, for instance, machines having flat cards or other arrangements of combs; and likewise the fibers could be presented to the cards or combs by different forms of traveling means other than a rotary frame.

What I claim and desire to secure by Letters Patent of the United States is:

1. In a machine of the character described, means for conveying a plurality of sticks for carrying textile fibers, and means whereby displacement of a stick from carrying position operates to stop the machine.

2. In a machine of the character described, means for conveying a plurality of sticks for carrying textile fibers, and means whereby breakage of a stick from carrying position operates to stop the machine.

3. In a machine of the character described, means for conveying a plurality of sticks for carrying textile fibers, and means whereby displacement of a stick from carrying position operates to stop the conveying means.

4. In a machine of the character described, means for conveying a plurality of sticks for carrying textile fibers, means for removing the sticks from said conveying means, and means operable by the displacement of a stick from normal position for stopping the machine.

5. In a machine of the character described, means for conveying a plurality of sticks for carrying textile fibers, means for unwinding the sticks from the fibers to release them from the conveying means, and means adapted to be actuated by a broken stick to arrest the operation of the machine.

6. In a machine of the character described, means for conveying a plurality of sticks for carrying textile fibers, means interposed in the path of the sticks to cause them to be unwound from the fibers to release them from the conveying means, and means operable by a broken stick for arresting the operation of the machine.

7. In a machine of the character described, means for conveying a plurality of sticks for carrying textile fibers, means interposed in the path of the sticks to cause them to be unwound from the fibers to release them from the conveying means, and means arranged out of the normal path of the released sticks and adapted to be engaged by a broken stick for arresting the operation of the machine.

8. In a machine of the character described, means for conveying a plurality of sticks for carrying textile fibers, means for operating on the fibers, stopping means for arresting the operation of the machine, detent means for rendering the stopping means inactive, and means adapted to be actuated by a broken stick to release the detent means to cause the actuation of the stopping means.

9. In a fiber dressing machine, in combination with means adapted to carry sticks filled with fibers with the sticks projecting from said means and the coöperating dressing means and the means for unwinding the sticks from the fibers before reaching the dressing means, means responsive to the force exerted by a broken stick for stopping the machine.

10. In a fiber dressing machine, in combination with means adapted to carry sticks filled with fibers with the sticks projecting from said means and the coöperating dressing means and the means for unwind-

ing the sticks from the fibers before reaching the dressing means, means operable by a broken stick for stopping the machine.

11. In a fiber dressing machine, in combination with the rotatable frame adapted to carry sticks filled with fibers with the sticks projecting from the frame and the coöperating dressing drum and the means for unwinding the sticks from the fibers before reaching the dressing drum, means whereby the displacement of a stick due to breakage stops the machine.

12. In a fiber dressing machine, in combination with the rotatable frame adapted to carry sticks filled with fibers with the sticks projecting from the frame and the coöperating dressing drum and the means for unwinding the sticks from the fibers before reaching the dressing drum, means disposed adjacent to the rotatable frame in the path of movement taken by a broken stick and responsive to the force exerted thereby for stopping the machine.

13. In a fiber dressing machine, in combination with the rotatable frame adapted to carry sticks filled with fibers with the sticks projecting from the frame and the coöperating dressing drum and the means for unwinding the sticks from the fibers before reaching the dressing drum, a movable member disposed in the path of movement taken by a broken stick and responsive to the pressure exerted thereby for stopping the machine.

14. In a fiber dressing machine, in combination with the rotatable frame adapted to carry sticks filled with fibers with the sticks projecting from the frame and the coöperating dressing drum and the means for unwinding the sticks from the fibers before reaching the dressing drum, a movable member comprising a plurality of teeth extending into the path taken by a broken stick and responsive to the pressure exerted thereby for stopping the machine.

15. In a fiber dressing machine, in combination with the rotatable frame adapted to carry sticks filled with fibers with the sticks projecting from the frame and the coöperating dressing drum and the means for unwinding the sticks from the fibers before reaching the dressing drum, means responsive to the force exerted by a broken stick for shifting the driving belt to an idle pulley and thereby stopping the machine.

16. In a fiber dressing machine, in combination with the rotatable frame adapted to carry sticks filled with fibers with the sticks projecting from the frame and the coöperating dressing drum and the means for unwinding the sticks from the fibers before reaching the dressing drum, mechanically operated means for stopping the machine, and means responsive to the force exerted by a broken stick for tripping said mechanically operated means.

17. In a fiber dressing machine, in combination with the rotatable frame adapted to carry sticks filled with fibers with the sticks projecting from the frame and the coöperating dressing drum and the means for unwinding the sticks from the fibers before reaching the dressing drum, a movable member for stopping the machine, means for operating said movable member, a lock for normally restraining the movement of said member, and means responsive to the force exerted by a broken stick for releasing said lock.

18. In a fiber dressing machine, in combination with the rotatable frame adapted to carry sticks filled with fibers with the sticks projecting from the frame and the coöperating dressing drum and the angular members disposed adjacent the circular frame for unwinding the sticks from the fibers and moving them away from the machine, means disposed between said members and responsive to the force exerted by a broken stick for stopping the machine.

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