B. F. Adams.
Cordage Mach.

No. 4,574. Patented Jun. 13, 1846.

Fig. 1.

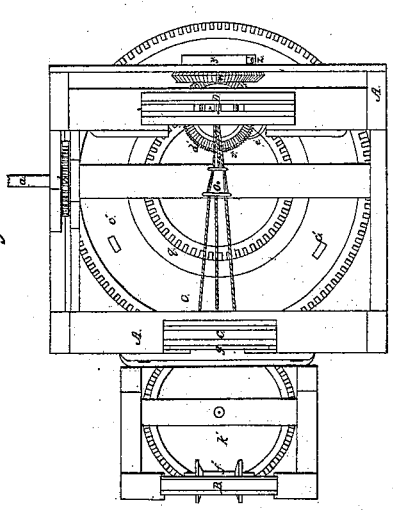


Fig. 2.

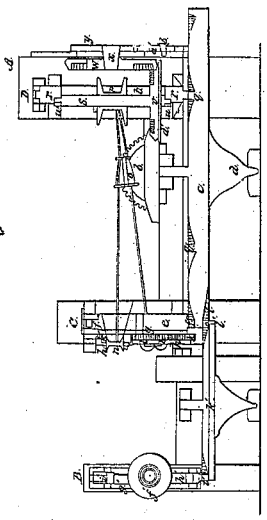


Fig. 3.

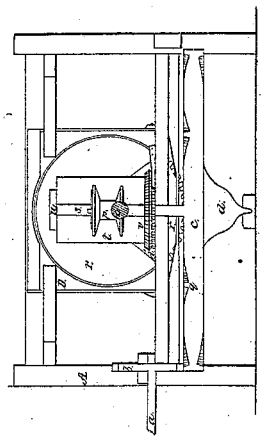


Fig. 4.

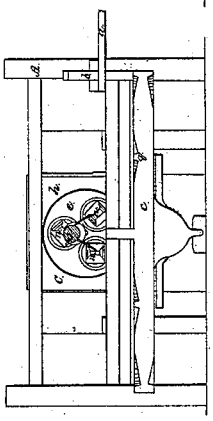


Fig. 5.

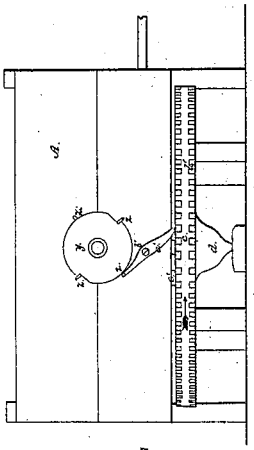


Fig. 6.

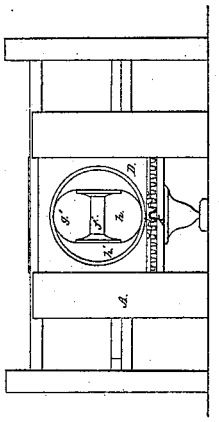
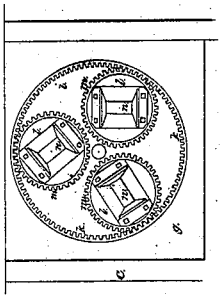


Fig. 7.



UNITED STATES PATENT OFFICE.

BENJAMIN FRANKLIN ADAMS, OF NEW BEDFORD, MASSACHUSETTS.

IMPROVEMENT IN MACHINERY FOR MAKING CORDAGE.

Specification forming part of Letters Patent No. **4,574**, dated June 13, 1846.

To all whom it may concern:

Be it known that I, BENJAMIN FRANKLIN ADAMS, of New Bedford, in the State of Massachusetts, have invented certain new and useful Improvements to be Used in the Manufacture of Cordage; and I declare that the following description and accompanying drawings, taken in connection, constitute a full and exact specification of the construction and operation of the same.

Figure 1 of the above-mentioned drawings represents a top view of my machinery. Fig. 2 is a longitudinal vertical and central section of the same. Fig. 3 is a vertical transverse section taken through the center of the main cogged wheel and looking toward the bobbin on which the rope is wound after being laid, as will be hereinafter described. Fig. 4 is a vertical transverse section taken through the main cogged wheel and looking in the opposite direction or toward the bobbin on which the yarns are wound previous to being spun and laid. Fig. 5 is an elevation of the front end of the machine; and Fig. 6 is an elevation of the rear end, exhibiting the bobbin from which the heart-strand of the rope is taken.

Such other figures or drawings as may be necessary to a full understanding of the mechanism will be hereinafter referred to and described.

Within a suitable frame **A** (see Figs. 1, 2, 3, &c.) three rectangular or square frames B C D are to be arranged in vertical positions and the one in advance of and apart from the other, as seen in Fig. 2. The said frames are to be sustained within the main frame in such manner as to be easily raised up and down for the purpose to be hereinafter described. The first frame B contains and carries the bobbin on which the heart-strand is wound. The second frame C contains and sustains the bobbins on which the yarns are wound for the formation of the outer strands of the rope. The third frame D contains and sustains the mechanism for laying or twisting the strands together and winding them upon the bobbin or reel after being manufactured. The driving-power is applied to the shaft *a* of a vertical toothed pinion *b*, Figs. 1 and 3, the said pinion engaging with and turning a large horizontal gear-wheel *c*, arranged in the lower part of the main frame, as seen in the drawings, and sustained upon and by a vertical shaft *d*, which revolves in proper bearings.

The frame C contains a circular wheel *e*, which has teeth around and projecting from its circumference, as seen at *f f*, which teeth engage with those upon the outer upper edge of the large crown-wheel *c*, so that the revolution of the crown-wheel gives motion to the wheel *e*. The said wheel is sustained and moves around within a circular space of corresponding size formed in the frame C, or this said wheel *e* may revolve upon friction-wheels or other suitable mechanical devices applied to or situated within the frame C. The wheel *e* is placed adjacent to or by the side of a plate *g*, (see Fig. 7, which denotes a view of the rear end of the frame C, the cap-plate *h* being removed therefrom,) within which a circular space *i*, having a row of inverted cogs or teeth *k*, as seen in Fig. 7, is formed. The said plate *g* is fixed or bolted firmly to the frame C. Within the circular space *i* are three or any other suitable number of small wheels or cylinders *l l l*, each of which is properly supported by and so as to revolve within the wheel *e*, and has cogs or teeth *m* placed upon its periphery, the said cogs engaging with those of the fixed plate *g*, so that when the wheel *e* is revolved it will cause the cylinders *l l* to revolve. Each of the said cylinders contains within it a bobbin *n*, arranged as seen in the drawings, and so confined to the cylinder as to turn freely upon its (the bobbin's) axis, so as to permit the yarns (wound upon it) to be drawn off, as may be required during the operation of spinning. In the manufacture of ropes by my machinery the several yarns of each strand are laid or stretched out together and side by side, and thus wound upon the bobbin. After being wound upon the several bobbins the several yarns of each strand are passed through a hole or passage bored through a conical block *o*, there being the same number of holes or passages through the block that there are strands in the rope to be made. The several strands after proceeding from the block *o* are united together and connected to a bobbin *p*.

The horizontal wheel *c* has another series

of teeth q arranged and projecting upon its upper surface, as seen in the drawings. The said series of teeth engages with those of a vertical wheel r, arranged and moving within the frame D, substantially as the wheel e is arranged and moves in the frame C. The bobbin p is placed and slides upon a shaft s, which extends across an opening t, cut through the wheel r, the said shaft turning in bearings at u u on each side of the opening. A bevel gear-wheel v is placed upon the shaft s near one end of it and engages with and is revolved at intervals (in order to wind the rope laid upon the bobbin p) by another bevel-wheel w, applied to one end of a short shaft x, supported in the frame-work A, so as to revolve.

A wheel y, having four or any other suitable number of teeth z projecting from its circumference, is attached to the other or front end of the shaft x. Between the wheel y and the crown-wheel c is a lever a', which turns upon a fulcrum b', as seen in Fig. 5. The upper surface of the wheel c has a series of cams or inclined planes c' c' projecting from it, there being the same or any other suitable number of cams as teeth upon the wheel y, and these cams are so disposed as when the crown-wheel revolves to successively come into contact with the lower arm of the lever a' and raise the same, thereby pressing the upper arm thereof away from the tooth z of the periphery of the wheel y, so as to allow the wheel w to make a partial rotation on its axis, which will be limited by the upper end of the lever a' coming in contact with the next tooth z after the cam c' has passed the lower end of the said lever; the weight of the lower arm of the lever being sufficient to press its upper arm against the periphery of the wheel y. The shaft s has a ratchet-wheel d' fixed upon it (or upon the side of the beveled gear v, as seen in the drawings) and a spring-catch e' connected with the wheel in order to prevent the back rotation of the shaft, which would otherwise be caused by the strain of the rope while being laid.

The peculiar object of the mechanism just described and which intervenes between the shaft s and the crown-wheel c is to take up or wind upon the bobbin p the rope as fast as laid. Were the shaft s to make one entire revolution upon its axis every time the wheel r makes one, it would take up or wind the rope upon the bobbin too fast, and in order to obtain the requisite velocity of motion of the shaft, to be regularly progressive without any stoppage at intervals, very extensive machinery would be required.

By means of the wheel y, the lever below it, and the cams or inclined planes upon the crown-wheel the motion of the shaft s (in order to wind up the rope as fast as laid) will be occasionally arrested, in order that it may not wind up the rope too fast. Whenever the wheel w ceases to rotate, the shaft s will be caused to rotate, and vice versa; the rotation of the shaft s being produced by the rotation of the wheel r in conjunction with the wheel w when this latter is prevented from rotating.

The bobbin on which the yarns comprising the "heart" strand of the rope are wound is seen at f'. It is placed across and within an opening g' of a wheel h', which is supported and travels around or revolves on its axis within a frame B in substantially the same manner as the wheel e is supported and moves in the frame C. The wheel h' has cogs or teeth i' upon its periphery, which engage with those of a horizontal toothed wheel k', which is set in motion by engaging with a series of cogs l', extending downward from the crown-wheel, as seen in the drawings. The revolution of the wheel h' puts a twist in the heart-strand. The said heart-strand is led through the center of the wheel of the frame C and the conical block before mentioned and united (with the other strands) to the bobbin on the shaft s. When no heart-strand is to be used in a rope, the cogged wheel k' may be lowered down, so as to remove its teeth out of gear with those of the crown-wheel c.

When the machine is first put in operation, the frame D should be raised upward far enough to prevent the teeth q of the wheel c from giving motion to the wheel r. The machinery of the frame is next put in motion, so as to put any given or required number of turns or twists in each strand. This being effected, the frame D is next depressed so as to put the wheel r in revolution. The twisting, laying, and winding processes will then be carried on and the twist of the strands preserved so long as the bobbins of the frame C are supplied with yarns.

My machinery is intended to supersede the necessity of the long rope-walks in general use for the twisting and laying of yarns into a rope. The simplicity of its construction and operation renders it available for cordage of any size required. My mode of laying and winding all the yarns of each strand upon one bobbin and afterward twisting them together in order to form the strand obviates the great difficulties which are experienced in the common process of making the strand by reason of the rupture or breaking of the yarns. As all the yarns of each strand are drawn from one bobbin, their delivery must be effected without any material variation of strain upon them, whereas by the common process of twisting the yarns, as each proceeds from a separate bobbin, many yarns are often broken, thus weakening the rope. Twisting the heart-strand also renders it less liable to break than when the yarns of it are laid straight and not twisted together.

Having thus described my machine, I shall claim—

1. The combination of machinery, substan-

tially as described, intervening between the wheel *c* and the bobbin-shaft *s* for the purpose of arresting the rotation of the bobbin at regular intervals of time, for the purpose as above set forth, the said combination consisting of the wheel *y*, the cams or inclined planes *c' c'* upon the crown-wheel *c*, the lever *a'*, and the gears *w* and *v*, arranged and operating together substantially as described.

2. In combination with the machinery for twisting and laying the several outside strands, the mechanism contained within the frame B and put in motion by the wheels *c* and *k'*, the same being for twisting the heart-strand previous to its being laid, substantially as set forth.

In testimony whereof I have hereto set my signature this 2d day of December, A. D. 1844.

BENJAMIN FRANKLIN ADAMS.

Witnesses:

JAMES HARPER,

HENRY H. CRAPO.