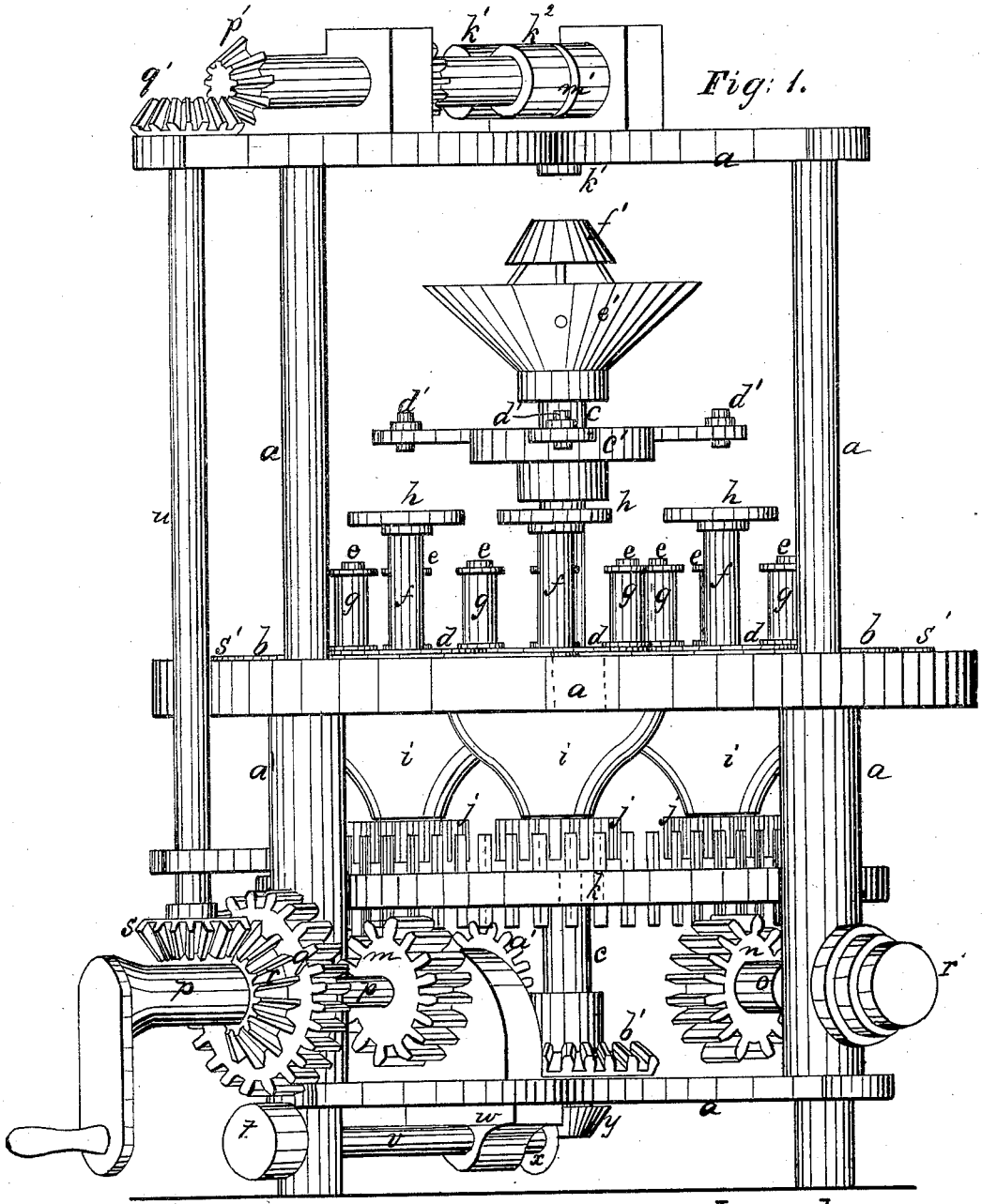
Sheet 1. 3 Sheets.

W. G. Pike.

Rope Mach.

No. 108,387. Patented Oct. 18 1870.

Fig: 1.



Witnesses:

Wm. R. Wright

George E. Buckley

Inventor:

Wm. G. Pike

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Rope Mach.

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Fig: 2.

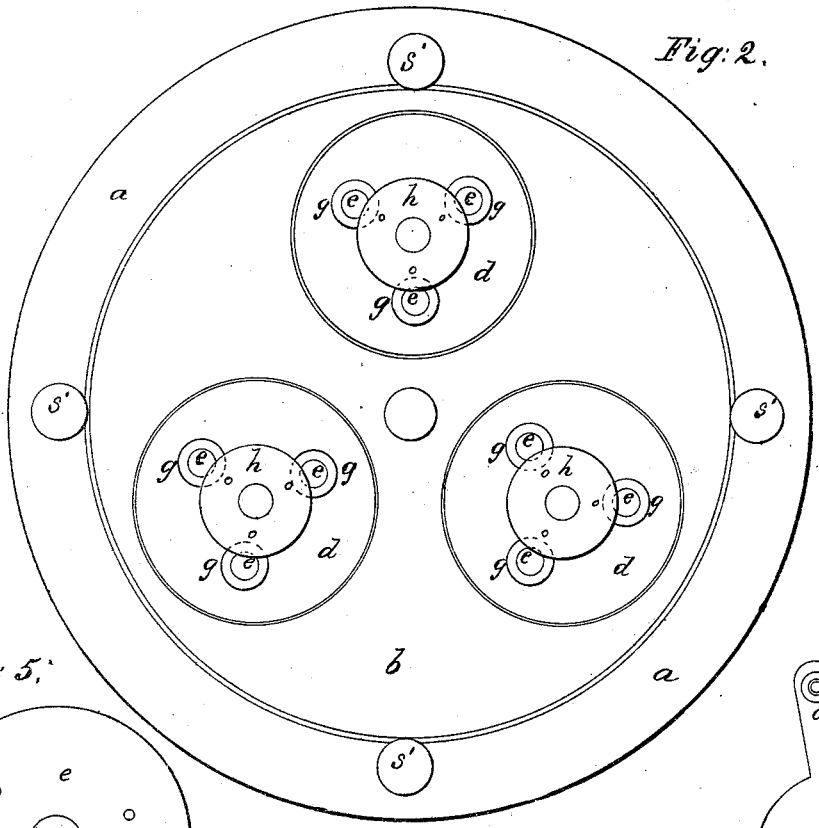
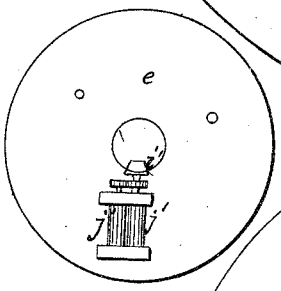


Fig: 5.



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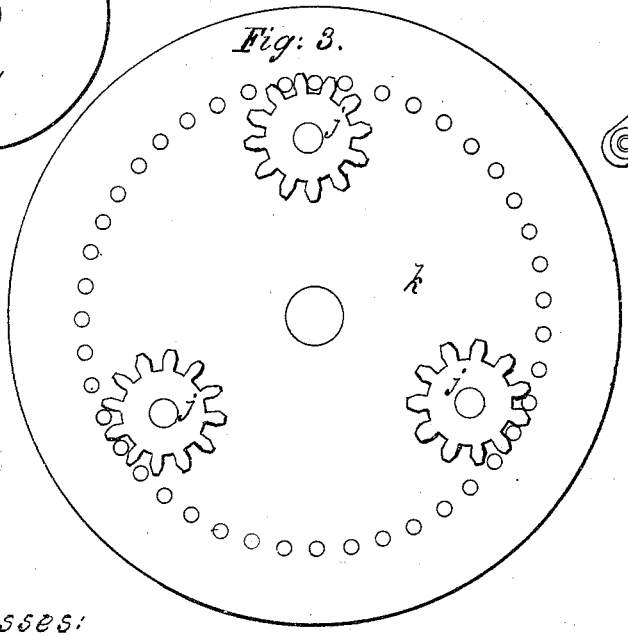

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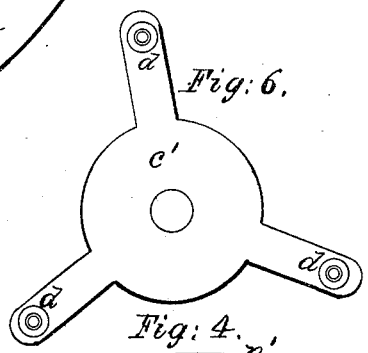

Fig: 4.

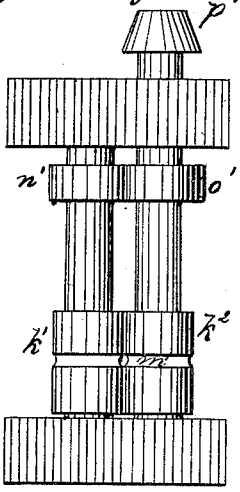

Fig: 7.

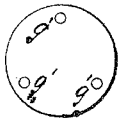

Fig: 8.

Witnesses:
Wm. R. Wright
George E. Buckley

Inventor:
Wm. G. Pike.

Sheet 3. 3 Sheets.

W. G. Pike.

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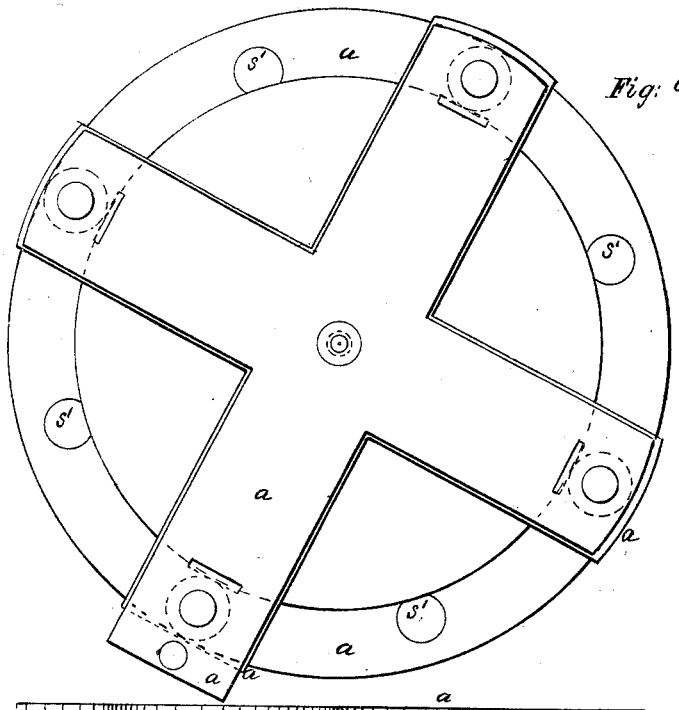

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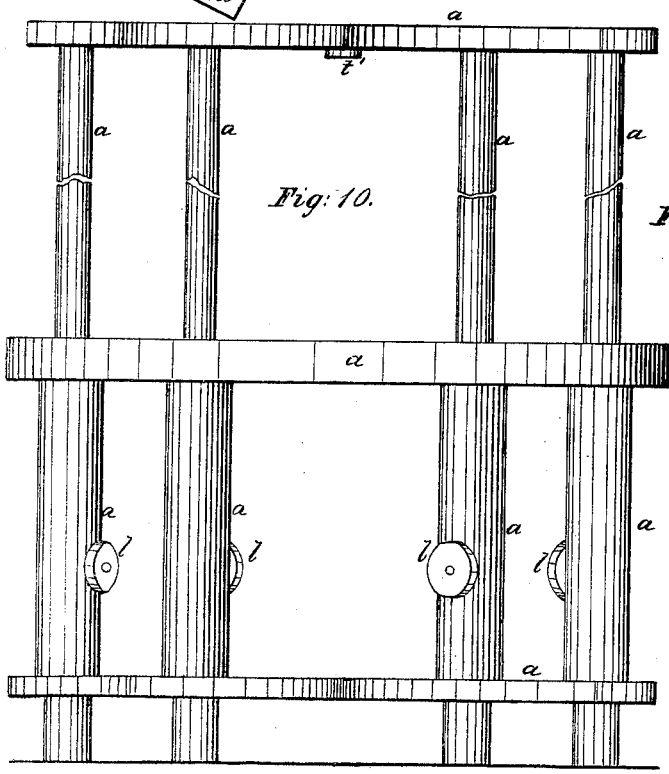

Fig: 10.

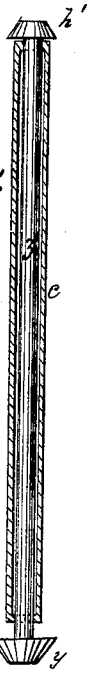

Fig: 11.

Witnesses:

Geo. T. Buckley

Inventor:

Wm. G. Pike

United States Patent Office.

WILLIAM G. PIKE, OF PHILADELPHIA, PENNSYLVANIA.

Letters Patent No. 108,387, dated October 18, 1870.

IMPROVEMENT IN MACHINES FOR MAKING ROPE.

The Schedule referred to in these Letters Patent and making part of the same.

To all whom it may concern.

Be it known that I, WILLIAM G. PIKE, of Philadelphia, in the State of Pennsylvania, have invented a new and useful Machine for Making Ropes, of which machine the following is a specification.

In the annexed drawing—

Figure 1 is a side elevation, partly in perspective, of the complete machine.

The remaining figures represent details.

Figure 2 being a plan of that portion of the frame of the machine which encircles the bobbin-disk carrier *b*, and contains the friction-rollers *s'*, representing also a plan of said carrier and of the bobbin-disks *d*, and a central aperture for the upright main shaft of the machine.

Figure 3 is a plan of the gearing employed to drive the bobbin-disks.

Figure 4 is a plan of the drawing-rollers k^1 k^2 and their gearing.

Figure 5 is a plan of the auxiliary drawing-rollers *j'*.

Figure 6 is a plan of the frame or plate *c'*.

Figures 7 and 8 are plans of the top and bottom of the perforated guide *f'*.

Figure 9 is a plan of the frame *a*, showing the cross-braces.

Figure 10 is an elevation of the frame.

Figure 11 is a longitudinal vertical section of the hollow shaft *c* and inclosed shaft *z*, with bevel-gears attached to the latter.

a, figs. 1, 2, 9, and 10, represents the frame of the machine.

b, figs. 1 and 2, is the bobbin-disk carrier, which is rigidly attached to the hollow shaft *c*.

d d d are the bobbin-disks, each of which is provided with three upright studs, *e*, arranged on each disk, so as to be equidistant from the shaft *f* of the disk.

g g g are bobbins which revolve on the studs *e*.

Each disk-shaft *f* carries at its upper extremity a plate, *h*, figs. 1 and 2, which is provided with perforations, as shown in fig. 2, for tubing the yarns, and the perforations may have short steel tubes inserted into them, if desired.

Each shaft *f* extends down through a bearing-box, *i*, fig. 1, and carries at its lower end a cog-wheel, *j*, figs. 1 and 3.

k, figs. 1 and 3, is a gear, which is provided with cogs on its upper and lower faces, as shown in fig. 1.

The wheel *k* is loose on the hollow shaft *c*, and it rests on friction-rollers, *l*, fig. 10.

The cogs on the lower face of the wheel *k* are shown to be geared into the cog-wheels *m* and *n*, which are attached to shafts *o* and *p*, which extend through and have bearings in the legs of the frame, as shown in fig. 1.

The gear *m* is adjustable on the shaft *p*, so as to engage the gear *k*, as shown, when desired. It must be disengaged when gear *m* is used.

q and *r*, fig. 1, are gears on the shaft *p*.

s and *t* are gears, the former being attached to the vertical shaft *u*, and the latter to a horizontal shaft *v*, fig. 1, one end of which has a bearing in a leg of the machine, and the other end in a box, *w*.

The shaft *v* carries at its inner extremity the bevel-gear *x*, which engages the bevel-gear *y*, which is attached to the lower extremity of the shaft *z*, fig. 11.

a', fig. 1, is a bevel-gear attached to the shaft *p*. It engages the bevel-gear *b'*, which is rigidly attached to the hollow shaft *c*.

c', fig. 1, is a frame or plate, rigidly attached to the hollow shaft *c*, and having arms perforated at their extremities for the steel gathering-tubes *d'*.

e', fig. 1, is a guide-plate, preferably made in the hollow dish-shape shown.

It is provided with three perforations, two of which are shown in fig. 5.

f' is a guide supported from the plate *e'*, as shown, it being perforated with three guide-holes, *g'*, figs. 7 and 8, for tubing the strands.

Attached to the upper end of the shaft *z*, fig. 11, is the bevel-gear *k'*, which engages the bevel-gear *i'*, fig. 5, which is on the shaft of one of the rollers *j'*.

k^1 k^2, figs. 1 and 4, are drawing-rollers, which are grooved for the rope, as shown at *m'*, and which carry gear-wheels *n'* and *o'*, respectively.

The roller k^2 carries the bevel-gear *p'*, which engages the bevel-gear *q'*, which is attached to the upper end of the shaft *u*, fig. 1.

r', fig. 1, is a cone-pulley on the shaft *o* of the gear *n*.

s' s', figs. 1 and 2, are friction-rollers employed to steady the disk-carrier *b*.

t', fig. 1, is a steel eye or short tube, set in the frame *a*.

To prepare the machine for operation, the bobbins *g*, fig. 1, are supplied with rope-yarns.

The free ends of the three yarns from the bobbins of each disk, being passed through their proper perforations in plates *h*, respectively, the said ends are brought together, and the yarns thus made to form a strand, which passes through its appropriate tube, of the three steel tubes *d'*, one strand being passed through each of said tubes *d'*.

The three strands are thence led through the three perforations in the guide-plate *e'*, one strand through

each perforation, and thence through the three perforations in the guide f', one strand through each perforation, the three strands intended to form the rope being at this point brought together and then passed through the eye t' into the groove m' of the drawing-rollers k^1 and k^2.

Power is then applied to the shaft p, which, through the bevel-gears a' and b', turns the hollow shaft c of the machine rotating the disk-carrier b, with its several bobbin-disks d, the latter being rotated independently through the operation of their several gears and the stationary gear k in a direction opposite to the direction of rotation of the disk-carrier b, thereby twisting the yarns from each set of bobbins into a strand.

It will be observed that the frame c', guide-plate e', guide f, and disk-carrier b, being all rigidly attached to the shaft c, are rotated by it simultaneously in one direction; also, that the rope, being firmly held in the groove m' by the pressure of the rollers k^1 and k^2, is kept from turning while the three strands are brought together.

The union of the strands takes place as they leave the perforations in the guide f', between which and the eye t' they get their final twist.

The roller k^2, being moved by the action of the gears p', q', s, and r, rotates in one direction, and the roller k^1, being moved by the action of the gears o' and n', rotates in an opposite direction.

These rollers thus serve the double purpose of drawing the rope from the twisting parts of the machine as fast as it is finished, and holding the rope, as above said.

The drawing-rollers may be made wholly of metal; but I prefer to make them wholly of, or coat them thickly with vulcanite, gutta-percha, or other suitable elastic substance.

The auxiliary drawing-rollers j', fig. 5, are in all respects like the rollers k^1 and k^2, and are used for a similar purpose.

They are unnecessary when metallic rope is being made, but may be employed with advantage in the manufacture of hempen or Manila ropes.

They receive their motion from the upright shaft z, through the bevel-gear h'.

In addition to their other uses, they serve to relieve the drawing-rollers k^1 and k^2 of a portion of the strain of drawing off the rope.

In describing the operation of the gear k above, I have referred to it as being stationary; but when it is desired to vary the twist of the strands, *i. e.*, either to increase or diminish the twist, it becomes necessary to give rotary motion to the gear k, and when it is desired to increase the twist, the gear k is caused to move in a direction opposite to the direction of rotation of the disk-carrier b by adjusting the gear m so as to engage the cogs on the lower face of the gear k.

When, on the other hand, it is desired to lessen the twist of the strands, the gear m is disengaged from the gear k, and the gear n is put in motion by applying a belt to the pulley-cone r', thereby causing the disk-carrier b and the gear k to move in the same direction and diminishing the twist of the strands, as desired.

The motion of the drawing-rollers k^1 and k^2 may be increased or diminished by employing gear-wheels of greater or lesser diameter in the ordinary manner.

The drawing-rollers k^1 and k^2 are adjustable toward or from each other to accommodate ropes of different sizes, and the auxiliary drawing rollers j' are similarly adjustable.

The machine above described is intended for a rope of three strands, each of which is composed of three yarns.

The number of yarns, however, may be increased by increasing the number of bobbins, and the number of strands may be increased by correspondingly increasing the number of bobbin-disks d, guide-plates h, guide tubes d', and guide-holes in the guides e' and f'

When it is desired to dispense with the auxiliary drawing-rollers j', the shaft c may be made solid.

I claim—

1. The rotary bobbin-disk carrier b, the three or more bobbin-disks d, each of the latter being provided with bobbins and a perforated guide-plate, h, said disks being contained within said carrier and so arranged that each has an independent rotary motion on its own axis, in a direction which is contrary to the direction of motion of the central shaft c, in combination with the shaft c, substantially as set forth, to twist the several strands intended to form the rope.

2. The above-claimed mechanism, in combination with the frame or plate c', and its perforations, the guide-plate e' and guide f', eye t', and rollers k^1 k^2, to draw and deliver the rope and hold it while the strands receive their final twist and are united into a rope, substantially as set forth.

3. The disk-carrier b and bobbin-disks d, in combination with the gears j and k, to give said disks an independent rotary motion in a direction which is contrary to the direction of motion of the central shaft c.

4. The combination of the cone-pulley r', gear k, and disk-carrier b, with their intermediate gearing for securing control over the independent rotary motion of the bobbin-disks.

Witnesses:
WM. R. WRIGHT,
GEO. E. BUCKLEY.

WM. G. PIKE.