I. Dimock,

Assorting Thread.

No. 21,556. Patented Sep. 21, 1858.

Fig. 1.

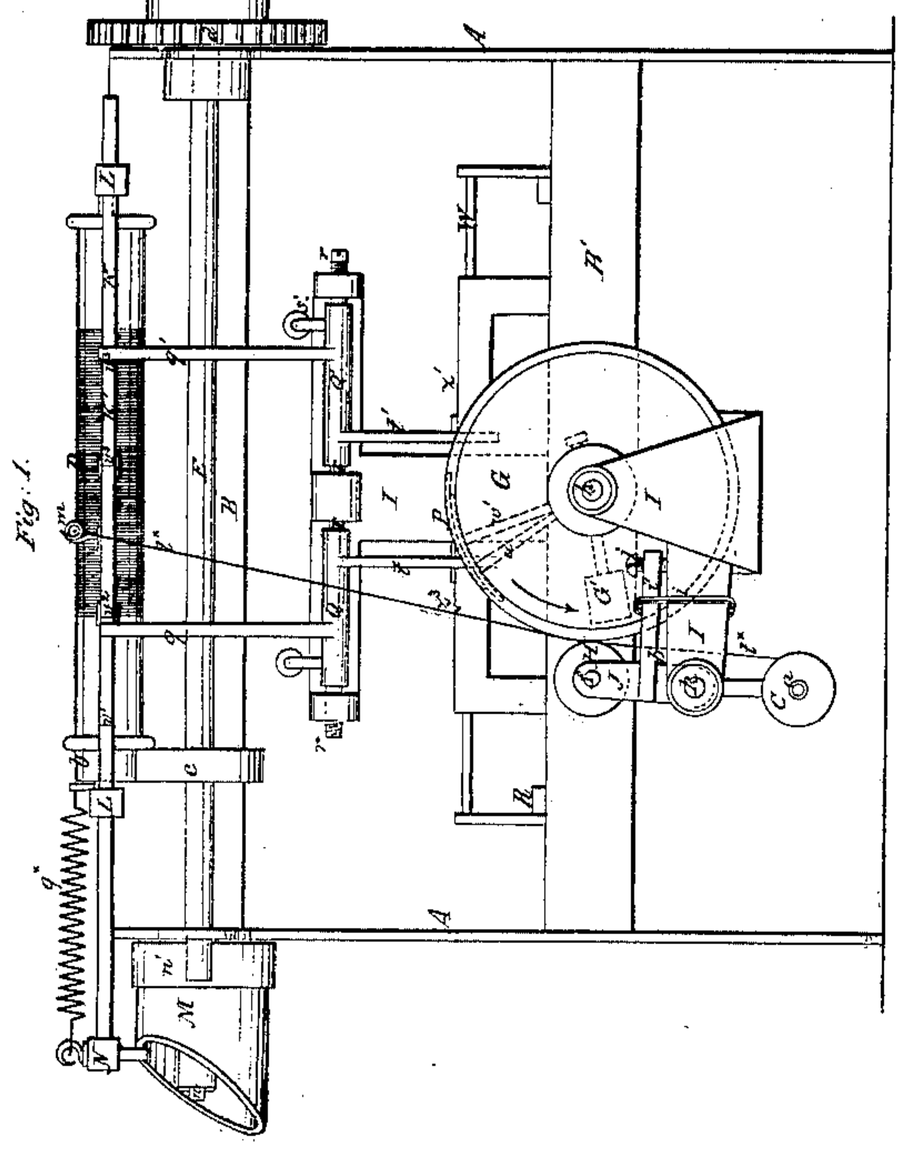


Fig. 2.

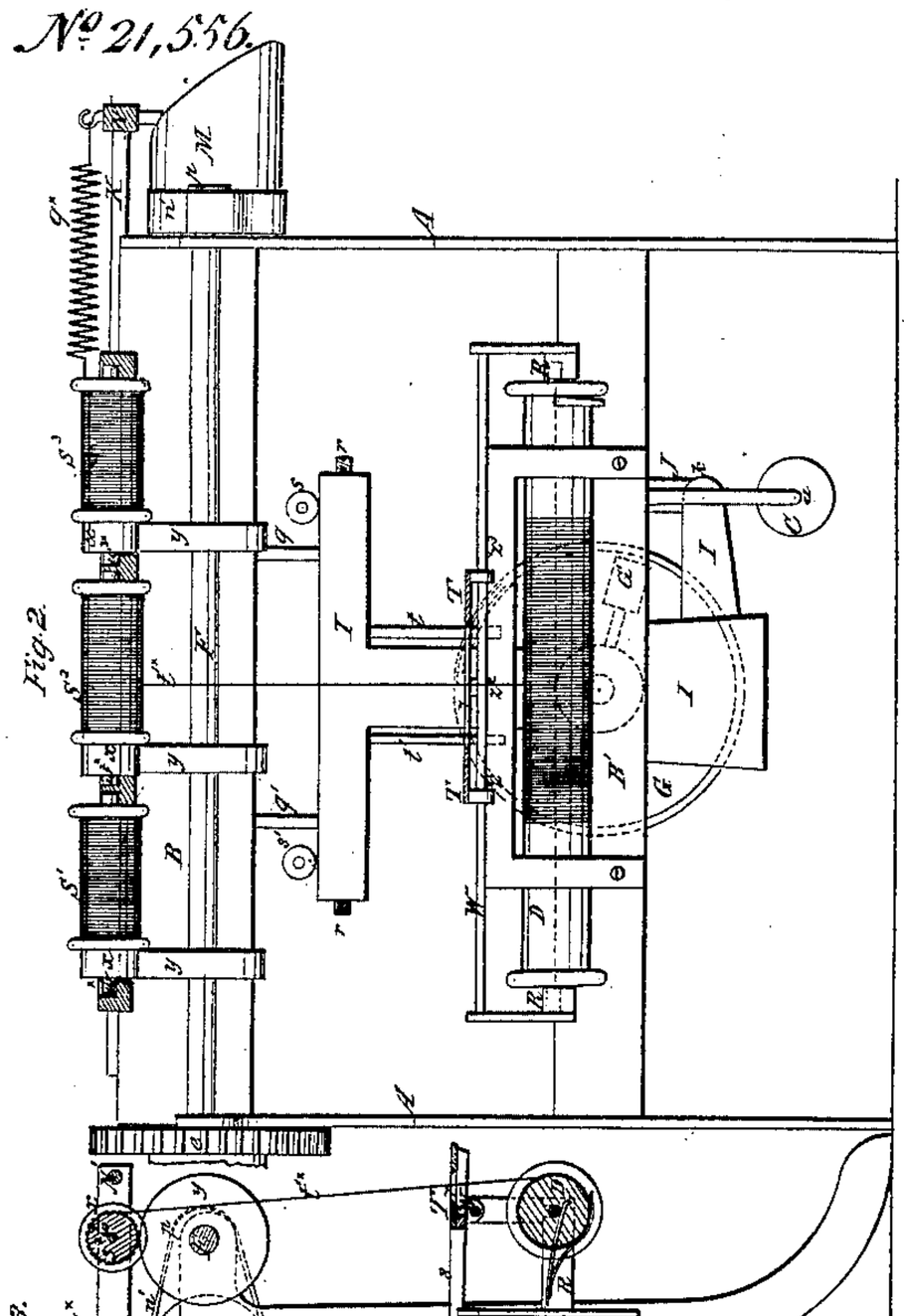


Fig. 3.

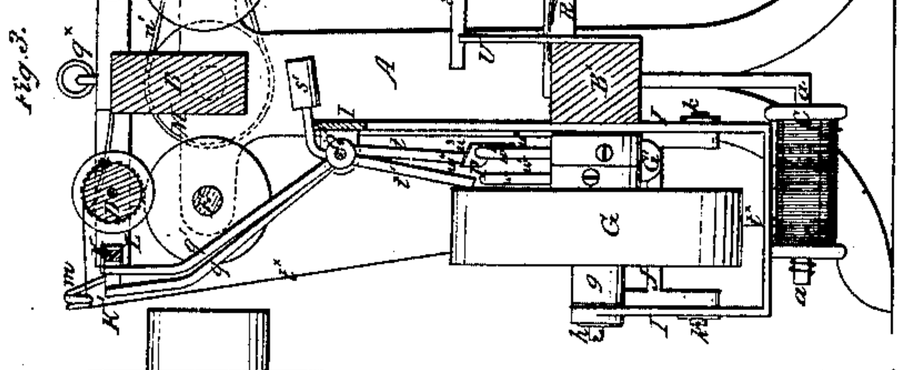


Fig. 4.

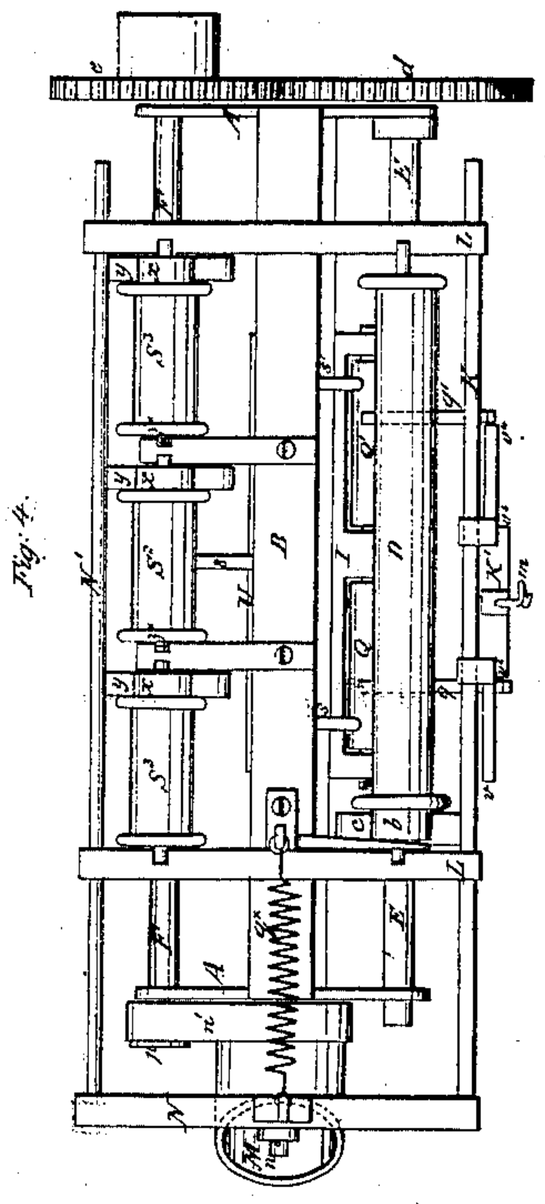


Fig. 5.

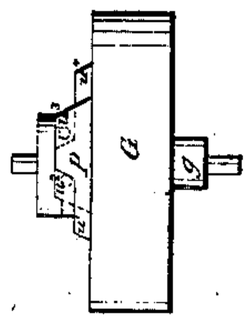
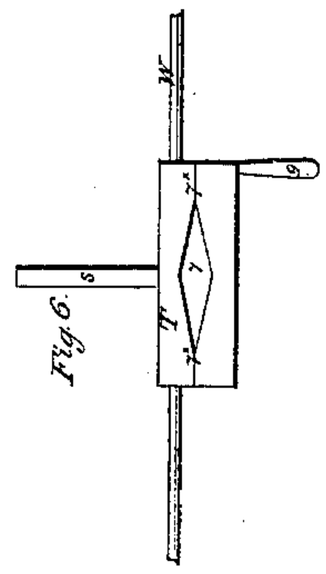


Fig. 6.



UNITED STATES PATENT OFFICE.

IRA DIMOCK, OF MANSFIELD CENTER, CONNECTICUT.

MACHINE FOR SORTING SILK OR OTHER THREAD ACCORDING TO ITS SIZE.

Specification of Letters Patent No. 21,556, dated September 21, 1858.

To all whom it may concern:

Be it known that I, IRA DIMOCK, of Mansfield Center, in the county of Tolland and State of Connecticut, have invented a new and useful Machine for Sorting Silk or other Thread According to its Size or Thickness; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a front view of the machine. Fig. 2 is a back view of the same. Fig. 3 is a transverse vertical section of the same. Fig. 4 is a plan of the same. Figs. 5 and 6 represent separate portions of the machine as will be found hereinafter explained.

Similar letters of reference indicate corresponding parts in the several figures.

The principal feature of my invention consists in certain means whereby a thread or threads of silk or other fibrous material produced by spinning or obtained in any other way is so directed on to a bobbin or other winding apparatus that it will be distributed or arranged upon different parts of said bobbin or apparatus according to its size or thickness, that is to say with the thicker and thinner portions separated or with portions of one size or thickness on one portion of the bobbin or apparatus and those of another size or thickness on another portion.

My invention further consists in certain means of controlling the winding of the thread or threads on a series of bobbins or spools from the bobbin or winding apparatus on the several parts of which it has been distributed according to its size or thickness, so that all of one thickness will be wound upon one bobbin or spool, and all of another thickness on another, and the whole be sorted in as many quantities of different size or thickness but each having nearly the same thickness throughout, as may be desired.

To enable others skilled in the art to make and use my invention I will proceed to describe its construction and operation.

A, A, are two standards, and B, B^1, are longitudinal pieces of timber or iron which combine with the standards to constitute the framing of the machine.

C, is a bobbin, on which the thread t^*, to be sorted is placed in the machine; the said bobbin being fitted to rotate freely on a stationary spindle *a*, attached to the lower part B^1, of the framing.

D, is a long bobbin or roll, upon which the thread is wound singly from the bobbin C, and upon which the thread, as it is wound, is distributed nearer to one or the other end, according to its size or thickness, said bobbin or roll D being fitted tightly on a spindle which is arranged in fixed bearings at the top of the machine, and being driven by the contact of a friction roller *b*, at one end of it with another friction roller *c*, on a shaft E, arranged in suitable bearings below it. The shaft E, derives rotary motion through a pair of spur gears *d*, *e*, from a shaft F, which is the driving shaft of the machine and to which rotary motion is imparted by any suitable agency. The thread in passing from the bobbin C, to the longer bobbin or roll D passes between the smooth peripherical surfaces of a cylindrical wheel G, and a smaller cylindrical roller H. The wheel G, has a slightly eccentric axle *g*, which works between two center screws *h*, *h*, in a frame I, which is bolted to the lower rail B^1, of the main framing. The said axle may, however, be provided with journals and fitted to work in suitable journal boxes.

The roller H is centered between two center screws *f*, *f*, in a small frame J, attached to the frame I, by center screws *k*, *k*, or otherwise in such a manner as to be capable of swinging to adjust the roller nearer to or farther from the wheel G, which may be termed the eccentric wheel. The roller H is held toward the eccentric wheel G, by means of a spring *i*, applied to an arm i^1, forming part of its swinging frame, but it is prevented approaching said wheel too closely by means of a screw *j*, which screws through said arm and bears upon the frame J. This screw *j*, serves to adjust the roller H to the proper distance from the eccentric wheel for the thread *t*, to receive a slight pressure in passing between said roller and wheel. The thread *t*, passes through a guide *l*, on its way from the bobbin C, to the wheel G, and roller H. The eccentric wheel has a weight G^1, attached in such a manner as to draw that part of its periphery which is farthest from its center in a downward direction toward the roller H, as indicated by the arrow upon said wheel in Fig. 1, which action of the weight causes the wheel always to press the thread against the roller H. As the

thread is drawn up from the bobbin C, it slides over the surface of the wheel G, and causes the roller H, to turn; and as a thicker portion comes between the said wheel and roller, its friction on the wheel causes the latter to turn in the opposite direction to the arrow shown upon the wheel to present a sufficiently wider space between the wheel and roller to permit it to pass; but as a thinner portion comes between said wheel and roller, the weight G^1 draws back the wheel in the direction of the arrow. In this way it will be seen that the thickness of the thread passing between the wheel and roller determines the position of the wheel; and this position of the wheel controls, by the means presently to be described, the position of a traversing guide *m*, which directs the thread *t*, on to the long bobbin or roll D, so as to make it direct the said thread toward one or another portion of said bobbin or roll, so that its thickness shall be regularly graduated or nearly so from one end of the said bobbin or roll to the other.

The traversing guide *m*, is attached to a long horizontal bar K, which is fitted to slide longitudinally and in a direction parallel with the bobbin or roll D, in guides L, L, on the top of the framing, and this bar derives a longitudinal motion by the action of a cam M, working on a fixed stud *n*, at one end of the framing, aided by a spring q^*, on a crosshead N, to which the bar K, and another sliding bar N^1, constituting a guide bar, are attached, the said cam being driven by a belt n^1, from a pulley *p*, on the shaft F. The length of movement of the bar K, is about or a little more than one-third of the length of that part of the bobbin or roll D on which it is desired to distribute the thread. The traversing guide *m*, is not attached rigidly to the bar K, but to a slide K^1, which fits to the said bar with a sufficient degree of friction to prevent it moving thereon by the action of the thread on the guide, but to permit of its being moved by coming in contact with one or other of two arms *q*, q^1, which I call shifters whose operations are so controlled by the action of a cam P, attached to the wheel H, as to shift the slide along the bar as the said wheel is caused to change its position by the varying thickness of the thread, and thus cause the guide *m*, to traverse opposite to a different part of the bobbin or roll D. The shifters *q*, q^1, are attached to two rockshafts Q, Q^1, which are arranged parallel with the bar K, and bobbin D, between suitable centers *r*, *r*, in the upper part of the frame I, and which have weights S, S^1, applied to them in such a manner as to pull back the arms *q*, q^1, or shifters (which stand in front of the bar K, and slide K^1) toward the bar K. The rockshafts have also attached two other arms *t*, t^1, one on each, which stand behind the cam P, which has four inclined steps u^1, u^2 u^3, u^4, shown in Fig. 5, and the slide K, has four square projections v^1, v^2, v^3, v^4, shown in Fig. 4. The steps u^1, and u^4, are even with each other, and so are the more prominent steps u^2, u^3. The projections v^1, v^4 on the slide K, are equally prominent, and so are the more prominent ones v^2, v^3. The distance of the two arms *t*, t^1, from each other is such that there is room to admit the two steps u^2, and u^3, between them and permit said arms to rest upon the steps u^1, and u^4; and the distances between the shifters *q*, q^1, and between the projections v^2, and v^3, on the slide K^1, are respectively such that when the slide is properly placed upon the bar K, the slide moving with the bar may not be interfered with by the shifters. The distance from either of the two more prominent projections v^2, v^3, on the slide K^1, to the nearest of the projections v^1, and v^4, is slightly less than the length of traverse of the bar K. The cam P is formed of two thin plates of metal, in form the reverse of each other, fitted to slide one under the other, and attached to the shaft J, of the eccentric wheel H, by separate arms *w*, w^1, and hubs *x*, x^1. The outer piece which conforms to the periphery of the eccentric wheel has formed upon it the two steps u^1, and u^2, and the inner piece the two steps u^3, and u^4. This construction of the cam permits the steps u^1, u^4, to be set farther apart or nearer together.

The operation of the slide K, to control the direction of the thread on to the bobbin D, is as follows: When the thickness of the thread passing between the eccentric wheel G, and roller H, is about an average of the whole quantity to be sorted, the position of the wheel G, will be such that the steps u^2, and u^3, will be between the arms *t*, t^1, attached to the shifters, which arms are always pulled toward the cam by the weights *s*, s^1, and while said arms *t*, t^1, rest against the two steps u^1, u^4, the slide K^1, occupies such a position on the bar K, that the projections v^2, v^3, work between the shifters *q*, q^1, without touching either of them, and the guide *m*, is caused to traverse opposite the bobbin D, to an equal distance from the center of the portion on which the thread is to be distributed; and though the projections v^1, v^4, pass the shifters, the latter are prevented by the action of the steps u^1, and u^4, of the cam P, on the arms *t*, t^1, from advancing far enough to be struck by the last-mentioned projections. As soon, however, as the eccentric wheel is caused to change its position in any considerable degree by a variation in the thicknes of the thread passing it, one of the arms *t*, t^1, is thrown back by the action of one of the steps u^2, u^3, upon it, and its shifter *q*, or q^1, allowed to be thrown forward entirely out of

the way of the slide, while the other arm t^1, or t, is allowed by the removal of the step u^4, or u^1, to be thrown forward by its weight s, or s^1, and the corresponding shifter q^1, or q, allowed to fall back as the projection v^4, or v^1, passes it with the motion of the bar K. The consequence of this is that as the bar K returns, the projection v^4, or v^1, of the slide K^1 meets the shifter which has fallen back, and the slide is thus arrested while the bar K completes its movement in that direction. The slide having been thus shifted on the bar, the operation of the traversing guide m, is the same as before, but takes place opposite to a portion of the bobbin D, nearer to one or the other end thereof, according as the change of position has been caused by an increase or diminution in the thickness of the thread. The shifters now remain stationary till there is again a sufficient variation in the size of the thread to make the eccentric wheel and its cam resume their first-mentioned positions, when that shifter which has been thrown forward out of the way of the slide K^1, is allowed to fall back and the said slide K^1, while the bar moves onward, which causes all parts to return to the conditions or positions first specified, where they remain till there occurs another sufficient variation in size to cause the cam P, to operate the shifters.

By the above operation of the traversing guide m, it is obvious that the thread is distributed with that portion which is of a size forming an average of the whole on the middle of the bobbin D, and that which is thinner nearer to one, and that which is thicker nearer to the other end.

In the example of the invention represented in the drawing, the thickest will be toward that end of the bobbin which is toward the right hand in Fig. 1, but this depends upon the arrangement of the eccentric wheel G, which, if turned to operate in a direction the reverse of that explained with reference to the arrow shown upon it in Fig. , would cause precisely the reverse arrangement of the thread on the bobbin. When as much thread as is considered desirable is wound upon the bobbin D, the latter is removed with its spindle from the bearings over the shaft E, and placed in bearings in two brackets R, R, at the back of the lower rail B^1, of the framing, to have the thread unwound from it in three different sizes on to the three spools S^1, S^2, S^3, which are fitted tightly on to independent spindles w^{1*}, w^{2*}, w^{3*}, arranged in line with each other in bearings in the top of the framing immediately over the shaft F. The spindles w^{1*}, w^{2*}, w^{3*}, are furnished each with a friction roller x, which rests upon one of three friction rollers y, y, y, on the shaft F, and by that means the spools S^1, S^2, S^3, are caused to have a rotary motion imparted to them from the said shaft F.

A short distance above the brackets R, R, there is rigidly secured a straight bar of round iron or steel W, which is parallel with the direction of the axis of the bobbin D, when the spindle of the latter is supported in its bearings in the brackets R, R; and to this bar is fitted a carriage T, having a long arm 8, which is made with a V-shaped lower edge to be received within one of three notches z^1, z^2, z^3, in the top edge of a plate U, which is bolted to the rail B^1, the said notches serving to keep the carriage T from being moved along the bar accidentally. The top of the carriage T is formed of two plates, which are formed as shown in Fig. 6, (which is a plan view of said carriage,) so as to present an opening y, (see Figs. 3, and 6)—whose length is about equal to or a little greater than one third of the length over which the thread is distributed on the bobbin D, and whose width diminishes from the middle toward its ends where it terminates in very acute notches y^*, y^*, in which a thread will catch.

To commence the winding of the thread from the bobbin D, upon the spools S^1, S^2, S^3, its end is found, and if the said end is near the middle of the bobbin, the carriage T is arranged with its arm 8 in the middle notch Y^2, and the thread t, after being passed up through the opening y, is made fast to the middle spool S^2; but if the end of the thread is nearer to either extremity of the bobbin, the carriage is arranged with its arm in the nearest notch z^1, or z^2, and the thread after being passed up through the opening y, is made fast to the spool S^1, or S^3, nearest that end of the bobbin. Suppose, for example, the end of the thread is found to be nearest the left hand end of the bobbin, the carriage is arranged with its arm in the notch z^1, and the thread is conducted up to the spool S^1. The spool being in motion, the winding from the bobbin D commences; the latter being turned by the draft of the thread. So long as the thread comes from that portion of the bobbin within a certain distance from the middle, it passes freely through the opening y, but as soon as it draws from the middle portion, the oblique direction it takes from the bobbin to the spool brings it into one of the notches y^*, in which it is held, and by that means the winding is stopped or the thread would be broken, but such breakage is guarded against by the driving of the spools by friction rollers. The stoppage will be observed by the attendant whose duty it will be to watch the machine, and who will then break the thread close to the spool, and after moving the carriage by its handle g, to the next notch z^2, will take the broken end coming

from the bobbin D, and secure it to the spool S^2, which then commences winding. The ends of the thread may be secured to the spools sufficiently to commence winding, by simply wetting them in the mouth and laying them on the spools. The winding on the spool S^2 continues till the thread begins to unwind from within a certain distance from either end of the bobbin D, when the oblique direction it is caused to take between the bobbin and spool brings it into one of the notches y^*, and again causes a stoppage of the winding. The thread is then broken again by the attendant and the carriage shifted to the notches z^1, or z^3, nearest the part of the bobbin D, from which the thread comes and the end secured to the nearest spool S^1, or S^3. In this way the operation proceeds, the attendant breaking the thread and securing it to the next spool every time the winding stops, until the thread is all unwound from the bobbin D, when another on which the thread has been similarly distributed may be put in its place. The spools S^1, S^2, S^3, may be taken out as fast as they severally become full and be replaced by empty ones. While the winding-off from one bobbin D, is going on, another may be in operation at the top of the machine having the thread wound on it in the manner hereinbefore described.

It is obvious that the thread may be sorted into more than three sizes by increasing the number of steps on the cam P, and stops on the slide K^1, and the number of the spools S^1, S^2, S^3, and notches z^1, z^2, z^3.

I will remark that instead of the eccentric wheel, a weighted wedge might be arranged to operate in combination with a roller so as to produce substantially the same effect, and two surfaces of other form may be arranged to operate with a substantially similar result, but I regard the use of the eccentric wheel and roller to be the most practical.

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

1. A device by which the varying thickness of the thread is made to shift a traversing guide or its equivalent, to distribute the thread upon a winding apparatus according to its thickness, consisting of two surfaces, one of which is caused to receive a reciprocating motion through the agency of variations in the thickness of the thread passing between them; whether the said surfaces consist of the peripheries of an eccentric wheel and roller, as represented in the drawing and herein described, or have any other form which permits of their operation in an equivalent manner.

2. The movable carriage T, with its opening y, and notches y^*, y^*, applied in combination with the series of spools S^1, S^2, S^3, and the bobbin D, or winder on which the thread has been distributed and arranged according to its size or thickness, and operating substantially as described, to stop the winding operation as the unwinding of the thread from said bobbin or winder varies beyond certain parts thereof.

IRA DIMOCK.

Witnesses:
ARTHUR G. HILL,
E. W. EATON.