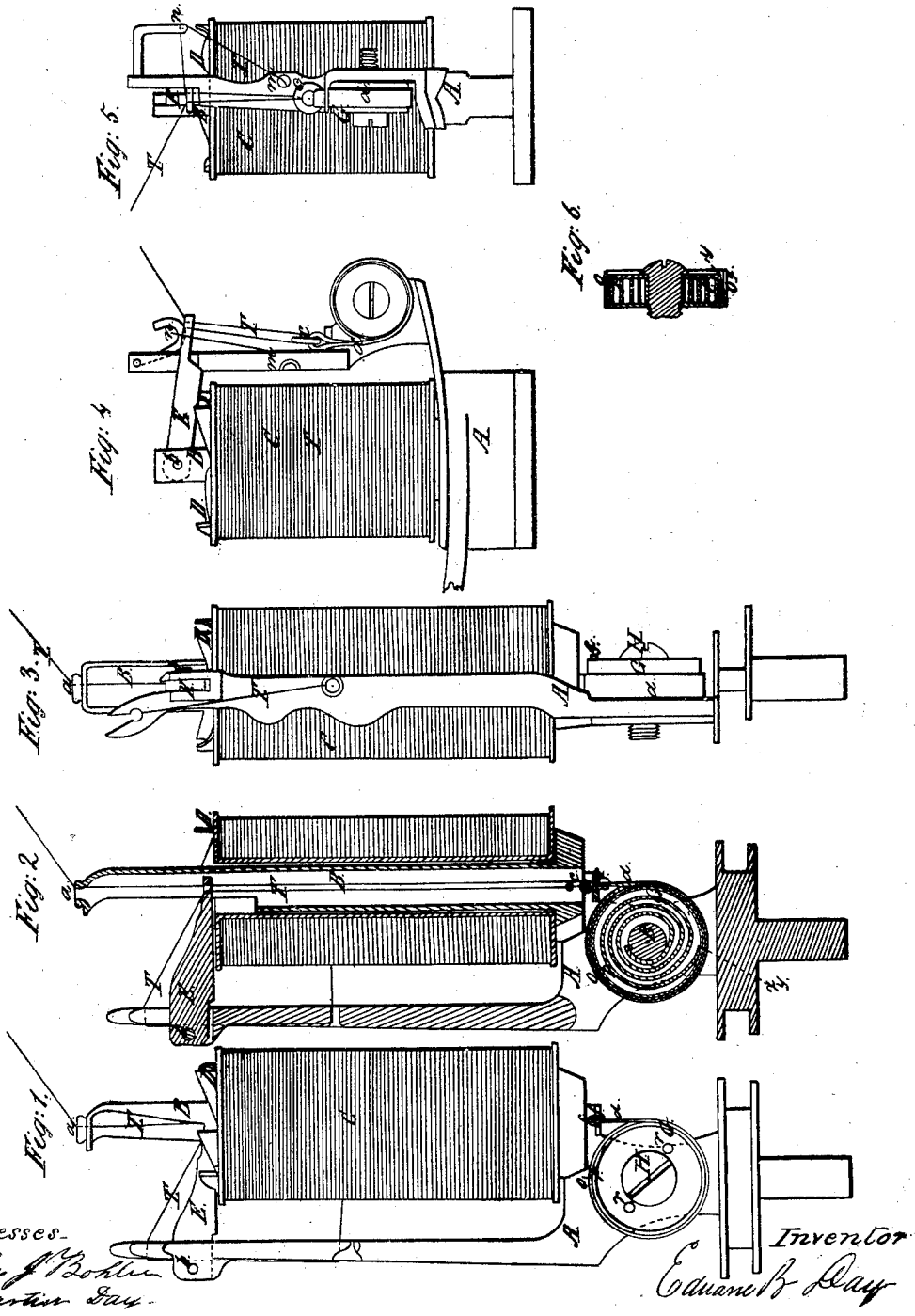
E. B. Day.

Braiding Mach.

No. 27,039. Patented Feb. 7, 1860.



Witnesses-
John J. Bohlen
Martin Day.

Inventor
Edward B. Day

N. PETERS, PHOTO-LITHOGRAPHER, WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

EDWARD B. DAY, OF BOSTON, MASSACHUSETTS.

BRAIDING-MACHINE.

Specification of Letters Patent No. 27,039, dated February 7, 1860.

To all whom it may concern:

Be it known that I, EDWARD B. DAY, of Boston, in the county of Suffolk and State of Massachusetts, have invented a new and useful Improvement in the Braiding-Machine; and I do hereby declare the same to be fully described and represented in the following specification and the accompanying drawings, of which—

Figure 1, is a side elevation of a braiding machine vertical racer furnished with my invention. Fig. 2, is a longitudinal section of the same. Fig. 3, is an edge elevation of it. Fig. 4, is a side view of a radial and horizontal racer and exhibits the mode of applying a spring pulley and its band thereto. Fig. 5, an edge view of it.

My improvement has reference to the tension apparatus or that by which the slack of the thread is taken up during the serpentine movements of the racer through its race and around the axis thereof.

In order to maintain a proper tension on the thread and to aid in delivering it from the bobbin as fast as may be necessary while conducting the braiding operation, it has been customary to use a weight suspended on the thread and working within a hollow spindle on which the bobbin revolved. As a matter of necessity this spindle had to be placed vertically. The constant change of position of the weight causes such a change in the center of gravity of the racer as to produce more or less unsteadiness of motion thereof, causing it to "wabble" and wear its race, and become worn when in contact with the race. A spring pulley having the bobbin thread wound around its periphery has been employed in place of the movable weight, such being shown in the United States Patent No. 13,719, in which case, the said pulley, when in operation, revolved on a tubular journal, the thread being led through such before being wound around the pulley. A projection from the pulley serves to trip the latch of the ratchet. This latter plan, although a great improvement on the first is objectionable on several accounts particularly in consequence of the difficulty of applying the thread to the pulley, and besides it is somewhat complicated and expensive.

In carrying out my invention, I employ a spring pulley, that is to say, one in which there is a spiral spring coiled around the arbor on which the pulley is to travel and having one end affixed to the rim of such pulley while the other is fixed to the arbor. In connection with such pulley, I employ a belt or band wound around the periphery of the pulley and having one end fastened thereto, the other end carrying a ring or its equivalent, the pulley being arranged on the racer either below or aside of the bobbin.

In the drawings, A, denotes the stand or frame of the racer, while B, is the spindle, and C, the bobbin thereof, the bobbin at one end being provided with a ratchet, D, in the usual manner.

The vertical racer, shown in Figs. 1, 2, and 3, has its spindle, B, tubular or hollow and terminating at top in a thread guide or eye *a*. The ratchet latch or pawl, E, has its fulcrum *b*, in the stand of the racer while such latch extends over the ratchet and into the hollow spindle and receives the thread T, directly through its eye. Such thread in its passage from the bobbin is carried through a guide notch at the top of the stand and from thence down through the eye of the latch and into and through the ring, *c*, of the band, *d*. The said band should be wound around the periphery of the spring pulley G, arranged below the bobbin and so that the axis of the bobbin may be tangential or about so to the circumference of the pulley. This pulley should turn freely on a stationary journal, H, and have one end of the band fastened to its circumference. The band, *d*, is led upward through a bifurcated stop, *f*, arranged and projected from the stand A as shown in Figs. 1, 2, and 3, and such band has a ring, *c*, affixed to its upper end. The stop, *f*, serves to arrest the winding up of the band and the further descent of the eye after it may have been drawn down in contact with it.

In the horizontal radial racer shown in Figs. 4, and 5, the band, *d*, plays outside of the spindle, B, which is not hollow, but supports the fulcrum, *b*, of the pawl, E, while the eye of the pawl is at the outer end of the pawl. The spring pulley, G, is arranged aside of the bobbin and has its band, *d*, and ring, *c*, disposed about the pulley and with respect to the latch or pawl as shown in the said Figs. 4, and 5. The thread, T, from the bobbin passes through guides or eyes, *m*, *n*, of the stand, thence through the eye of the pawl and into the band ring, and thence upward through the pawl.

Draft on the thread of either racer will cause the band ring to be moved toward the

pawl and to unwind from the spring pulley, the action of the pulley being such as to take up the slack of the thread during the serpentine movement of the racer through its race. The diameter of the ring of the band should be larger than that of the eye of the pawl in order that when the ring may be drawn against the pawl, such ring may move the pawl out of engagement with the ratchet so as to allow the bobbin to revolve and give out thread as may be wanted during the performance of the braiding operation.

By my mode of applying or arranging the spring pulley, I can easily adapt it to the vertical bobbin as well as to one whose axis stands radially with respect to the article to be braided. With my invention there is no material change of the center of gravity of the racer, as the spring pulley is stationary in all respects relatively to the racer except that of being capable of revolving on its own arbor.

In order that the tension on the thread may be regulated, the spring pulley may be composed of two hollow circular boxes, *o*, *p*, each being open at one end, and one being placed within the other as shown in Figs. 1, 2, and 6, the latter being a transverse section of the pulley. Each box is furnished with a slit (*x*, or *y*,) made transversely in its rim and to receive the band, which should be fastened to the inner box, and extend lightly between the rims of the two. In this case, if the spiral spring should have its outer end fastened to the rim of the inner box, while its inner end should be fastened to the journal on which the pulley may be supported. Any rotation of the inner box within the outer will affect the contractile power of the spring. By providing the side of the inner box with holes arranged as shown at *r*, *r*, in Fig. 1, we may insert a key therein at any time, and revolve the inner box within the outer so as either to wind up or unwind the spring within the inner box, and thereby either increase or decrease its tension on the band the friction of the band between the rims of the boxes—serving, under other circumstances, to prevent the inner from rotating in the outer one.

In the racer shown in the United States Patent No. 13,719, the spring pulley and the bobbin are so arranged that the former is in such close proximity to the ratchet pawl as to enable a stud projecting from the pulley, and stationary relatively to the same, to trip the pawl. Now I employ the band *d*, and its spring pulley, when the latter and the ratchet apparatus or ratchet, D, and pawl E, are not in such close contiguity as to render it convenient for a stud extending from, and stationary relatively to the pulley, to actuate the pawl. Consequently, the band is an additional mechanical device, when the spring pulley is employed and revolves on an axis, which is stationary relatively to the bobbin and the pawl of the ratchet is not in such position with respect to the pulley as to be actuated by a stud applied to it as described. The ring or eye through which the thread passes is the mechanical equivalent of the stud and is so connected with the spring pulley as to be movable relatively to it, either toward or away from it and all the time be under control of or subject to the draft of the spring pulley. From this, it will be seen that my invention involves a mechanical feature or device not found in that described in the said patent No. 13,719.

I do not claim the application of a weight within the hollow spindle of the bobbin of a braiding machine racer and so as to be capable of being raised and lowered therein, to take up the slack of the thread as the tension on the thread may be either increased or decreased; nor do I claim the application of a spring pulley with respect to a bobbin and its ratchet pawl as shown in the United States Patent Numbered 13,719; but what I do claim when the spring and the ratchet and pawl are so arranged relatively to each other that a stud or projection from and stationary relatively to the pulley cannot conveniently be made to actuate or trip the pawl, is—

1. Combining with the spring pulley and the pawl, a band or belt *d*, provided with a ring or its equivalent, the same being not only to admit of the movement of its tripping ring or device toward the pawl and away from the spring pulley, but to so connect the ring with the pulley that the retractive power thereof, or its spring may be continually in action on the ring.

2. And I particularly claim the arrangement of the spring pulley, its lifter band and ring, so that the said band and ring may play within the spindle of the lifter while the pulley is arranged outside thereof, as set forth.

In testimony whereof, I have hereunto set my signature.

EDWARD B. DAY.

Witnesses:
R. H. Eddy,
F. P. Hale, Jr.