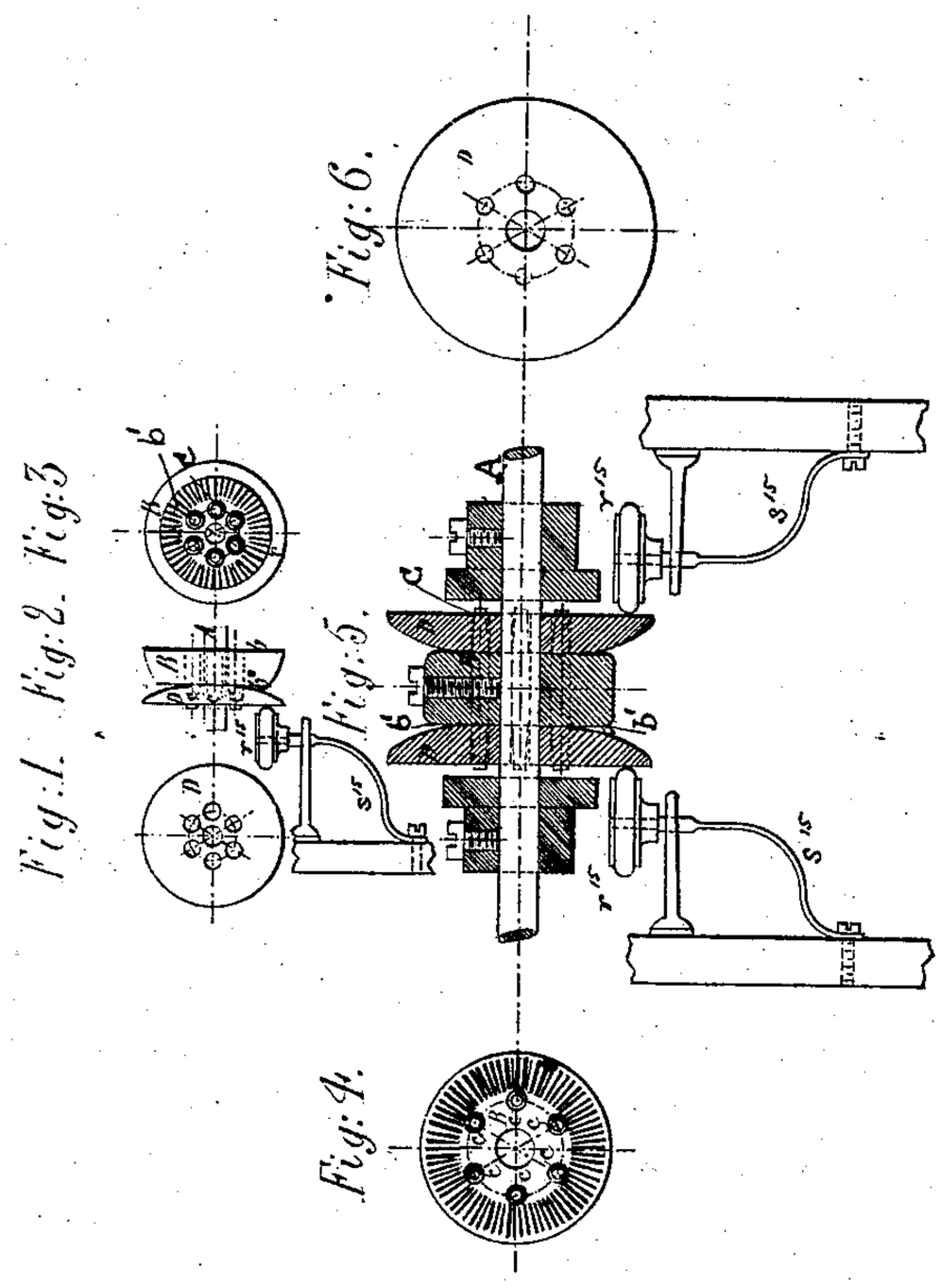
(No Model.) 2 Sheets—Sheet 1.

P. MOTIRON.

CAPSTAN OR DRAWING OFF DEVICE FOR SPINNING AND ROPE MAKING MACHINERY.

No. 281,388. Patented July 17, 1883.



Witnesses.

1: Robert Hooton

2: Jean Baptiste Rolland

Inventor.

Pierre Motiron

by his attorney

A. V. Briesen

(No Model.)

2 Sheets—Sheet 2.

P. MOTIRON.

CAPSTAN OR DRAWING OFF DEVICE FOR SPINNING AND ROPE MAKING MACHINERY.

No. 281,388. Patented July 17, 1883.

Fig: 8.

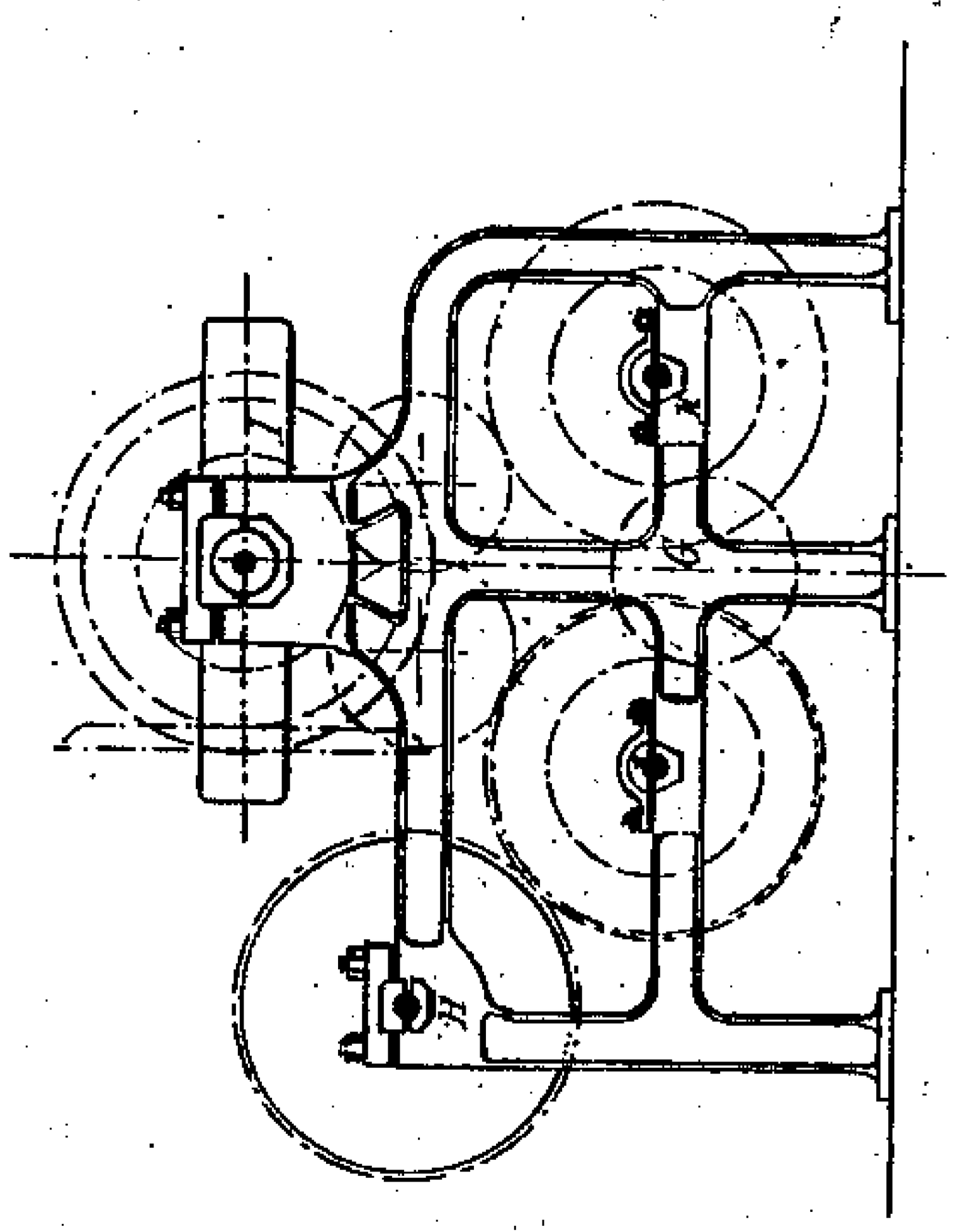


Fig: 7

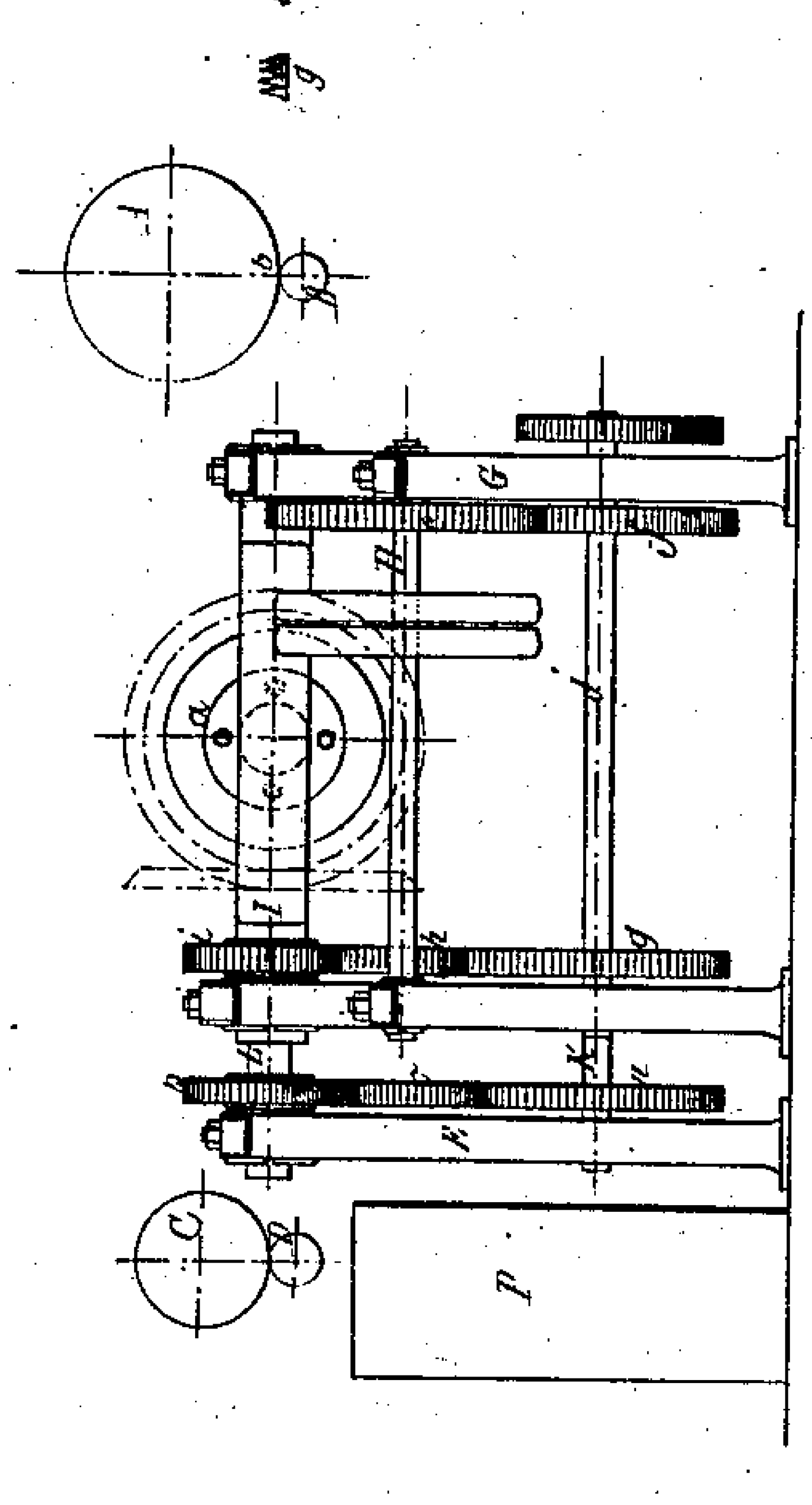
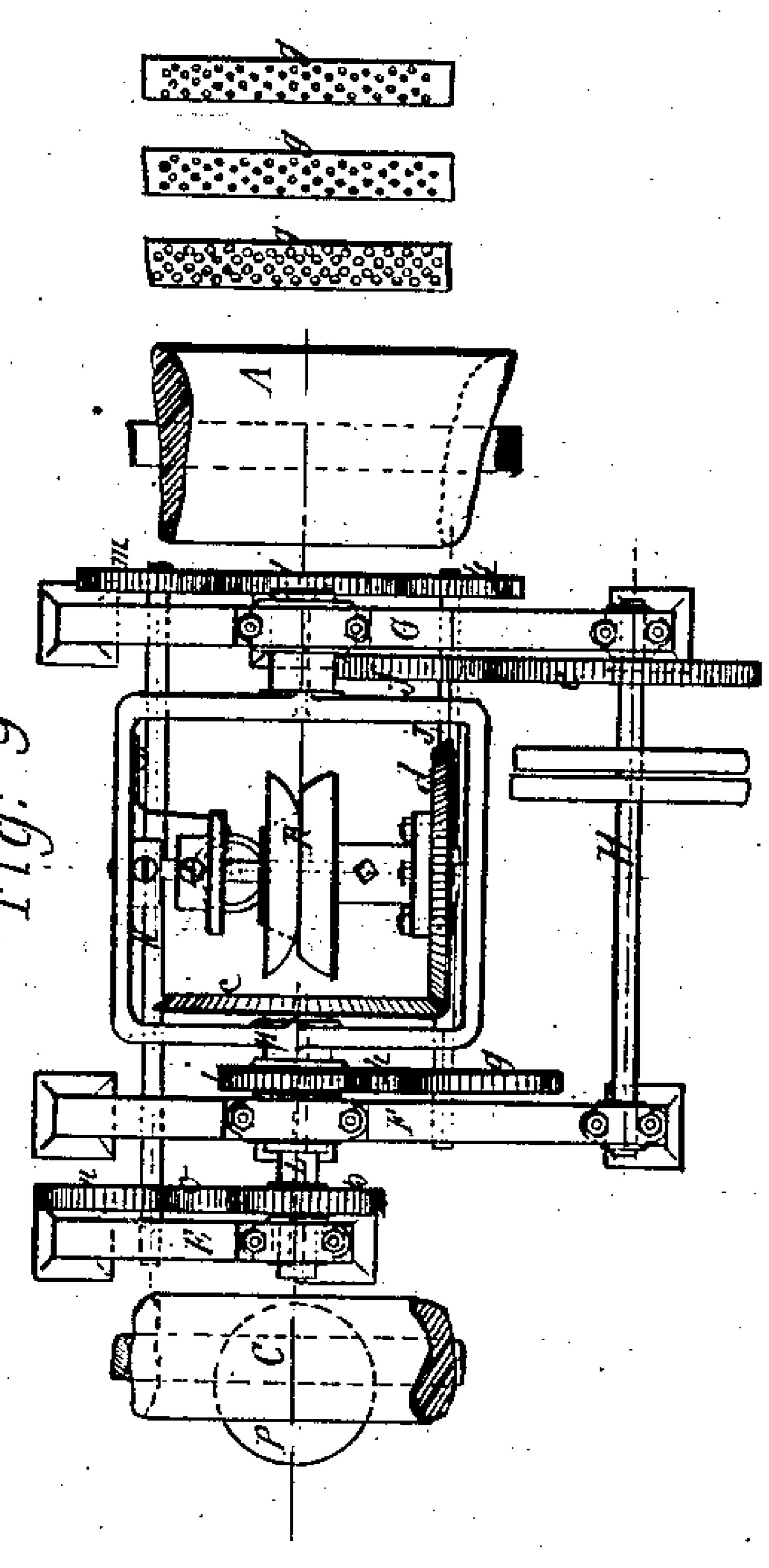


Fig: 9



Witnesses.

Robert M. Hooper

Jean Baptiste Rolland

Inventor.

Pierre Motiron

by his attorney

A. v. Briesen

N. PETERS. Photo-Lithographer. Washington. D. C.

UNITED STATES PATENT OFFICE.

PIERRE MOTIRON, OF PARIS, FRANCE, ASSIGNOR TO SOCIÉTÉ ANONYME DES CORDERIES PARISIENNES.

CAPSTAN OR DRAWING-OFF DEVICE FOR SPINNING AND ROPE-MAKING MACHINERY.

SPECIFICATION forming part of Letters Patent No. 281,388, dated July 17, 1883.

Application filed February 17, 1881. (No model.) Patented in France May 13, 1880, No. 136,643; in Belgium December 16, 1880, No. 53,337, and in England December 28, 1880. No. 5,462.

To all whom it may concern:

Be it known that I, PIERRE MOTIRON, of Paris, France, have invented Improvements in Capstans or Drawing-Off Devices for Spinning and Rope-Making Machines, (for which I have obtained French Patent No. 136,643, for fifteen years, dated May 13, 1880; Belgian Patent No. 53,337, for fifteen years, dated December 16, 1880, and English Patent No. 5,462, for fourteen years, dated December 28, 1880;) and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the annexed sheets of drawings, making a part of the same.

This invention relates to machinery employed in performing the successive operations required for the preparation and spinning of fibrous material and the manufacture thereof into ropes and cordage. The successive stages referred to comprise the spreading and drawing of the fibers, the spinning of the fibers into yarns, the twisting of the yarns into strands, and the laying of the strands into rope. According to this invention, the machines used in these four successive operations all contain a certain cylindro-conical device or apparatus hereinafter described. If upon one or more cylinders of constant diameter yarns of different sizes be wound an equal number of times, it will be found that their lengths are unequal and directly proportionate to the size of said yarns, the coarsest being the longest and the finest the shortest. In order, therefore, that the lengths of all the yarns or strands may be mathematically equal, it is necessary that the diameter of the drum or drums should diminish gradually and inversely to the increase in the diameter of the yarns or strands. This is the principle of the improved draft or delivery device or apparatus shown in Fig. 2, which is called hereinafter the "cylindro-conical device," and which is employed in all the machines I have named.

In the drawings I have represented my improved apparatus as applied to a spreader; but it can be used with equal advantage in machines for spinning fibers into yarn, twisting the yarn, and laying the strands into rope.

Figure 1 is a face view of the disk D, which is pressed against the boss B. Fig. 2 is a side view of the disk D and boss B on the spindle A. Fig. 3 is a face view of the roughened side of boss B. Fig. 4 is a similar view of the roughened side of boss B, used in the duplicated apparatus, which is shown in Fig. 5. Fig. 5 is a central section of the boss B on shaft A, between two disks D and their springs and rollers. Fig. 6 is a face view of one of the disks D shown in Fig. 5. Fig. 7 is a front view, Fig. 8 a side view, and Fig. 9 a top view, of a spreader containing my invention.

This cylindro-conical apparatus consists of a spindle, A, carrying a boss, B, which is mounted upon it. From the face b' of disk B project tapering pins C through holes in a movable disk, D, which is loose on spindle A, and pressed against the boss B by means of a suitable spring, s^{15}, carrying a friction-roller, r^{15}, and is caused to incline itself more or less to spindle A, the contact-face of the disk D being more or less conical, as shown. The disk D, as shown in face view, Fig. 1, has as many cylindrical holes as there are conical pins, and a collar on spindle A maintains disk D at the proper distance from the boss B, according to the size of the yarn. The face b' of boss B (see Fig. 3) is grooved or roughened to prevent slip. If, now, the shaft be rotated, the whole of this draft or delivery apparatus will turn with it, and the yarn or strand from the bobbin will enter between the movable disk D and the fixed boss B at the open side, directly opposite the friction-roller r^{15} on the spring s^{15}. The said yarn or strand is wound upon the cone formed by the pins and around the lowest part of the cone at first; but after having made a half-revolution the yarn or strand is nipped by the movable disk being pressed by the spring against the fixed part B, and the yarn is thereby forced to rise to the highest part of the cone. The portion of the yarn or strand wound upon the cone will be of constant length, whatever may be the variation in diameter of the same yarn or strand, the finer portion being wound upon the larger diameter of the cone and the coarser portion upon the smaller diameter, or, in other words, the different diameters of the yarn and the diameters on which they are wound are inversely proportional.

The spindle A is rotated by suitable ma-

chinery, and may carry a toothed wheel or pulley for this purpose. The springs s^{15} are secured to the frame or flier of the machine, as indicated in Fig. 9.

From the foregoing it will be readily understood that the lengths of the yarns or strands delivered or unwound in a given number of turns will be mathematically equal, and that, the torsion for each being invariably equal, the tension also will be mathematically exact, and as the tension of all the yarns or strands is equal, the strand or rope produced will possess its full strength and be perfectly uniform in make and in appearance.

There are three kinds of cylindro-conical apparatus based on the principle above explained: first, the single arrangement already described; second, the double apparatus represented in Figs. 4, 5, 6, in which the disks D are duplicated and the pins shown to project from both sides of the boss B, said apparatus being employed to prevent any slip of the yarns; third, multiple apparatus in which a number of single or double apparatus are placed in conjunction, as will be hereinafter explained.

It is well known that in the machines ordinarily employed for spreading coarse fibers—such as hemp—the material is fed onto an endless apron at the rear by an attendant, who supplies it in stricks which have been more or less hackled. Two rollers retain the material as it leaves the apron while it is being operated on by gill-combs and conducted to the spreading and drawing rollers. The latter are made of wood, and, owing to the great pressure, considerable power is required to bring the material into the form of a sliver and supply it to the delivery-rollers at the front, immediately above the cans in which the slivers are received. It often happens that, owing to the attendant having supplied too much material on to the feed-apron, the rollers are caused to slip without drawing, and it becomes necessary to stop the machine to free the material from between the rollers. To obviate this objection the cylindro-conical device A B D before described is embodied in an apparatus applied to a spreader, as shown in Figs. 7, 8, and 9. This represents one mode of applying my invention.

A B, Figs. 7 and 9, are the spreading and drawing rollers, and C D the delivery-rollers, placed above the can P.

g g g are the gill-bars. Between the spreading and delivery rollers is applied the machine embodying the cylindro-conical apparatus before referred to. This machine is composed of three frames, E F G, of which F and G are alike, and of the form shown in Fig. 8, while the third frame, E, is of less width, not having to support the driving-shaft H of the machine, which, through gear-wheels, imparts motion to shaft J, which is supported in bearings in framing F G, and imparts motion through the gear-wheels *g h i* to the twister I, by which the desired torsion is imparted to the sliver between the point *a*, where it is nipped by the cylindro-conical device and point *b*, where it is delivered from the rollers A B. The same shaft, at the opposite end of the machine, transmits motion, by means of gear-wheels *k l m*, to a shaft, K, supported in bearings on frames E G. The shaft K in turn imparts motion, by means of gear-wheels *n o p*, to a shaft, L, which passes through the boss M of twister I, and is made hollow for the sliver to pass through to the delivery-rollers. Upon the shaft L is keyed a miter-wheel, *c*, which, by means of another miter-wheel, drives the cylindro-conical device R, which is of the construction hereinbefore more specifically referred to.

In order to vary the length of the sliver, the twist remaining the same, or to vary the twist, the length delivered remaining the same, the two gear-wheels *k m* may be changed at will, and the wheel *l* be so mounted as to gear with wheels *k m* of any diameter.

Between the point where the sliver quits the device R and the point where the delivery-rollers seize it, it is deprived of the twist which it received between the points *a* and *b*, so that on leaving the delivery-rollers the sliver has returned to the condition in which it left the rollers A B, except that it possesses almost perfect regularity, and that the tension of all the fibers is equal—a result which has never hitherto been attained. The results of such an arrangement are that the motive power required is considerably reduced, while the production is increased, owing to the greater speed at which the machine may be driven and the larger quantity of material which may be fed, without inconvenience, into the machine.

In order to completely equalize the slivers before they pass to the spinning-machine, the same machine is employed, except that the slivers are fed from cans instead of by hand, as before. The slivers are doubled or tripled, according to the numbers and quality of yarn desired.

The principle of the cylindro-conical device before described is also applicable to the operation of rope and cable making; and by its means all the strands may be stretched and twisted in proportion to their size, and the rope or cable possesses the full strength of the strands combined, which all break at once when the strength is exceeded.

The device is also applicable to spinning and twisting machines.

I claim—

The combination of the shaft A, boss B, having roughened face *b'*, and tapering pins C, projecting therefrom, and of the perforated disk D, which is placed upon the shaft A, against said boss B, with the spring s^{15} bearing on said disk D, all arranged substantially as herein shown and described.

Witnesses: PIERRE MOTIRON.

ROBT. M. HOOPER,

JEAN BAPTISTE ROLLAND.