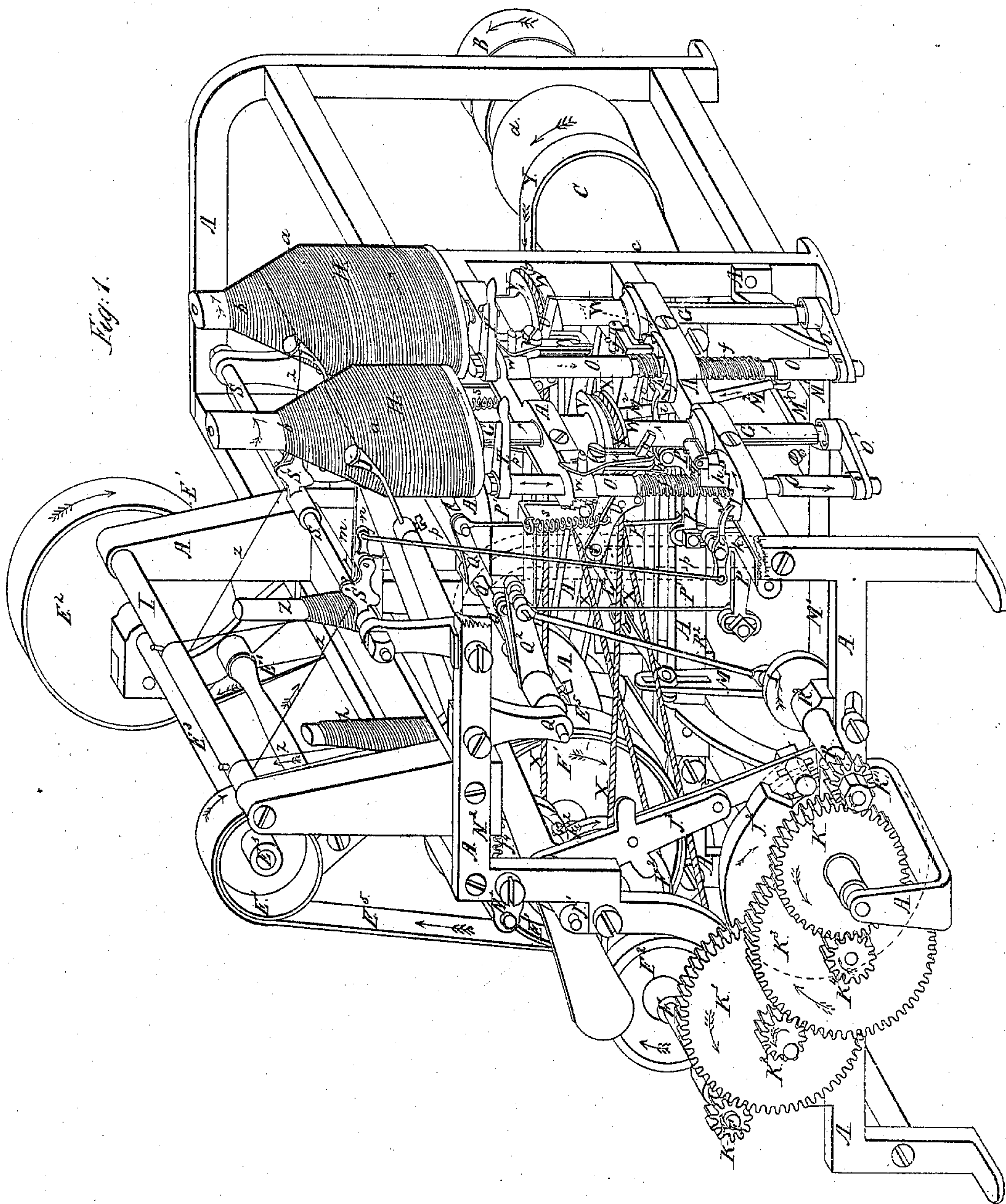


Tompkins & Johnson.
Bobbin Winder

Sheet 1, 2, Sheets.

No 17,120.

Patented Apr. 21, 1857.



Sheet 2, 2 Sheets

Bobbin Winder.

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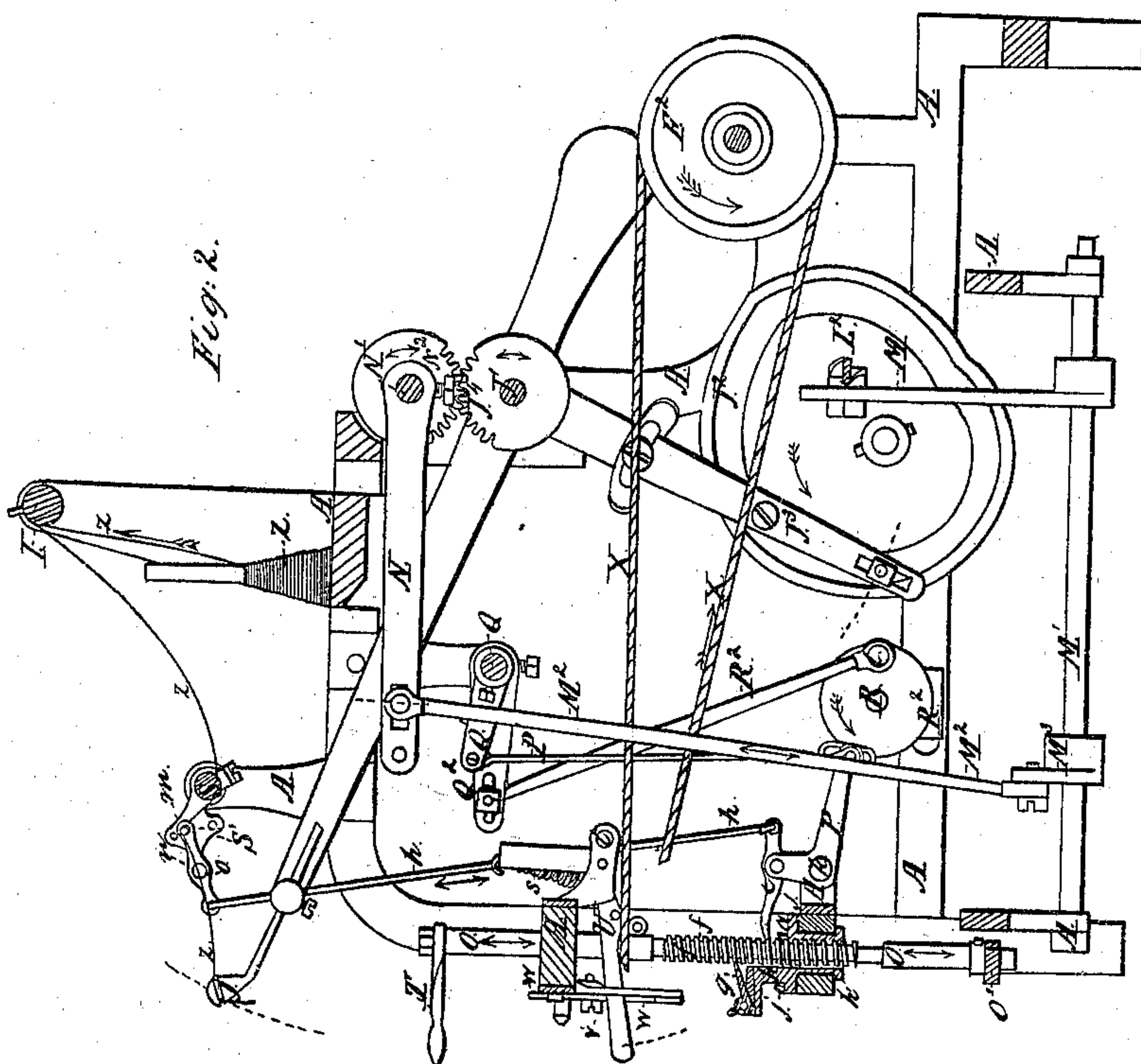
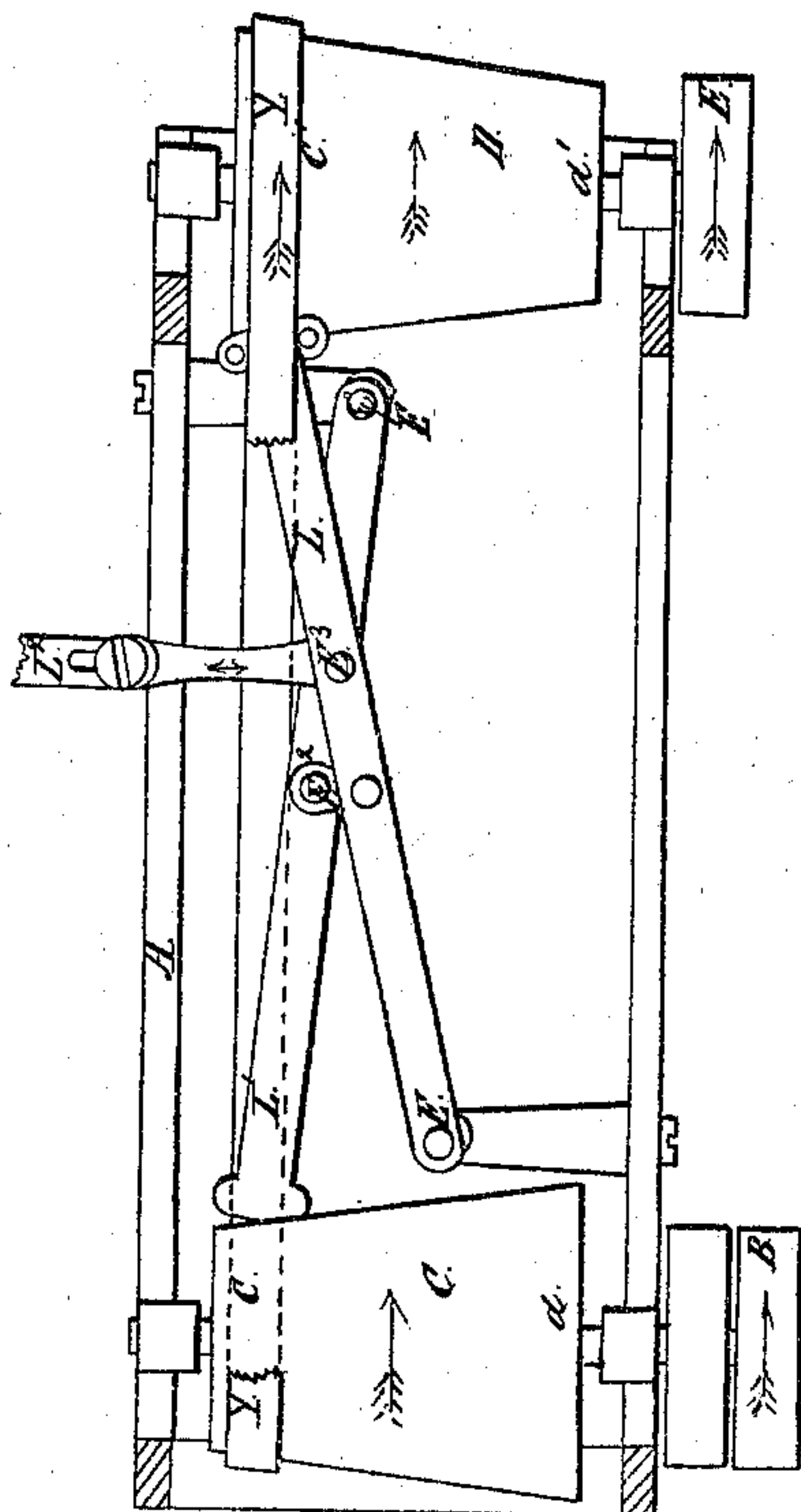


Fig. 3.



UNITED STATES PATENT OFFICE.

C. TOMPKINS, OF TROY, NEW YORK, AND J. JOHNSON, OF ROXBURY, MASSACHUSETTS.

MACHINERY FOR WINDING CONICAL BOBBINS.

Specification of Letters Patent No. 17,120, dated April 21, 1857.

To all whom it may concern:

Be it known that we, CLARK TOMPKINS, of Troy, in the county of Rensselaer and State of New York, and JOHN JOHNSON, of Roxbury, in the county of Norfolk and State of Massachusetts, have jointly invented certain new and useful Improvements in Machines for Winding Conical Bobbins; and we do hereby declare that the following is a full, clear, and exact description of our invention, reference being had to the annexed drawings, making a part of this specification, in which—

Figure 1 is an isometrical drawing of a machine embracing our improvements, Fig. 2 a partial transverse sectional elevation and Fig. 3 a partial plan thereof.

The same letters refer to like parts in all the figures; and the arrows indicate the directions in which the parts move.

A is the frame-work of a machine made to wind two bobbins simultaneously.

B is the main belt pulley, fastened on the shaft of the drum C; which latter, by the belt Y, turns the drum D, and thereby the pulley E fast on the shaft of the drum D. The pulley E, by the cross-belt E', drives the pulley E² fast on the counter-shaft E³, and thereby the pulley E⁴ fast on the same shaft. The shaft F, from which motion is distributed to various parts of the machine, receives rotary motion from the pulley E⁴, by means of the belt E⁵ and the pulley F' fast on the same shaft.

G, G, are the bobbin spindles, and H, H, the partly filled bobbins, fixed upon them. Rotary motion is given to each bobbin-spindle separately, from the shaft F, by means of the pulleys F², F², fixed on that shaft, the bands X, X, and the feathered sleeve-pulleys W, W, on the grooved spindles. By turning the bobbin-spindles the threads of yarn z, z, are drawn from the fixed jack-bobbins Z, Z, over the friction bar I, along the yarn carriers J, J, and around upon the bobbins H, H. The yarn-carriers are fast on the rock-shaft J', and are slowly vibrated back and forth, to lay the yarn as usual evenly upon the cone of the bobbins, by the action of the cam J² upon the arm J³ affixed to said rock-shaft. The cam J² is fast on the shaft of the gear wheel K³, which receives motion from the pinion K, fast on the shaft F, by means of the

wheel K' and pinion K². The bobbins slide endwise separately, from the yarn carriers, as the winding progresses.

So far as we have hereinbefore described the construction of our improved machine, we do not pretend to have made it materially different from others in use for winding such bobbins.

Now, we construct our improved machine so that the bobbins shall run with such variable motion that the yarn in winding back and forth on the conical part shall be drawn from the feeding bobbins with uniform or nearly uniform speed, and consequently with more even extension than when the bobbins are run with uniform velocity. The manner in which we give this even speed to the yarn in winding is as follows, viz: We make the drums C and D of such conical shape in respect to the conical form of the bobbins to be wound, that when the belt Y is running upon the ends c, c', of these drums as seen in Fig. 3, and the yarn, z, is at the same time winding upon the large ends a, a, of the cones of the bobbins, the speed of the yarn will then in such case be the same as when the yarn is winding upon the small ends, b, b, of the bobbins with the belt Y at the same time running upon the ends d, d', of the drums; and, so connect the yarn-carriers, J, J, with the belt Y, by means of any suitable positively operating mechanism, that while the yarn is winding from the large end, a, to the small end, b, of the cone of the bobbins, the belt Y shall at and during the same time, by means of such connection, travel with a like motion from the ends, c, c', to the ends d, d', of the drums, and that while the yarn is winding back from the small ends to the large ends of the cones of the bobbins, the belt Y shall at and during the same time be slid on the drums from the ends d, d', to the ends c, c', thereof. We generally make the yarn carriers shift the belt Y by means of the following arrangement of parts, viz;—the twin belt-shifters L, L', hung to the frame-work at e, e', linked together at e², and operated by the rod L² which is hung to the shifter L at e³ and slowly reciprocated endwise by the arm M, fast on the shaft M';—which shaft is rocked by the action of the connecting rod M² on the arm M³ fast on the

shaft M' ; the rod M^2 being moved endwise by the arm N , fast on the shaft N' , which latter is rocked by the action of the toothed arc J^4 , fast on the yarn-carrier shaft J' , upon the toothed arc N^2 , fast on the shaft N' .

Heretofore, in machines for simultaneously winding a series of such conical bobbins for feeding knitting machines, when the vibrating yarn-carriers have been made stationary and the bobbins to slide endwise as the winding progressed, the bobbins have in such case generally all been held together in a sliding frame, so that the spindles could not slide separately. Hence, in such machines, whenever a thread of yarn breaks or runs out, the operative has to mend or renew that thread without any delay or else stop the whole machine if perfect bobbins are to be wound; for since the endwise movement of the bobbin continues while the yarn remains broken, (and as there is no way to set a single bobbin back to the place it was in when its yarn broke, without setting the whole series back with it,) when a broken thread is mended after being left broken for a time, and the winding resumed the yarn is then laid too high up on the bobbin, so as to "break down" and draw off bad, in the manner well known and detested by all operators of knitting machines. Sometimes, however, bobbin winders have been made so that the bobbin spindles are slid endwise separately by means of a fixed, hollow, conical guide acting against the conical part of the wound yarn; but such machines are not much used; for when a thread of yarn breaks or runs out in such a machine the cone-guide sinks and hides the end of the yarn so that it is difficult to find it; and also makes friction on the wound yarn so that the bobbins are not as perfect as they would be if they were not thus rubbed down. Now, for the purpose of avoiding these defects, we so construct our improved machine that the bobbins are separately slid away from the yarn-carriers as the winding progresses without having anything touch the wound yarn, and that at any time any bobbin-spindle can be slid back by the operative to commence winding a new bobbin, or to resume the winding on a partly filled one at the proper place, however far such a bobbin may have slid after its yarn broke or run out, without in any manner interfering with the winding of any other bobbin of the series. To do this, we connect each revolving bobbin-spindle, with a parallel sliding rod O , by means of an arm O' ; so that when the rod is slid endwise in either direction its bobbin-spindle goes with it, and so that the rod cannot turn on its axis,—the rod having a screw f upon itself as long as the distance that it is intended to have the bobbins slide; and then make a finger, g , to fit the threads of the screw, f , and mount it

on a sleeve, h , loose on the rod and turning in the frame-work, so that as the sleeve is turned by a driving pawl, i , acting on the ratchet wheel j fast on the sleeve h , the finger will feed the rod O , and thereby its bobbin-spindle, away from the yarn-carriers. We hang the finger g to the sleeve h , as seen in Fig. 2, in such manner as to allow the rod O to be freely slid back at any time to commence winding a new bobbin or to complete one.—(If the bobbin spindles are arranged vertically, as we always prefer to arrange them, and slide with their rods freely, their own weight will slide them down as the fingers go step by step around the screw-rods; but if the spindles are arranged horizontally, or, slide hard, the fingers must then be temporarily buttoned to the sleeves, h , so as to positively feed the bobbins along.) We drive each pawl, i , by an elbow lever, P , hung to the frame-work at k , and operated by the rod P' , which receives motion from the rock-shaft Q by means of the arm Q' ; and we work the rock-shaft Q from the wheel K^3 by means of the pinion K^4 , the wheel K^5 , the pinion R' and crank l on the shaft R , the connecting-rod R^2 , and the arm Q^2 fast on the shaft Q .—The shaft R turns in an adjustable block R^3 , so that if coarser yarn is to be wound, a smaller pinion can be substituted for the pinion R' , or, if finer yarn, a larger one; in order that the bobbins may in all cases be slid endwise with the right speed. Instead of the screw f and its ratchet-finger-nut g , rack-teeth fitting a pinion, worked by pawls hung to the lever P , may be substituted; but we prefer the particular arrangement of mechanism shown in the drawings, although others, substantially the same, will work satisfactorily. A handle, T , is on each rod O for convenience in resetting the bobbins.

In those bobbin winders wherein the bobbins are separately slid endwise by fixed hollow cones acting upon the wound yarn, whenever a thread of yarn breaks, the bobbin on which that thread was winding of course stops sliding; but when the bobbins are made to separately retreat from the yarn-carriers by means of mechanism acting independently of the yarn on the bobbins, as in our improved machine, a bobbin will not stop sliding when its yarn breaks, or runs out, unless some additional mechanism is provided. Now, we cause each thread of yarn as it runs to a bobbin, to be drawn under the rod S and over a finger, m , in one end of a lever, n , hung at o to an arm S' fast on the rod S ; and connect the other end of the lever n to the pawl i by the connecting rod p , all in such manner that the tension of the yarn in winding shall counteract the weight of the rod p and thereby allow the pawl i to engage with the ratchet wheel j in the same manner that it acts when no rod p is attached

to it; and so that when a thread breaks or runs out the weight of the connecting rod *p* shall at once lift the point of the pawl *i* out of the ratchet teeth, and thereby stop the endwise movement of the bobbin on which such thread was winding, without in any manner interfering with the action of any other bobbin of the series; and hence, so that whenever the yarn is mended and the winding resumed, the yarn will then be laid in exactly the right place on the bobbin, without requiring the operative to carefully set back the bobbin-spindle as she must otherwise do. Heretofore, in machines for winding these conical bobbins, when the bobbin-spindles have been separately slid endwise, rotary motion has been given to each spindle by a band, running upon a long drum or whir fast on the spindle, and so between fixed guides in the machine that as any bobbin of the series became full its rotary motion would be stopped by its band running off one end of the long whir. But, as the running pulleys, *W*, which drive the sliding spindles, do not slide in the framework, we of course could not employ the just named original mode of stopping a bobbin when full; and have hence devised the following more convenient arrangement of parts for the like purpose, viz. To each shallow sleeve-pulley *W*, we arrange a loose sleeve-pulley *V*, to receive a band *X*, when thrown from a pulley *W*. *U* is a shipper for each band, hung to the frame-work at *t*; and *u* is a catch, hung to the frame-work at *v*, to hold the shipper so as to keep the band on the pulley *W*; as seen at *x* in Fig. 1.—*s* is a spring to make the shipper *U* change the band from the driving pulley to the loose one when the catch *u* is pushed from the shipper; as at *y* in Fig. 1. The top, *w*, of each catch, *u*, is beveled, and each handle, *T*, is so formed, and fastened on a rod *O*, of our mechanism for sliding the bobbin endwise, in respect to the catch *u*, and the winding bobbin, that when any bobbin is full, or rather, reaches that place in respect to the yarn-carriers where the winding thereon should end, the handle *T* shall then push the catch *u* from the belt-shipper, and thus allow the spring *s* to throw the band from the driving to the loose pulley, and thereby stop the rotary motion of that bobbin without in any manner changing the operation of any other bobbin of the series. Heretofore, the rotary motion of the full bobbin has been stopped by the action of a fixed guide against the yarn wound on the bobbin; but in our improved machine the bobbin is automatically stopped running with-

out requiring anything to touch the yarn on the bobbin.

What we claim as our invention and desire to secure by Letters Patent is—

1. The manner herein described in which the speed of the winding bobbins is changed so as to constantly draw the yarn from the fixed bobbins with uniform or nearly uniform swiftness, and thus secure more even tension on the winding yarn, and thereby make the new bobbins of more uniform density than if they were revolved with uniform velocity.

2. We also claim in machines for simultaneously winding a series of such bobbins giving each bobbin-spindle of the series the proper independent retreating movement from the yarn-carriers as the winding progresses, by means of the mechanism herein described, or its equivalent, for the purpose specified; in contradistinction from giving each bobbin the separate retreating movement by means of a fixed guide acting against the conical part of the wound yarn, and instead of making all the bobbins move endwise together as heretofore.

3. We also claim, when the revolving bobbins in such machines are separately moved endwise by the mechanism shown in the drawings, connecting each thread of yarn as it runs to a bobbin of the series, with the parts which give that bobbin its retreating movement, by means of a device arranged, and operated upon by the tension of the winding yarn, substantially in the manner herein set forth; so that whenever a thread of yarn in such case breaks or runs out, the bobbin upon which it was winding at once stops moving endwise and consequently, so that when the yarn is mended and the winding resumed the yarn is then laid by the carriers in exactly the proper place on the bobbin, without any readjustment of the bobbin by the operative.

4. And finally, we claim the combination of parts herein described whereby the rotary motion of each bobbin is stopped whenever it is slid by the mechanism herein described to that place in respect to the yarn-carriers where the winding should end.

CLARK TOMPKINS.

JOHN JOHNSON.

Witnesses as to the signature of Clark Tompkins:

A. F. PARK,

JOHN MORAN.

Witnesses as to the signature of John Johnson:

JAS. M. BATTLES,

WM. GASTON.