(No Model.)

C. D. CLARK.

NIPPER FOR SPINNING MACHINES.

No. 404,898. Patented June 11, 1889.

Fig. 1.

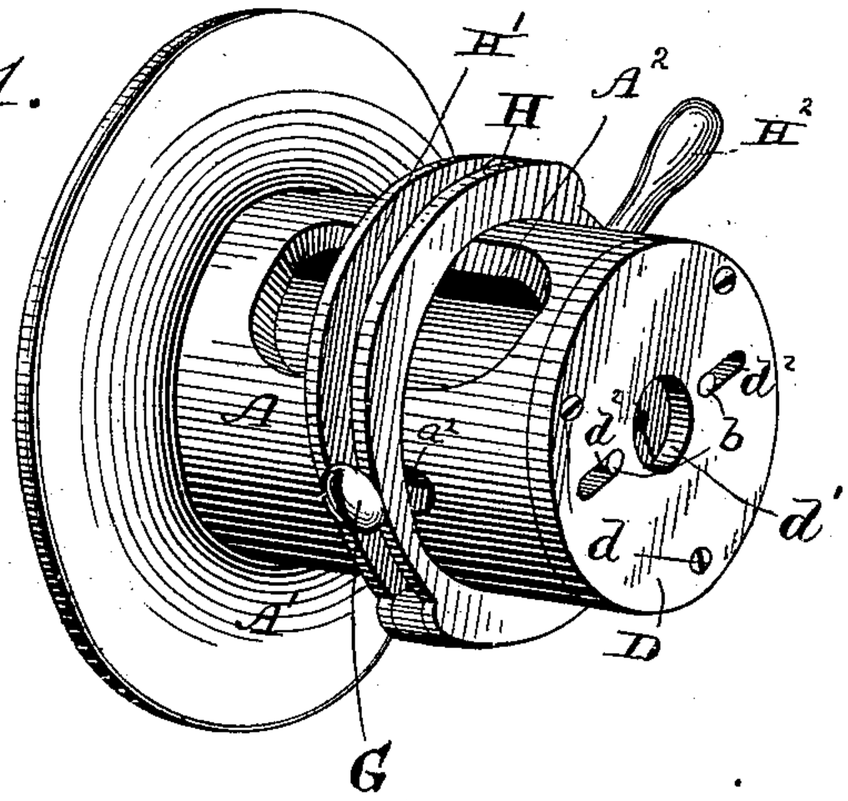


Fig. 7.

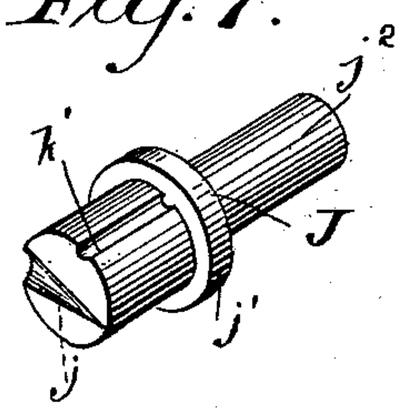


Fig. 2.

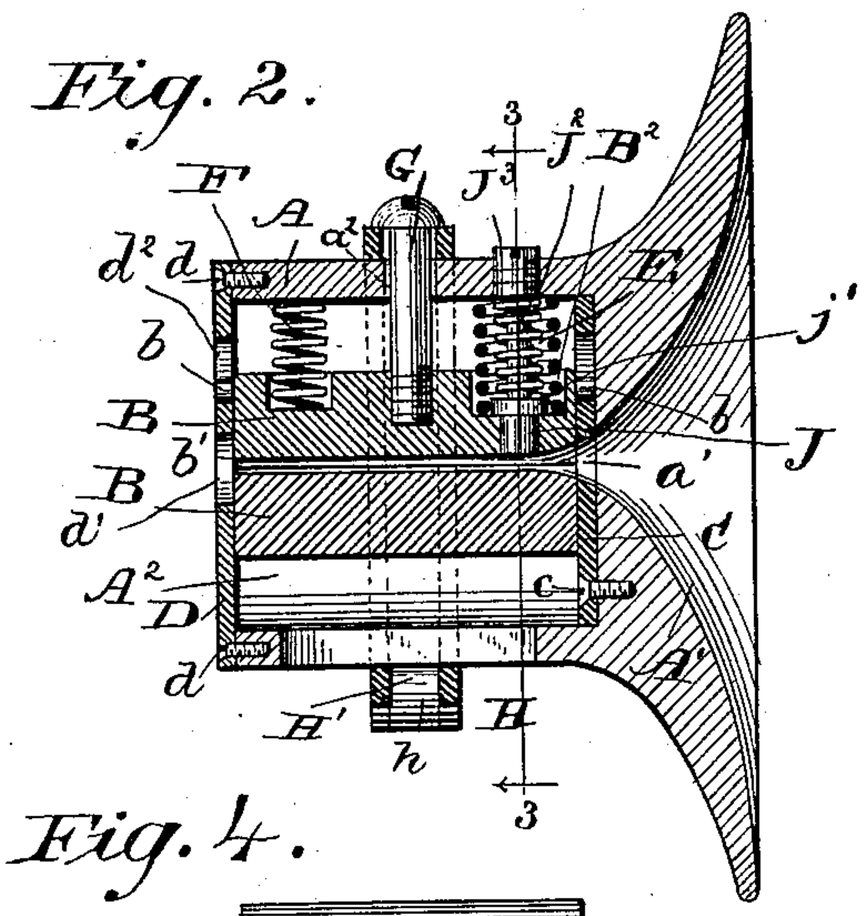


Fig. 3.

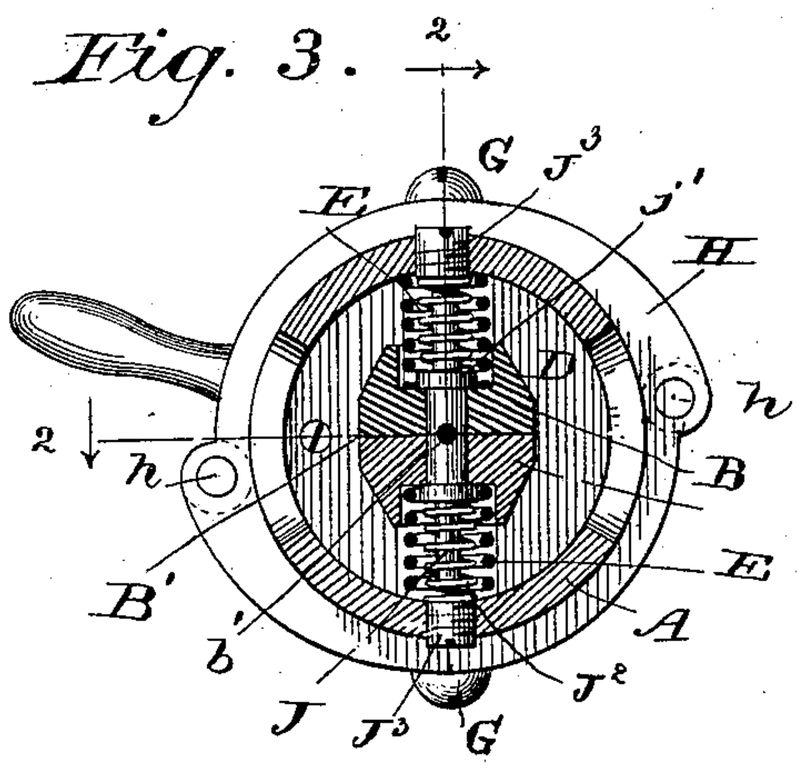


Fig. 4.

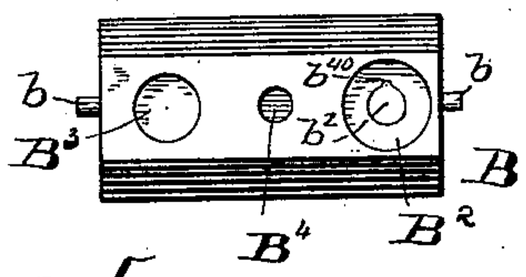


Fig. 5.

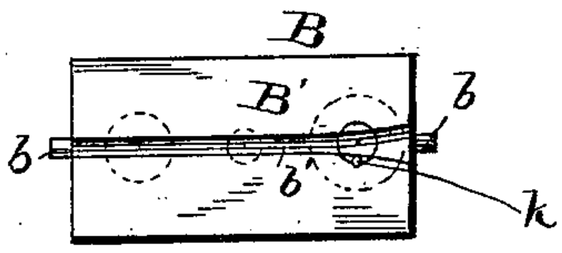
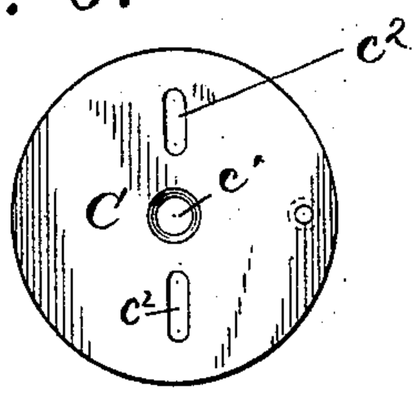


Fig. 6.



Witnesses:
Arthur Johnson
Jean Elliott

Inventor
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By Burton & Burton
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UNITED STATES PATENT OFFICE.

CHARLES D. CLARK, OF CHICAGO, ILLINOIS, ASSIGNOR TO WILLIAM DEERING & COMPANY, OF SAME PLACE.

NIPPER FOR SPINNING-MACHINES.

SPECIFICATION forming part of Letters Patent No. 404,898, dated June 11, 1889.

Application filed September 29, 1888. Serial No. 286,741. (No model.)

To all whom it may concern:

Be it known that I, CHARLES D. CLARK, a citizen of the United States, residing at Chicago, county of Cook, and State of Illinois, have invented certain new and useful Improvements in Nippers for Spinning-Machines, which are fully set forth in the following specification, reference being had to the accompanying drawings, forming a part thereof.

The purpose of this invention is to provide means for preventing the unevenness in twine which is sometimes occasioned by small lumps which exist in the fiber which is fed into the spinning device, such lumps causing an enlargement of the mouth of the nipper during the entire time that they are passing through it, and consequently causing a lump or enlargement in the twine of corresponding length.

In the drawings, Figure 1 is a perspective of the nipper of a twine-spinning machine having my device embodied in it. Fig. 2 is a view of the two surfaces exposed by cutting the devices at the places indicated by the lines 2 2 on Fig. 3, both said surfaces being shown as in one plane. Fig. 3 is a transverse section of the device through the line 3 3 on Fig. 2. Fig. 4 is an exterior side plan, and Fig. 5 an interior side plan, of either of the jaws. Fig. 6 is a plan of the end plate which secures the jaws in place. Fig. 7 is a view of one of the plunger-pins detached.

A is the shell or case of the nipper. It is formed with a bell-shaped mouth A′, by which the "sliver"—that is, the band or rope of fiber to be twisted into cord—is gathered into the central aperture a', which leads from the mouth into the chamber A^2 in the back of the shell A, which contains the nipper-jaws B B. Each of these jaws is formed with a flat face B′, midway in the width of which there is formed a groove b'. These grooves match each other and together form a cylindrical aperture through lengthwise between the jaws when their faces B′ are in contact. At the forward end this aperture is enlarged, so that it forms a continuation of the aperture a' at the center of the mouth A′. Each of these jaws is provided with a gudgeon b at each end, by means of which the jaws are kept in proper place in the chamber A^2 and guided in their movements, hereinafter described. A plate C is secured to the bottom or forward end of the chamber A^2 by a screw c, and in said plate there are two radial slots c^2, in which the gudgeons b of the jaws enter, and a similar cap-plate D is provided, secured over the open rear end of the chamber A^2 by the screws d entering the shell A, and said plate has similar slots d^2 to receive and guide the gudgeons at the rear ends of the jaws B B. Each of the plates C and D has a central aperture c' and d', respectively, the aperture c' coinciding at the forward side with the mouth a', and at the rear side with the enlarged end of the aperture formed by the grooves b' b'.

The jaws B B are inserted into a chamber A^2, with their faces B′ in contact, as stated, the springs E and F being first inserted in the sockets B^2 and B^3, respectively, formed in the back side of the jaws. These springs E and F are of such length that when the jaws containing them in the said sockets are inserted into the chamber A^2 the springs impinge against the walls of the chamber, and, advisedly, they will be made long enough so that it will be necessary to compress them somewhat in order to cause them to enter the chamber, as described. The springs E, applied to the jaws respectively, are of equal strength, and likewise the springs F are equal, so that the tendency of said springs, reacting against said jaws and forcing them together, will be to locate the jaws centrally within the chamber A^2, and thus to cause the aperture formed by the coinciding grooves b' b' to coincide axially with the central aperture a' in the mouth A′. In the side walls of the chamber A^2—that is, in the shell A—there are formed two elongated apertures a^2, diametrically opposite. These apertures are designed to admit the bolts G G, which are passed through them, respectively, and screwed into the apertures B^4 B^4, respectively, in the back side of the jaws B B, midway in their length. These bolts thereby constitute stems for the said jaws, which will permit them to oscillate slightly in an axial plane at

right angles to their faces B′, as hereinafter described.

Outside of the shell A, and encircling the same, I locate the cam-ring H, which is interiorly coincident with the surface of the shell A, and exteriorly slightly eccentric thereto, and provided with the slot H′, through which the screws G G are passed. The heads of said screws stride the slots and overhang the exterior of the cams, respectively. The ring H is provided with a handle H^2, by means of which the ring may be moved around the shell A, such movement causing the cams to actuate the bolts G and either draw the jaws outward or permit them to be forced inward by the springs E and F. The socket B^2 at the forward end of the jaws B is larger than the socket B^3 at the other end, for the purpose of admitting the larger spring, so that within it there may be room for the plunger-pin J. Such a pin is inserted in each jaw and extends through an aperture b^2, so that the plunger-pin protrudes into the groove b' on the face of the jaw. The end of this plunger-pin which thus protrudes is provided with a tapering groove j, commencing at one side and merging in the flat end of the pin without reaching the other side, the two grooves in the two plunger-pins, when the ends of said pins are placed abutting against each other, forming a conical socket entering from one side and terminating without piercing to the other side. Each of the plunger-pins is also provided with a flange j', which stops against the bottom of the socket B^2 and prevents the pin from extending farther through the jaw than necessary, for the purpose hereinafter described. Said flange also answers as a stop for the spring J^2, which is coiled round the stem j^2 of the pin, and a hole is bored through the shell A in line with the pin to admit the plug J^3, which stops the other end of the spring J^2.

The conical aperture formed by the butting ends of the plunger-pins J J coincides substantially with the enlarged mouth of the aperture formed by the grooves b' b', so that when the jaws are closed together and not in operation—that is, no fibers entering them—said conical socket constitutes the continuation of the mouth A, aperture c', and enlarged mouth of the aperture formed by grooves b' b'. In order to hold the plunger-pins J J with this conical aperture actually coinciding with the mouth a' and with the grooves b' b', a pin k is provided, which is inserted in a longitudinal groove k' in the pin J, coinciding with a groove b^{40} in the side of the aperture b^2, said pin acting as a feather to permit the longitudinal and prevent the circular motion of the plunger-pin.

The operation of this device is as follows: When the rope or band of the sliver is to be twisted into cord, the handle H^2 being made use of to rotate the cam-ring H, the jaws B B are withdrawn from the center of the chamber sufficiently to permit the end of the sliver to be introduced and passed through the mouth and between the jaws and suitably connected with the twisting mechanism beyond the farther end of the nipper. The quantity of sliver thus introduced is such as can be laid in the tubular aperture b' b' between the jaws when properly twisted, and at starting it will be suitably twisted, so that it will lie in those jaws and permit them to be closed together by the springs E and F. In this position the plunger-pins J J are necessarily held apart by the sliver which passes between them, the aperture on the farther side toward the tubular aperture b' b' being flat, because the conical grooves j do not extend through to that side of the pins. The springs J^2 J^2 are sufficiently strong to hold the sliver, which thus passes between the ends of the pins, so that no twisting will occur on the receiving side beyond said pins, the effect of the twisting mechanism being therefore limited to the portion of the sliver which lies beyond the pins in the grooves b', and further entirely beyond the nippers. The portion of the sliver that lies in the grooves b' b' is therefore being twisted under some pressure, or at least while closely confined by the jaws and in the grooves. This causes all the loose ends of the fiber to be gathered together and twisted into the strand, while at the same time it forms the mass of sliver into a cylindrical body, so that while it is being twisted it is kept round, and when the twisting is completed it is a substantially cylindrical cord, instead of a flat twisted spiral-shaped or irregular cord, as it might otherwise be. While the farther side of the plunger-pins J J presents a flat opening the receiving side presents, as described, the conical grooves, which, when the ends of the spring are together, make a conical opening, and these conical grooves serve to supplement the action of the mouth A′ and of the enlarged and tapering ends of the grooves b in the tendency to gather the fibers as they enter the grooves b' b'.

If the sliver were perfectly uniform and without irregularities or obstructions, no variation in the position of any of the parts would occur as the sliver passed on through the nipper and was formed into cord; but, in fact, slight irregularities exist, and in addition to variations in the fiber which are not entirely removed by the preceding processes there will occasionally exist small lumps which will enter the nipper. As these lumps pass between the plunger-pins, the springs J^2 J^2 will yield to allow them to enter and pass, and if such obstructions are large enough they will force apart the receiving end of the jaws B B, the springs E E yielding for that purpose. If now the entire length of the jaws should be open whenever an obstruction enters, and remain open while such obstruction was passing through, the whole quantity of cord being twisted while the obstructions were thus passing and while the jaws were

thus opened would be free from the restraint and pressure of the jaws, and all the frayed diverging ends of fiber which, by reason of that restraint and pressure, are in the proper operation of that device twisted into the cord and add to its strength and are prevented from making it irregular, would remain protruding and loose, and the cord thus formed would be rough and enlarged. The chief purpose of this invention is to prevent such a result, and it is effected by means of the construction shown and due to the action of the springs E and F, and the pivoting of the jaws by means of their stems G, for when an obstruction enters in at the receiving end and forces the receiving end of the grooves B B apart the discharge ends of the jaws remain in contact and are held together by the springs E F, thus limiting the aperture at the discharge end to the proper size, although it is temporarily enlarged at the receiving end. As the obstruction advances through the duct formed by the grooves *b' b'*, reaching the line of the stems G G, being midway between the two lines of pressure exerted by the springs E E at the forward end and by the springs F F at the discharge end, and operating for an instant as a fulcrum, over which the jaws may be rocked, the entire length of the jaws will for that instant be opened; but as soon as the obstruction has passed that pivotal point the springs E E, gaining leverage as the springs F F lose it, the fulcrum being moved toward the latter springs, the jaws will be forced together by the springs E E at the receiving end and opened at the discharge end; but they will gradually close as the obstruction approaches the discharge end and again assume their normal position in contact throughout, when the obstruction emerges from the discharge end. There will thus be no time, except the bare instant that the obstruction is passing the line of the stems G G, when the cord will be entirely free from the restraint and pressure of the jaws, and in consequence the enlargement of the cord caused by the obstruction will be reduced to a minimum; also, even when the jaws are partly opened by the obstruction, that opening is a tapering one, so that the effect of it upon the cord is much less than if it were continuous of the full width caused by the obstruction.

In addition to the capacity of the jaws to oscillate, as described, during the passage of the obstruction between them, very much increased efficiency is obtained by the use of springs to hold them together over former constructions which have operated slowly by gravity. The cord is drawn through the nipper at considerable speed, and when an obstruction has opened the jaws, if the device for closing them is slow in its action, considerable length of cord may pass before they are again fully closed, and the gravity-acting devices heretofore employed permit considerable irregularity in the cord on account of the slowness with which they close the jaws together after they have once been separated by an obstruction.

I claim—

1. In a nipper for a twine-spinning machine, in combination with the tubular shell having a flaring mouth, a pair of nipper-jaws located within the shell and having opposed faces normally in contact, a pair of opposed springs located within the shell and reacting between the wall thereof and the jaws, respectively, at their forward part, and a pair of springs located within the shell and reacting between the wall thereof and the jaws, respectively, toward their rear end, the opposed springs of each pair being of substantially equal tension, whereby the jaws are held normally with their opposed and contacting faces in a plane which contains the axis of the flaring mouth and are made capable of separating at either end without separating at the other, substantially as set forth.

2. In a nipper for twine-spinning machines, in combination with a tubular shell having a flaring mouth, a pair of nipper-jaws having faces opposed to each other, and provided with coinciding longitudinal grooves constituting together a longitudinal duct, a pair of opposed springs located within the tubular shell and reacting between the wall thereof and said jaws, respectively, toward the receiving end of the jaws, and a pair of opposed springs located within the shell and reacting between the wall thereof and the jaws, respectively, toward the delivery end of the jaws, the opposed springs of each pair being substantially of equal tension, substantially as and for the purpose set forth.

3. In combination with the chambered shell, the nipper-jaws located therein, and the springs which yieldingly hold them together, said jaws being provided with stems which protrude transversely through the wall of the shell, and the cam-ring encircling the shell and having the eccentric cams engaging the protruding portion of the stems, respectively, substantially as set forth.

4. In combination with the chambered shell, the jaws located in said chamber, opposed springs reacting between them, respectively, and the wall of the chamber, said jaws being provided, respectively, with stems G G, which protrude through the chamber-wall and are exteriorly headed, and the cams guided on the exterior of the shell and engaging the protruding portions of the stems, respectively, substantially as and for the purpose set forth.

5. In combination with the chambered shell, the jaws located in such chamber, springs which react against the forward ends of the jaws, and other springs which react against the rear end of the jaws to yieldingly hold the jaws together at said ends, respectively, the stems G G, projecting from said jaws midway between said springs, and the shell

having elongated apertures a^2, in which said stems, respectively, are guided, substantially as set forth.

6. In combination with the shell having the receiving-mouth and the rear chamber entered from said mouth, the jaws located in said chamber and provided with gudgeons *b*, and the guide-plates C and D, provided with the parallel slots c^2 and d^2, which receive the gudgeons, respectively, and the springs which force the jaws together, substantially as set forth.

7. In combination with the shell and the jaws located therein and the springs which force them together, the plunger-pins J J, protruding through said jaws to their opposed faces near the receiving end, said pins having grooves *j'* in their abutting ends diminishing in depth toward the discharge side thereof, and springs which react against said plunger-pins to force them toward each other, substantially as set forth.

8. In combination with the shell having the receiving-mouth and the rear chamber entered through the same, the jaws located in said chamber, and springs which react against said jaws, respectively, the plunger-pins within and extending to the opposed faces of the jaws, respectively, and the springs which react upon said plunger-pins to force them toward each other longitudinally, said springs being independent of the springs which act upon the jaws, substantially as set forth.

In testimony whereof I have set my hand, in the presence of two witnesses, at Chicago, this 24th day of September, 1888.

C. D. CLARK.

Witnesses:
A. L. UPTON,
ARTHUR JOHNSON.