No. 676,567. Patented June 18, 1901.

A. B. MORSE.

WINDING MACHINE.

(Application filed June 13, 1899.)

(No Model.) 2 Sheets—Sheet 1.

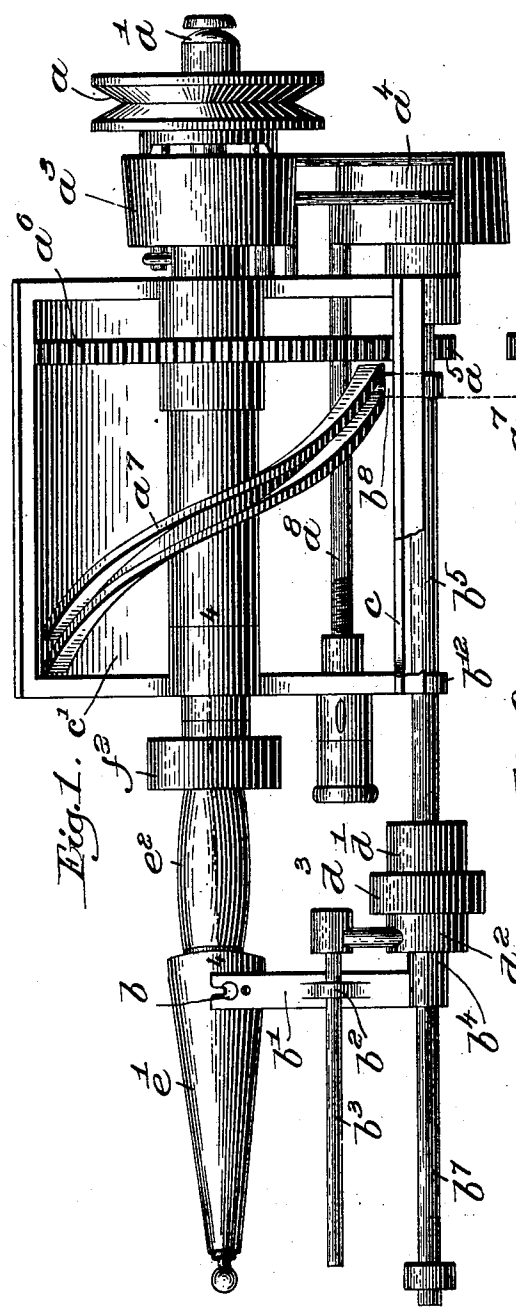


Fig. 1.

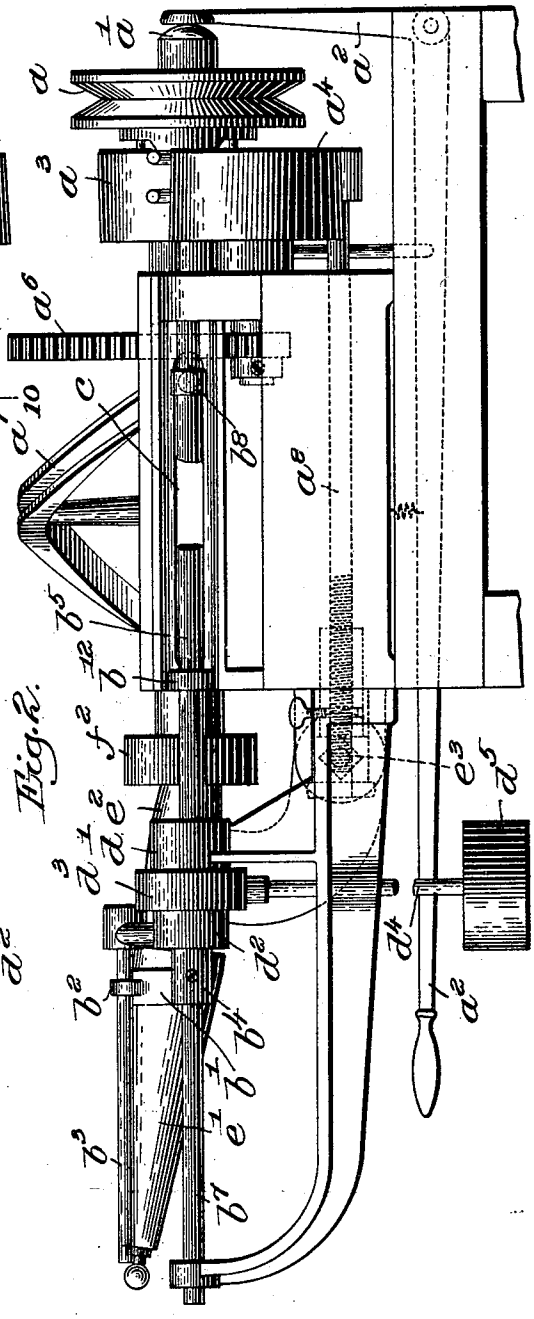


Fig. 2.

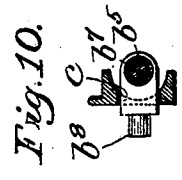


Fig. 10.

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Fig. 3.

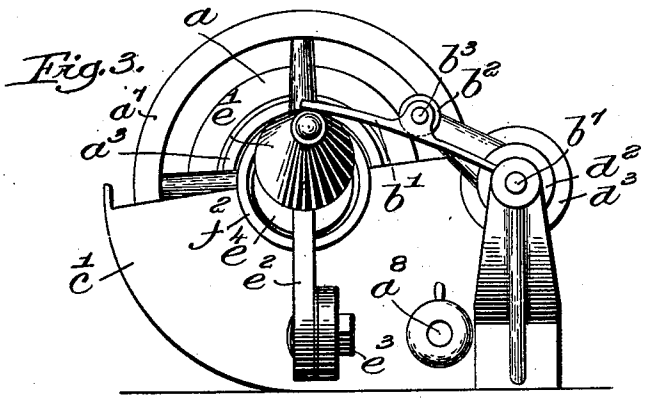


Fig. 4.

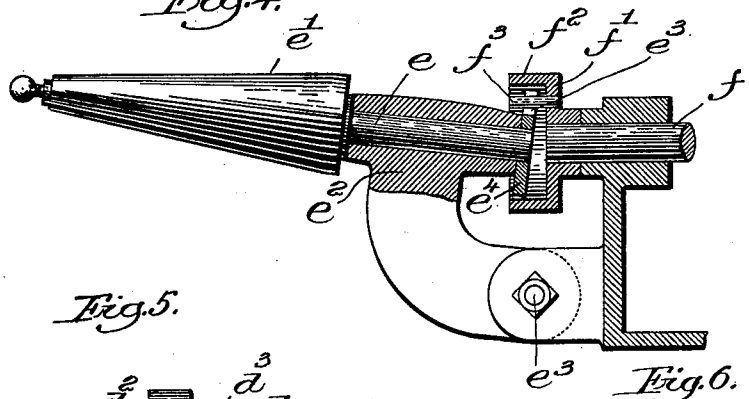


Fig. 5.

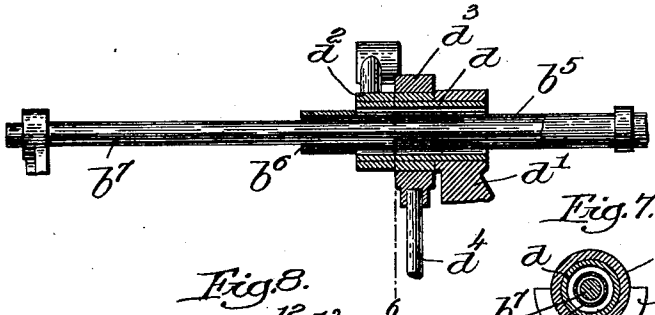


Fig. 6.

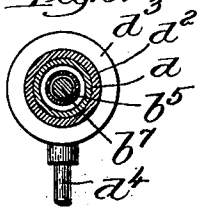


Fig. 7.

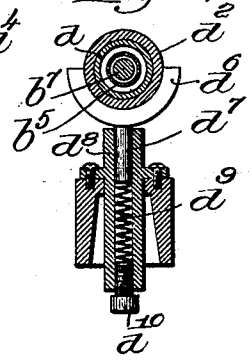


Fig. 8.

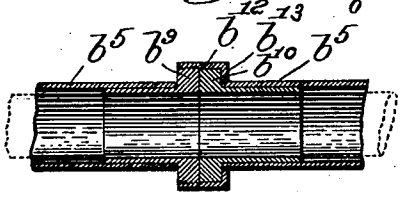
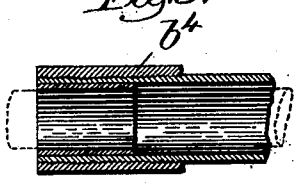


Fig. 9.



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UNITED STATES PATENT OFFICE.

ALFRED B. MORSE, OF EASTON, MASSACHUSETTS.

WINDING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 676,567, dated June 18, 1901.

Application filed June 13, 1899. Serial No. 720,362. (No model.)

To all whom it may concern:

Be it known that I, ALFRED B. MORSE, of Easton, county of Bristol, State of Massachusetts, have invented an Improvement in Winding-Machines, of which the following description, in connection with the accompanying drawings, is a specification, like letters on the drawings representing like parts.

My invention is an improved winding-machine particularly adapted for winding yarn, my improvements relating more particularly to the means for mounting, guiding, and maintaining the proper pressure of the thread-guide, certain details of improvement also relating to the mounting and adjustment of the quill.

The various details of construction and particular features of invention contained in my new machine will be more fully explained and the invention more particularly defined in the following description, reference being had to the accompanying drawings.

In the drawings, Figure 1 is a top plan view of sufficient portions of my machine to make the invention readily understood. Fig. 2 is a front elevation thereof. Fig. 3 is a left-hand end elevation. Fig. 4 is a broken detail of the quill-spindle and adjacent parts, the connections being shown in section substantially on the line 4 4, Fig. 1. Fig. 5 shows in broken detail the thread-guide support and adjacent parts, partly in vertical longitudinal section. Fig. 6 is a vertical cross-section taken on the line 6, Fig. 5. Fig. 7 is a sectional view similar to Fig. 6, showing a modification. Figs. 8 and 9 are longitudinal vertical sectional views showing two means for permitting the swivel action of the thread-guide as the cop builds up, and Fig. 10 is a sectional detail on line 10, Fig. 1.

The driving mechanism and throw-cam arrangement herein shown are not claimed herein.

Power is derived from a pulley a, coupled by means of any suitable clutch mechanism a' and clutch-lever a^2 to usual cone-pulleys a^3 a^4, the latter operating a gear-pinion a^5, which meshes with a drive-gear a^6, connected with and driving the throw-cam a^7. A belt-shifter a^8 is provided for shifting the belt carried by the cone-pulleys a^3 a^4.

The parts above described are all substantially as shown in my application, Serial No. 684,585, filed June 27, 1898.

The thread-guide or guide-button b is carried at the end of an arm b', provided with a suitable rib or bracket b^2, perforated to slide on a guide-rod b^3, supported in special manner, presently to be described. The arm b' has its hub b^4 shrunk onto the end of a thin tube b^5, supported by internal ribs b^6 on a bar or rod b^7 in substantially the same manner as shown in my above-mentioned application. In my said application, however, this tube was reciprocated by carrying a roll at one side traveling in the throw-cam and a guide-pin traveling in a slot adjacent the rod b^7, but on the opposite side thereof from the throw-cam. I have found, however, that a much smoother and more uniform reciprocation of the thread-guide is obtained by placing the direction-slot between the throw-cam and the bar b^7 and throw-member tube b^5, and accordingly I have herein shown a slot c, adjacent the rod b^7 and between it and the throw-cam a^7, in which the stud b^8, carried by the tube b^5, operates, the free end of said stud entering the groove of the throw-cam and serving to reciprocate the thread-guide. As herein shown, the slot c is provided in one edge of a casing or housing c', which I employ as a convenient frame for the adjacent portion of the machine and in which the adjacent parts are journaled; but it will be understood that the guide-slot c may be provided in any other suitable manner, provided its location is as stated. As herein shown, I have made the quill-spindle stationary, so that as the thread-mass builds up the quill does not swing away from the thread-guide; but instead thereof the thread-guide swings away from the thread mass, and the mechanism by which I accomplish this constitutes a chief part of my present invention.

Viewing Figs. 5 and 6, in connection with Figs. 1 and 2, it will be seen that I provide a sleeve d within and projecting from the hollow upper end of a stationary bracket d', and on this projecting sleeve I mount a hub d^2, which supports eccentrically the guide-rod b^3, already alluded to, so that as the thread mass builds up the thread-guide can raise its guide-rod b^3 simply by rotating the hub d^2 thereof on the supporting-sleeve d. As is well un-

derstood, however, it is necessary for the proper winding of the thread or yarn that the thread-guide should have a constant and considerable pressure on the thread mass, and accordingly I secure this pressure by means of an automatic frictional resistance, preferably in the form of a frictional strap or collar d^3, to the lower side of which is suspended by a rod d^4 a suitable weight d^5, the result being that all tendency of the thread-guide to leave the thread mass is resisted, and the pressure thereof on the thread mass is kept uniform by the constant frictional resistance of the strap or collar d^3, subject to the weight d^5.

In Fig. 7 I have shown another means of securing the frictional resistance, said means comprising a brake-shoe or collar d^6, having a stem d^7, supported in a hollow post d^8, and normally held in constant frictional engagement with the hub d^2 by means of a spring d^9, adjustable by a set-screw d^{10}.

In order that as the thread mass builds up the thread-guide may lift without inconvenience to the tube b^5, I may make the latter in two sections, as shown in Fig. 8, in which said sections are shown as provided with annular ribs b^9 b^{10} permanently secured thereto, the former of said ribs carrying a flange b^{12} with an inturned lip b^{13}, which embraces the rib b^{10} and constitutes a swivel-coupling, permitting the portion of the tube b^5 which carries the thread-guide to turn independently of the other portion.

Instead of the coupling mechanism shown in Fig. 8 I may mount the hub b^4 of the thread-guide directly on the end of the tube b^5, as shown in Fig. 9, where it will be seen that I have threaded the parts together by extremely fine threads, so that the slight turning occasioned by the thread-guide will not materially affect the relative longitudinal position of the parts.

Referring now more particularly to Fig. 4, it will be seen that the quill-spindle e, for supporting any usual quill or bobbin e' and mounted in an adjustable-bracket e^2, pivoted at e^3, is shown as arranged obliquely to support a conical quill, and in order that the spindle may be readily connected to and driven by the drive-shaft f I have coupled the same thereto by a universal joint, the adjacent end of the drive-shaft f being provided with a disk f', preferably flanged, as at f^2, and containing a pin f^3 to enter a slot e^3 of a flange or disk e^4, rotating with the spindle e. The bracket e^2 constitutes a journal-support and swings from a horizontal position to an inclined position for maintaining the winding-surface (by which I mean the surface on which or above which the thread-guide rests) in perfect parallelism with the path of reciprocation of said thread-guide, said swinging movement, both of the spindle and the journal support, being shown herein as accomplished by the adjustment at the pivot e^3; but I mean the word "swinging" to include any means whatever of adjustment for moving said support and permitting the spindle to swing from a horizontal position to the inclined position shown in Fig. 4, or vice versa, it being necessary only that the journal-bearing shall move similarly as the spindle swings between the two positions required, respectively, by a parallel quill or a conical quill. Heretofore various connections have been provided, and in my before-mentioned application I have shown gearing for this purpose; but the gearing is expensive and inconvenient and other constructions are cumbrous, while the one shown is simple and automatic in its accommodation to its different positions, the slot being in an inward position relatively to the pin f^3 when it is uppermost, as shown in Fig. 4, and being toward the free end of said pin when it is lowermost or in an opposite position to that shown in Fig. 4. Moreover, this connection enables me to adjust the angle of the spindle e to any minute degree desired, inasmuch as a slight change in the angle thereof does not necessitate any attention whatever to the connection.

While I do not intend to restrict myself to the particular kind of universal joint shown, yet for various reasons this joint is to be preferred. For instance, usually it is more convenient simply to take off the bracket e^2 and spindle when a cone has been running and replace them by another bracket and spindle when it is desired to use a parallel or tubular quill, and in such case it is obvious that the slot-and-pin connection shown facilitates such replacing of parts, inasmuch as the slot simply pulls off from the pin or slides thereon, as the case may be. It will be evident that with this connection the quill-spindle will be rotated with equal facility in either its oblique or horizontal position. I prefer to employ this connection for the reason that it is extremely simple, inexpensive, and easily kept in order.

In operation as the thread-guide is reciprocated the tendency of the tube b^5 and adjacent parts to vibrate or bind on the rod b^7 is largely counteracted by the position of the guide-slot c, as already explained, and the running of the parts is rendered extremely smooth and uniform. As the thread mass builds up the thread-guide is permitted to swing by reason of the swivel connection joining the two parts of the throw-tube b^5, and yet the thread-guide is constantly held down with the requisite pressure on the thread mass by reason of the resistance offered by the guide-rod b^3, due to the constant frictional pressure of the brake-like device engaging the hub d^2 thereon.

Various other mechanisms have been suggested for maintaining the proper pressure of the thread-guide upon the thread mass, and in my before-mentioned application I have shown a very desirable means for accomplishing this object; but it will be evident to those skilled in the art that the present apparatus possesses many advantages

thereover, requiring no particular skill in running it, but, on the contrary, being absolutely automatic and always uniform irrespective of the size of the thread mass and the speed of the machine.

If it is desired to change from winding conical quills, as shown, and to wind parallel quills or tubes, the change may be instantly effected simply by removing the bracket e^2 and spindle carried thereby and replacing the same by a bracket, which carries the spindle in a horizontal plane, inasmuch as the coupling mechanism automatically accommodates itself to the new conditions, it being unnecessary to remove or change in any way any of the driving parts.

While I have herein shown and described certain preferred mechanisms for carrying out my invention, I do not limit myself to any of the details herein shown otherwise than as specified in the claims.

Having fully described my invention, what I claim, and desire to secure by Letters Patent, is—

1. In a winding-machine, a quill-spindle, means to rotate it, a thread-guide movable toward and from said spindle, means, including a throw member, to reciprocate said thread-guide, guiding means to give direction to said reciprocations, a hub supporting said guiding means eccentrically to said throw member, a friction device in contact with said hub, and means for giving said friction device uniform pressure, substantially as described.

2. In a winding-machine, a quill-spindle, means to rotate it, a throw member, a guide therefor, means to reciprocate said throw member, a thread-guide carried by said throw member and capable of swinging relatively to said guide and away from said quill-spindle, a hub mounted concentrically of said throw member, a guide-rod carried by said hub parallel to said throw member, said thread-guide being retained and guided by said guide-rod, and a friction-brake for retarding rotary movement of said hub, substantially as described.

3. In a winding-machine, a quill-spindle, means to rotate it, a thread-guide movable toward and from said spindle, means, including a throw member, to reciprocate said thread-guide, a stationary bracket adjacent the thread-guide and carrying a sleeve surrounding said throw member, a hub mounted to turn on said sleeve, guiding means carried by said hub for governing the path of reciprocation of said thread-guide, and means for controlling the position of said hub and guiding means, substantially as described.

4. In a winding-machine, a quill-spindle, means to rotate it, a thread-guide movable toward and from said spindle, means, including a throw member, to reciprocate said thread-guide, guiding means to give direction to said reciprocations, a hub supporting said guiding means eccentrically to said throw member, a friction device in contact with said hub, said friction device comprising a collar, a hollow post, said collar having a stem extending in said hollow post, and a spring in said post normally pressing against said stem for giving the friction device uniform pressure, substantially as described.

5. In a winding-machine, a quill-spindle, means to rotate it, a thread-guide movable toward and from said spindle, means, including a throw member, to reciprocate said thread-guide, guiding means to give direction to said reciprocations, a hub supporting said guiding means eccentrically to said throw member, a friction device in contact with said hub, said friction device comprising a collar, a hollow post, said collar having a stem extending in said hollow post, a spring in said post normally pressing against said stem for giving the friction device uniform pressure, and means for adjusting the pressure of said spring, substantially as described.

6. In a winding-machine, containing a quill-spindle and means to rotate it, a thread-guide, a throw-cam for reciprocating it, and a throw member between said cam and said thread-guide, said throw member having a swivel connection between its ends for permitting said thread-guide to swing as the thread mass builds up, substantially as described.

7. A winding-machine, having a quill-spindle and a drive-shaft to rotate it, a thread-guide and means to reciprocate said thread-guide, said quill-spindle being connected to said drive-shaft by a universal joint, and a swinging journal-support in which said quill-spindle is mounted, substantially as described.

8. A winding-machine having a quill-spindle and a drive-shaft to rotate it, a thread-guide, and means to reciprocate said thread-guide, said quill-spindle being connected to said drive-shaft by a universal joint, an adjustable journal-support for said quill-spindle, and means for fastening said support in fixed adjustment for maintaining the same in position with the winding-surface of the quill parallel with the path of reciprocation of the thread-guide, substantially as described.

9. A winding-machine having a quill-spindle and a drive-shaft to rotate it, a thread-guide, and means to reciprocate said thread-guide, said quill-spindle and said drive-shaft being movable angularly out of axial alinement and having connection with each other comprising disks carried by the adjacent ends of the quill-spindle and the shaft, a pin being provided eccentrically in one of said disks, and a slot to receive said pin in the other of said disks, substantially as described.

10. A winding-machine having a quill-spindle and a drive-shaft to rotate it, a thread-guide, and means to reciprocate said thread-guide, said quill-spindle and said drive-shaft having connection with each other comprising disks carried by the adjacent ends of the

quill-spindle and the shaft, a pin being provided eccentrically in one of said disks, and a slot to receive said pin in the other of said disks, and a journal-bearing for said quill-spindle mounted to move more or less into and out of alinement with said drive-shaft, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

ALFRED B. MORSE.

Witnesses:

GEO. H. MAXWELL,

FREDERICK L. EMERY.