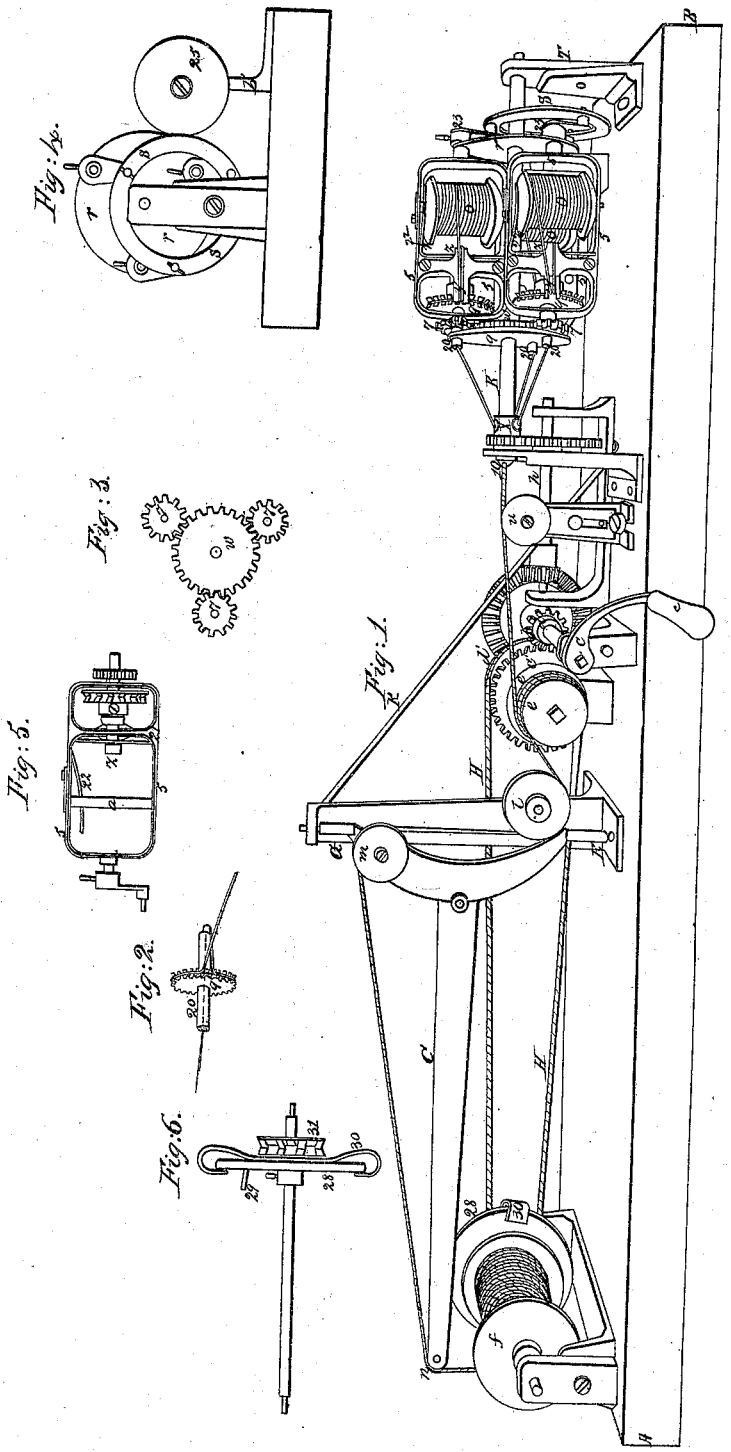
S & J. A. Bazin.

Rope Mach.

No. 3,451. Patented Feb. 28, 1844.



UNITED STATES PATENT OFFICE.

STEPHEN BAZIN AND JAMES A. BAZIN, OF CANTON, MASSACHUSETTS.

IMPROVEMENT IN MACHINERY FOR LAYING ROPE AND WINDING THE SAME INTO COILS.

Specification forming part of Letters Patent No. **3,451**, dated February 28, 1844.

To all whom it may concern:

Be it known that we, STEPHEN BAZIN and JAMES A. BAZIN, of Canton, in the county of Norfolk and State of Massachusetts, have invented certain new and useful Improvements in Machinery for Laying Rope and Winding or Forming the Same into Coils for Transportation or Stowage; and we do hereby declare that the following description and accompanying drawings, taken in connection, constitute a full and exact specification of the construction and operation of the said mechanism.

Figure 1 of the drawings above mentioned represents a perspective side elevation of our improved machinery for laying rope and coiling the same. Fig. 2 is a perspective side view of the drawing-pulley 9 and its shaft 20, to be hereinafter described, the same being shown as detached from the bobbin-frame. Fig. 3 denotes the arrangement of gear-wheels *w* 7 7 7 applied to the bobbin-frames and laying-shaft, or by which they (the bobbin-frames) are geared, so that their movements shall be correlative. Fig. 4 is an end elevation of the annulus or ring S and its roller 25, by means of which the bobbin-frames are kept in vertical positions. Fig. 5 is a side view of one of the bobbin-frames, and Fig. 6 is a representation of a portion of the mechanism connected with and which imparts motion to the winding or coiling reel.

In Fig. 1 the machinery is exhibited as erected upon a platform or base A B.

The several parts of the mechanism are put in motion by a winch or handle *c* or by any other convenient means. The moving power may be applied directly to the laying-shaft K at the end thereof in the vicinity of the standard T, should such an application be preferred to that represented in the drawings. The shaft K we term the "layer-shaft," because its office is to lay or twist the strands into one cord or rope. On the said layer-shaft two circular plates or balance-wheels *q r* are arranged at a suitable distance apart and for supporting the bobbin-frames 5 5 5 between them. In each of the said frames (there being three or more, and each being formed as exhibited in Fig. 5) a bobbin O is supported and revolves upon a transverse shaft *a'*, Fig. 5, extending from one of the bobbin-frames to the other. The series of bobbins and frames revolve transversely to the machine or with the lower shaft of each of the bobbins, at the same time revolving upon its axis, so that the said bobbins have two motions when the machine is in operation. The number of bobbins and also of bobbin-frames may be increased, as they must correspond in number with that of the strands or "readies," (as they are otherwise termed,) of which the rope is to consist.

At the left end of each of the bobbin-frames, as viewed in Fig. 1, is a pulley 9, Figs. 1 and 2, which is supported upon a short horizontal and hollow shaft 20. The said pulley has an angular groove turned in its periphery, and the said periphery is fluted or has teeth formed upon it, or is otherwise properly prepared, so as to prevent the strand passing over it and in the groove from slipping therein while the strand is drawn from the bobbin, the said drawing being effected by means of a drum *e*, (around which the rope takes three or four turns,) which being put in revolution by proper mechanism, draws the strands from their respective bobbins and thence around their respective pulleys, (and through the hollow shafts 20, in the manner to be hereinafter described,) and to and through the layer X fixed on the extremity of the layer-shaft.

On the left of each bobbin-frame and outside of it is a pinion-wheel 7, Figs. 1 and 3, which is fixed to and revolves with the hollow shaft 20 of the draft-pulley 9, already described. The teeth of the three pinions 7 engage with a central gear-wheel in Figs. 1 and 3, which is situated and turns freely upon the layer-shaft and is placed by the side or in the vicinity of the left circular plate *q*. Each of the pulleys 9 on being inserted in the bobbin-frame has its axle or shaft 20 passed through it, and fastened to the pulley by a binding-screw or by any other convenient means. The strand as it passes from the bobbin is guided into the groove of pulley 9 by being passed through a forked guide *y*, Fig. 1. After passing through the said forked guide it continues around the pulley 9 and thence through the forked guide, thence to the right, and is turned into a notch or guide at *z*, and inserted and passed through the hollow axle 20 of the pulley 9, the said hollow axle at its right-hand end being sustained and turning in a bearing in a cross-

bar 21, extending between the sides of the bobbin-frame, as seen in Fig. 5. A small spring 22 fastened to the bobbin-frame bears gently upon the end of the bobbin O, thereby causing a slight degree of friction thereon in order to prevent the bobbin from running loose on its axis, so as to throw slackness into the strand. At the right end of the bobbin-frames 5 5 5, as seen in Fig. 1, and at the left end, as seen in Fig. 5, on the gudgeons or shafts of the bobbin-frame and outside of the circular plate or balance-wheel *r*, are three cranks 23, there being one to each bobbin-frame gudgeon, the said cranks being connected to a ring or annulus S, Fig. 1 and 4. The holes through the said ring (or bearings of the arms of the cranks) should correspond in their distance apart from each other precisely to those which constitute the bearings of the gudgeons of the bobbin-frames. These cranks are fastened to the gudgeons of the bobbin-frames by screws or by any other convenient means usually adopted for such purpose. The object of the ring S is to keep each of the bobbin-frames and accordingly each of the bobbins in the same vertical position during one entire revolution of the layer-shaft or the balance-wheels *q* and *r*.

In the drawings the bobbins are represented as vertical, although they are respectively in different parts of their circle of revolution. The ring S serves to keep them in this position, and thereby causes each bobbin-frame to turn on its axis once during each revolution of the layer-shaft, thereby imparting the necessary twist to the strand to lay into a rope, and for this purpose that ring must be prevented from moving from its position.

During the operation of the machine the ring must revolve with the layer-shaft, and it must do so in the same place and not change its position. In order to cause it to be stationary in place and still to turn around, a roller 25, supported in the top of a fixed standard *b'*, Fig. 4, is brought against the periphery of the ring, and at a point of the said ring a little above a horizontal line drawn through the center of it, so as to prevent the ring from being carried upward on its cranks as the balance-wheels revolve. When operating for the purpose of laying rope, as the strands are commonly laid together, the roller 25 is on the farther side of the ring.

At the left end of the layer-shaft K is the layer X, which consists of a cylinder having three passages for the strands bored from the right end of its external curved surface toward the left-hand end, and somewhat inclining toward each other or toward the center of the vertical part of the left end of the same. The system of gearing through which motion is communicated to the shaft K is exhibited in the drawings; but as there is nothing new therein, and as various other modes of operating the shaft may be devised, it is not necessary to go into a particular description of any of the same. A pinion at the left end of the layer-shaft engages with a spur-gear on the horizontal shaft *h*, which shaft has a beveled pinion at its opposite end which engages with a beveled wheel on the driving or winch shaft. The rope, as it is laid by the mechanism heretofore described, is guided by a pulley *u* in a direction toward a drum *e* put in motion by a pinion *d* on the driving-shaft engaging with a spur-gear *c'*, fixed upon the shaft of the drum. The rope is wound around the drum three or four times, so as to create sufficient friction to draw the strand from the bobbins. After the rope leaves the drum it passes under and against a grooved pulley *l*, turning upon a bearing extending from the side of a standard G. It is then passed over a similar pulley *m*, applied to the side of the upper part of the right end of a long crane C. From this last pulley it continues toward the left end of the crane and passes over another pulley *n* in the said end, and thence is wound upon the coiling-reel *f*. The traversing crane works on gudgeons or is supported so as to vibrate or oscillate to and fro horizontally, first in one direction and then in another above or over the coiling-reel in order to coil or wind the rope thereon in successive layers, the one above the other until the reel is filled. In thus traversing, the end of the crane is forced and guided first by the circular head or flange at the end of the reel, and then successively by the last fake or turn of the rope around the reel, so so that one fake being wound at either end and a second begun by the mere friction of the sliding of the rope against the preceding fake the fakes are successively wound on the reel from one end thereof to the other, and then from the latter to the first end until the coil is completed. The band H, passing over a drum *d*, in the same axis with the drum *e* and a loose pulley 3, Fig. 6, on the spindle of the coiling-reel, puts the said loose pulley in motion. This pulley has a spring 30, Figs. 1 and 6, attached to it, whose ends pass and are bent over the edges or periphery of the circular plate 28, attached to the axis or shaft of the bobbin or reel *f*, and bears upon the lower side thereof to such a degree as to carry the circular plate around with the pulley, unless the motion of the plate is strongly resisted, in which case the spring slides along the plate. The circular plate has a pin 29, Fig. 6, projecting from it which passes into a corresponding hole in the head of the bobbin or reel *f*, thereby confining the bobbin to the shaft, so that it will turn around therewith. The size of the reel must evidently be sufficient to take up the rope as fast as it is delivered by the machine after the filling of the reel commences, and as each layer of rope on the reel increases the circumference on which the rope is wound, it will be evident that the revolving motion of the reel must be slower as the coil increases in size. To effect such a slower movement of the reel is the ob-

ject of the spring 30, which bears upon the circular plate 28, as already described, with a force sufficient to carry around that plate and the reel as often as the driving-pulley 31 revolves, provided no resistance is offered; but should enough rope not be delivered by the machinery to admit of the reel being revolved with the pulley, (as evidently must be the case after the first layer is completed upon the reel,) the resistance of the rope causes the spring to slide on the face of the circular plate 28, the friction of the spring thereupon being sufficient in the meantime to cause the reel to take up and wind the rope as fast as it is delivered by the machinery. For ropes to be made into coils the reel used is constructed similar to those in common use for such purposes in ropewalks.

From the above it will be seen that the traversing cone constitutes a perfect method of regulating the winding or laying of the rope in helical curves upon the reel, for as the rope is gradually turned upon the reel that part of the rope extending upward from the reel or toward the crane bears against the side of the helical coil as wound, and as the reel turns it constantly adapts itself to the coil and presses the crane laterally until it comes in contact with the head of the reel, when it is turned back by the said head and recoils itself in the opposite direction in the same manner, at the same time carrying the crane in the said direction with it, and so on until the coil is finished upon the reel.

Having thus set forth our invention, we shall claim—

1. The manner of regulating the drawing of the strand from the bobbins—viz., by means of the series of gear-wheels *w* 7 7 7, hollow shaft 20, grooved wheels *g g g*, and guides *y y y* intervening between the layer and bobbins, the same being substantially as hereinbefore set forth.

2. The mechanism for guiding or distributing the rope upon the coiling-reel, the same consisting of the reciprocating crane C, applied to or used in connection with the reel *f*, and constructed and operating substantially as hereinabove described.

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Witnesses:
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