(No Model.)

J. F. STEWARD.

FEED REGULATOR FOR TWINE MACHINES.

No. 502,326. Patented Aug. 1, 1893.

Fig. 1.

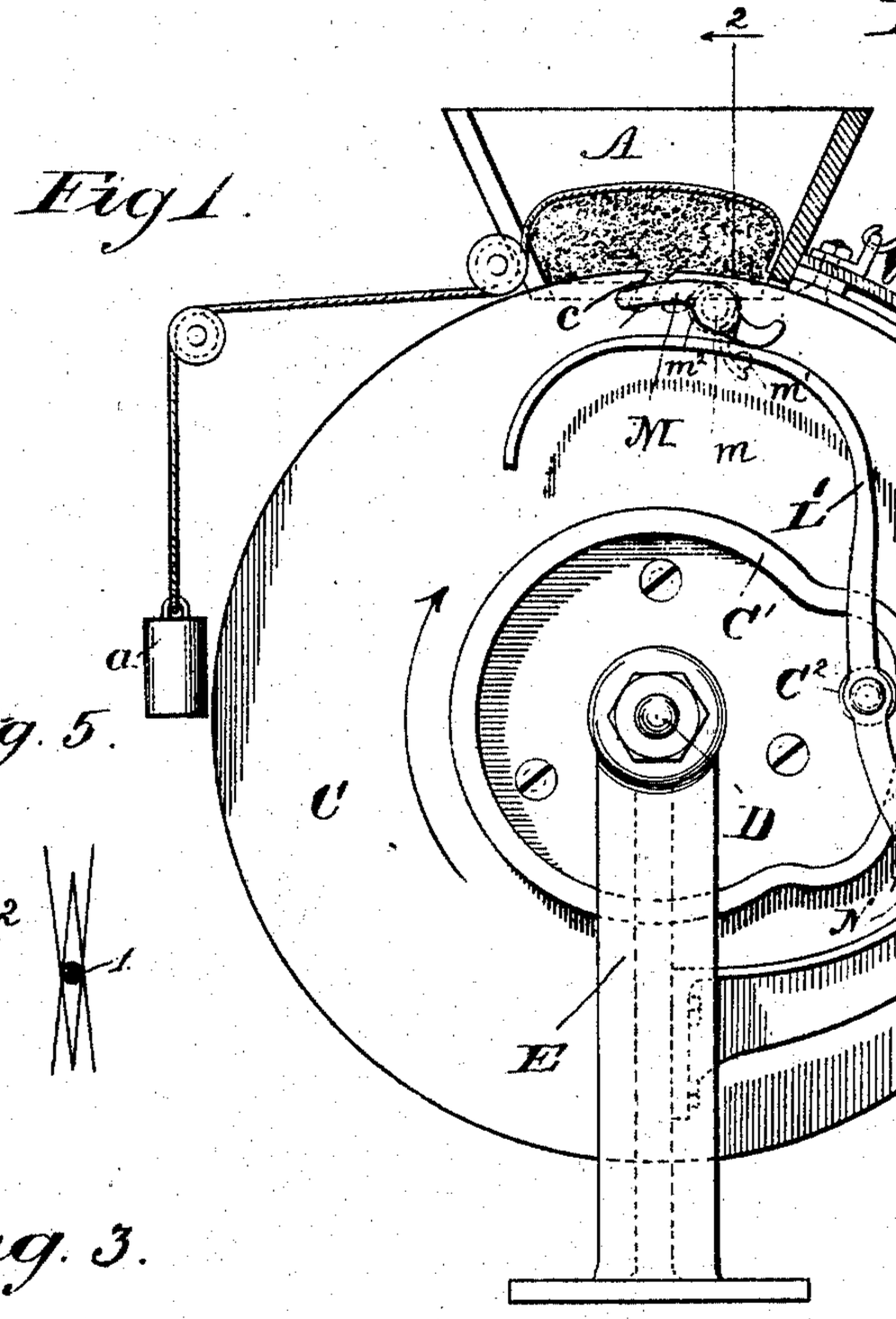


Fig. 4.

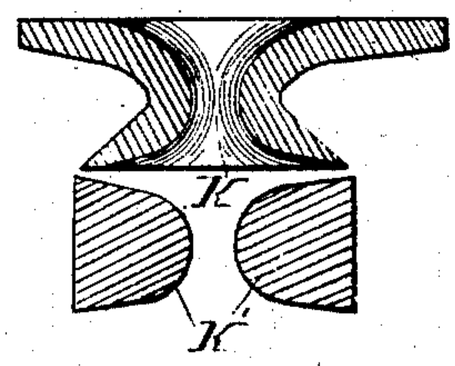


Fig. 5.

Fig. 6.

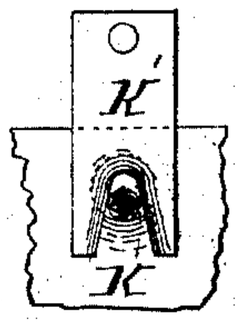


Fig. 3.

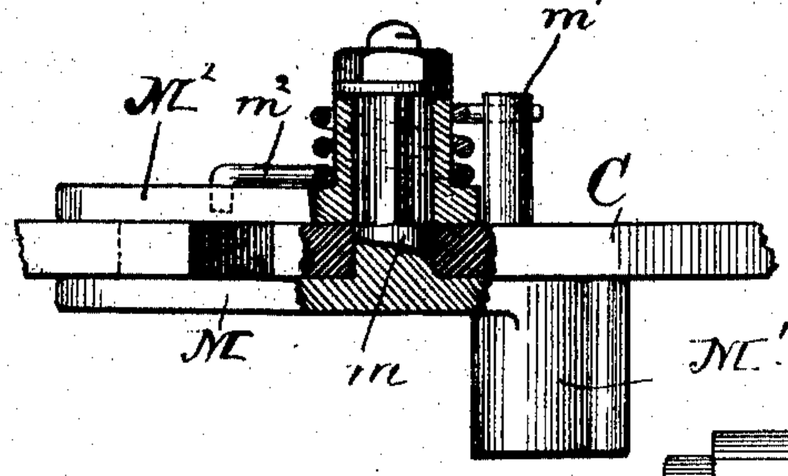
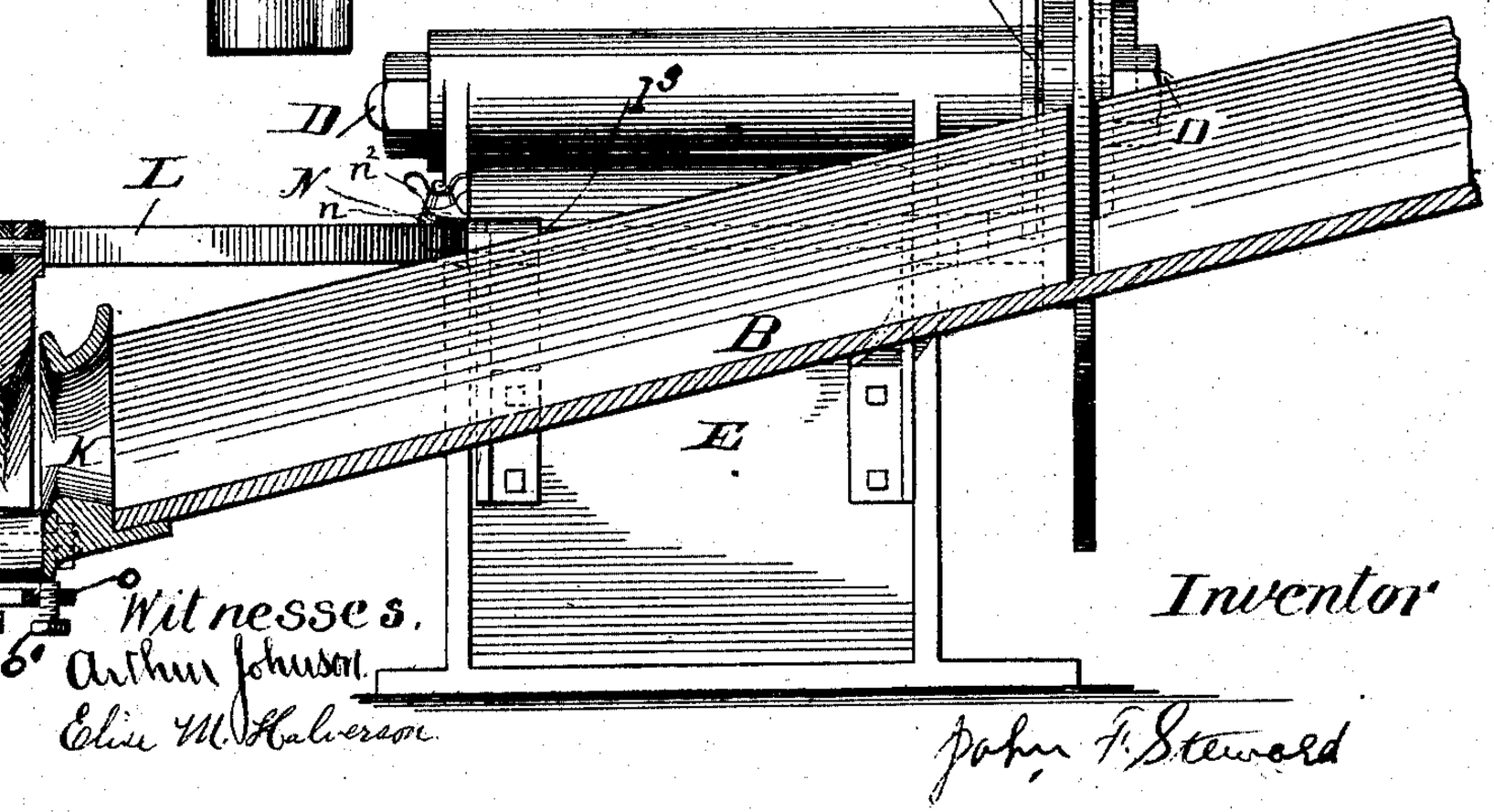


Fig. 2.



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JOHN F. STEWARD, OF CHICAGO, ILLINOIS.

FEED-REGULATOR FOR TWINE-MACHINES.

SPECIFICATION forming part of Letters Patent No. 502,326, dated August 1, 1893.

Application filed March 12, 1892. Serial No. 424,658. (No model.)

To all whom it may concern:

Be it known that I, JOHN F. STEWARD, of Chicago, in the county of Cook and State of Illinois, have invented a new Feed-Regulator for Twine-Machines, of which the following is a specification.

My method is applicable to various kinds of twine-making machinery, but I have seen fit to show it in connection with a sliver-making device forming the subject matter of an application by George H. Ellis and myself, filed March 12, 1892, Serial No. 424,650, and in order to do so have modified the Ellis-Steward machine referred to, to adapt it to the principles involved in my present invention.

The method consists in the use of means whereby the sliver that is formed ready for spinning is measured and the size so measured control mechanism whereby the sliver-making devices are caused to deposit more or less fiber as required; for instance, if the forming sliver be running large it will, through the mechanism I have devised, cause a decrease in the amount of fiber being deposited, and if it be small the feeding devices will be influenced to deposit larger quantities of fiber.

The figures of the drawings show the principles as seems to me best embodied for controlling sliver made of coarser fibers, particularly slough grass. At any rate, I find the embodiment to be a successful one.

Figure 1 is a side elevation of my machine. Fig. 2 is a side view, with the spinning apparatus, the fiber-receiving hopper, and various other parts, in section, as if cut on the line 2—2 of Fig. 1. Fig. 3 is a sectional view of the feeding jaw, partly in section. Fig. 4 is a sectional view of the parts for testing the size of the sliver, as I make them for the particular fiber referred to. Fig. 5 is designed to make clear the principles involved in the sliver-testing device or, as I have seen fit to call it, the feeler I have thought best to show in the present exemplification of my invention. Fig. 6 shows a modification of the feeler or sliver-testing device.

A is a hopper in which the fiber is placed and from which it is fed by the rope and weight *a*, or other suitable means, toward the path of movement of a wisp-forming and carrying jaw, which delivers it into a receiving hopper B ready to be spun. The wisp-forming jaw is preferably in the periphery of a thin wheel C, the said jaw consisting of a notch *c*, into which the fibers may fall or be pressed. The wheel C is secured to the shaft D, journaled in the frame E.

F is an arm reaching from the hopper A to the support G, which may be secured to the frame of the machine in any convenient manner. Beneath the arm F is the concave H, preferably a flexible strap extended around beneath the bar G and connected to the spring I, by which it is kept taut against the periphery of the wheel.

I have shown the notched-wheel form of feeding device as a suitable one, and in fact, a preferable one. The wisps are deposited in the hopper B and move in a longitudinal direction into a spinner, the spindle of which is shown at J. In order that it may be drawn thereinto the rollers *j* and *j'* are provided. By the rotation of these rollers on their axes, the fibers are drawn at any desired rate and the wisps delivered by the rotation of the feeding wheel C as frequently as may be desired by regulating in any suitable manner the speeds of rotation of same.

What I have so far described may be considered any sliver-making machine, but that shown will form the subject matter of the application above referred to.

My present invention will, be clearly understood without further description of the machine except as regards the method of use and the details of construction that adapt it to the present use.

The receiving hopper B is preferably inclined and terminates at its lower end in an aperture K, preferably kite-shaped, with the acute part of its contour downward.

K' is a feeler, as I will term it, which, in connection with an opposing element having the aperture K, and having a rising and falling movement, feels of the prepared sliver as it passes from the delivering hopper B, and is influenced by the size of the said sliver to control the feeding devices. This feeler is preferably made as shown in Fig. 1, in which figure, at the crossing of the lines 4—4 and 2—2, will be seen a lozenge-shaped opening formed by the parts forming K and K'. The faces of these two parts lie together, as shown in Fig. 4. I have made the upper and lower

angles forming this space very acute for reasons that will be explained. It may be under some circumstances advisable to make them other shapes—in fact, the two openings may have rounded ends, as shown in Fig. 6. With these parts properly shaped it will be readily seen that if the sliver be drawn through the opening it will raise the part K′ if large, and allow it to fall if small, the said feeler being free to rise and fall.

Turning now to Fig. 1, let us suppose the feeler K′ to be held downward by a slight spring force, or preferably by its own weight, for which reason I make it large and hang it to the lever L, pivoted at *l*, to suitable arms of the frame E. As the feeler K′ rises and falls then, under the influence of the moving sliver on account of its variations in size, the lever L at its upper end will be caused to rise and fall. What I have so far treated as a lever is in the form of a rock shaft having two arms l^2 and L′, the axis, as stated, formed by the rock shaft l^3. Adjacent to the notch in the feeder, which I have shown as a wheel, is an arm M, seen in detail in Fig. 3, pivoted to the wheel by the pin *m*, which passes through it and is squared to receive the arm M^2. The arm M is continued beyond its axis and has a supplemental arm M′, as shown in Figs. 1 and 3, so that it may be influenced by a part of the lever L which is bent to conform somewhat nearly, for a distance, with the path of movement of the said arm, and thus control it while passing under the supply reservoir. Around the axis of the arm is a spring m^2, connected to the arm at one end and to a pin, *m*′, at the other. This spring, as will be seen, is adapted to force the arms M and M^2 so as to close the slot intended to form a jaw and carry the wisps of fiber. The stop pin is provided to limit its movement, as seen in Fig. 1. The spring referred to is but slight in tension, being intended only to be sufficient to keep the notch of the feeding device closed until opened, and the weight of K′, or spring pressure if preferred, is sufficient to overcome the pressure of the spring m^2.

In the form of spinner which I have adapted my invention to operate with, the sliver, as it is formed, rotates in the hopper B, and as I do not wish the feeler K′ to interfere with said rotation of the sliver to a harmful extent I lift it so as to leave a large and free opening between it and the part K, and hold it in that position all of the time except when it is necessary to allow it to come in contact with the sliver so as to be influenced by the size of the latter. To accomplish this I locate a cam C′ upon the side of the wheel, and by means or this cam raise the part K′ and otherwise control it. An anti-friction roller C^2 is pivoted to the lever and the cam so shaped that the lever may be free to rock under the weight of K′ at the time the feed-controlling arms M and M^2 and the notch in the wheel the capacity of which they regulate, are passing beneath the supply reservoir. It is thus seen that during every revolution of the wheel the feeler K′ is dropped onto the sliver, which in this case is supposed to rotate, once during the revolution of the wheel C, and the upper end of the lever L allowed to act upon the movable part of the feeding jaw as a cam. It is plain, in short, that by the rising and falling of the upper end of the lever L, which, as said, forms, in effect, a cam track, the capacity of the feeding notch is regulated. In order that the scope of variation of the positions assumed by the cam-shaped part of the lever L under the influence of varying sizes of the sliver may be as great as possible, I have made the sides forming the opening through which the sliver passes as acute, in positions relative to each other, as possible. Reference to the diagrams of Fig. 5 will show that if the sliver be the size shown at 1, the feeler can drop much lower than if the sliver be large, as at 2 in the same figure. These figures show how a variation as great as three-eighths of an inch in the height at which the feeler is held, may be accomplished if the proportions be adhered to.

The operation has been sufficiently described, but it is proper to add that I have so provided that the size of the sliver shall affect the feeler K′ to raise it higher than is perhaps necessary. But as the feeding wheel will revolve quite fast and take small quantities of fiber at a time, little harm will result if it is closed during an occasional revolution. I prefer that the proportions be such as to cause a total stoppage of the feed in case of sudden enlargement of the sliver. This, however, can be adapted by makers to the special requirements, and even to mere whims of the makers.

I believe myself to be first to control the quantity of fiber formed into a sliver by measurement of the sliver itself, or its equivalent, by measurement of the same after it becomes twine, as my feeler K′ may be placed behind the spinner instead of before it. When placed before it, however, any reduction or increase in the size of the sliver is corrected as near the source of supply, and hence as quickly as possible.

I shall not so limit my claims as to only cover the construction shown, but in addition to broad claims, will cover the said specific details and combinations of details by means of which I carry out the invention.

The two essentials for carrying the principles into effect are, a feeding device adapted to be regulated, and a device adapted to be influenced by the size of the sliver to control the quantity fed by the feeding device. I shall claim the combination of these two elements broadly, and shall claim the combination of various mechanical parts forming each of them in addition, as well as such other combinations of parts as I have seen fit to make to properly carry out the invention.

It is plain that the feeding notch or jaw may be variously shaped and variously regu-

lated by the feeler K′ or its equivalent, or by the cam, and there may be a number of detours in the cam C′, but of course an equal number of feeding jaws in the periphery of the disk.

In order to enable the machine to be regulated so that it shall make large sliver or small sliver, as required, I provide adjustment whereby the feeler can be raised or lowered, and that while the machine is in operation. I apply a supplemental arm N to the rock shaft l^3, and extend the arm l^2 to form the arm n. Into the arm N, is hooked the end of the bolt n', which passes through the arm n and is provided with the nut n^2. The movement of the rock shaft is so slight that the adjustment nut will be so nearly still that it can be turned without stopping the machine.

The effect of the adjustment will be readily understood. If we suppose the thumb nut to be turned so as to raise the feeler, the result will be that a larger sliver will be required to affect it; in short, the wisp-forming jaw will then not be affected until the sliver becomes to be the desired size. Any increase in the size of the sliver will prevent the feeler from dropping so low as in case of small sliver, and the wisp-forming jaw permitted to have greater capacity.

While the feeding jaw or notch c is passing under the concave, preferably formed by the strap H, the fiber will be retained, but as soon as the notch passes away from the strap the spring will compel the arms M and M^2 to force the fibers out of the notch and permit them to fall into the receiver B. Having then a forced discharge, wisps may be quickly thrown out and the wheel revolved at a rapid rate of speed, if desired.

I have shown two means of adjustment to adapt the machine to various sizes of twine, either of which may be made use of, the former, that above described, and the latter shown in Figs. 1 and 2 consisting in slotting the holes by which the casting having the opening K is screwed to the frame pieces, and securing to the frame also a bracket o, through which a set screw o' is threaded. Loosening the bolts which pass through the slotted holes, the screw may be turned so as to raise or lower opening K. By this means it will be seen that the relative positions K and K′ will be varied.

I deem it not necessary to show the various means for adjustment of the feed-regulating device that have occurred to me, but recommend to those wishing to avail themselves of the invention to modify the means of adjustment to conform to special requirements.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. The combination of a supply hopper, a wisp-forming and carrying jaw, a spinner to which the fibers are delivered, and mechanism, influenced by the quantity of fiber being spun, adapted to regulate the amount of fiber delivered to the said spinner by regulating the capacity of the said wisp-forming and carrying jaw, substantially as described.

2. The combination of a supply reservoir, a wisp-forming and carrying jaw, operating to take fibers from the said supply reservoir, said jaw adapted to be increased or decreased in its capacity, and a controlling element therefor that is itself controlled by the quantity of fiber in the sliver at a point where the latter is fully completed, substantially as described.

3. A supply reservoir, a wisp-forming and carrying jaw, the capacity of which may be increased or decreased, a lever provided with a guiding surface adapted to regulate the capacity of the said wisp-forming and wisp-carrying jaw, and means controlled by the amount of fibers previously deposited for regulating the position of the lever all combined substantially as described.

4. The combination with the hopper at its end, having the aperture through which the formed sliver is drawn, of a feeler, the position of which is adapted to be influenced by the size of the outdrawn sliver, and a wisp-forming and carrying jaw adapted to lay the fibers of said sliver under the control of said feeler, substantially as described.

5. The combination of a supply reservoir, a wisp-forming and wisp-carrying jaw, a fiber receiving hopper out from which the said fibers are drawn as sliver, a feeler the position of which is adapted to be influenced by the size of said sliver, and means adapted, by the variations in position of said feeler due to irregularities in size of said sliver, to regulate the capacity of the said wisp-forming and carrying jaw, substantially as described.

6. The combination with the hopper, at its end having the aperture K through which the prepared sliver is drawn, of a feeler the normal position of which, in order to be influenced, is against the fiber being outdrawn, a supply reservoir and wisp-forming and carrying jaw, said feeler and said jaw connected by mechanism whereby the position of the feeler regulates the capacity of the wisp-forming and carrying jaw, substantially as described.

7. In combination with the hopper, having, at its end, the aperture K through which the prepared sliver is drawn, of the feeler K′ in its normal position being in contact with the outgoing sliver, mechanism connecting said feeler with the automatically adjustable wisp-forming and carrying jaw, and the said jaw, the said feeler moved out of contact with the sliver during the time that the feeding jaw is not passing the reservoir substantially as described.

8. The combination of the supply reservoir, the feeding jaws, the receiving hopper, the lever L for controlling the capacity of the said jaws, and the weighted feeler K′, said lever L connecting said feeler to said jaws substantially as described.

9. The combination of the hopper A and the hopper B, the feeding devices, the latter adapted to take the fibers from the hopper A and deliver them into the hopper B, the spinning mechanism adapted to draw the sliver prepared by the feeding devices from the hopper B, the said hopper having an aperture through which the said sliver is drawn, with the feeler K′, having the sides which span the outdrawing sliver at an acute angle relative to each other, whereby the variations in the size of the sliver will cause the said feeler to assume widely different positions during its contact with said varying sizes of sliver, and mechanism connecting the said feeler with the feeding devices so as to influence the capacity of the same, substantially as described.

10. In a sliver-forming machine, the combination of a wisp-forming and carrying jaw, a receptacle to which the wisps are delivered and from which the wisps are drawn in a longitudinal direction and thus formed into a sliver, a feeler and connecting mechanism whereby the movement of the said feeler, influenced by the size of the sliver passing it, is adapted to control the wisp-forming jaw, said connecting mechanism being adjustable so that the machine may be set for various sizes of sliver required, substantially as described.

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