4 Sheets--Sheet 1.

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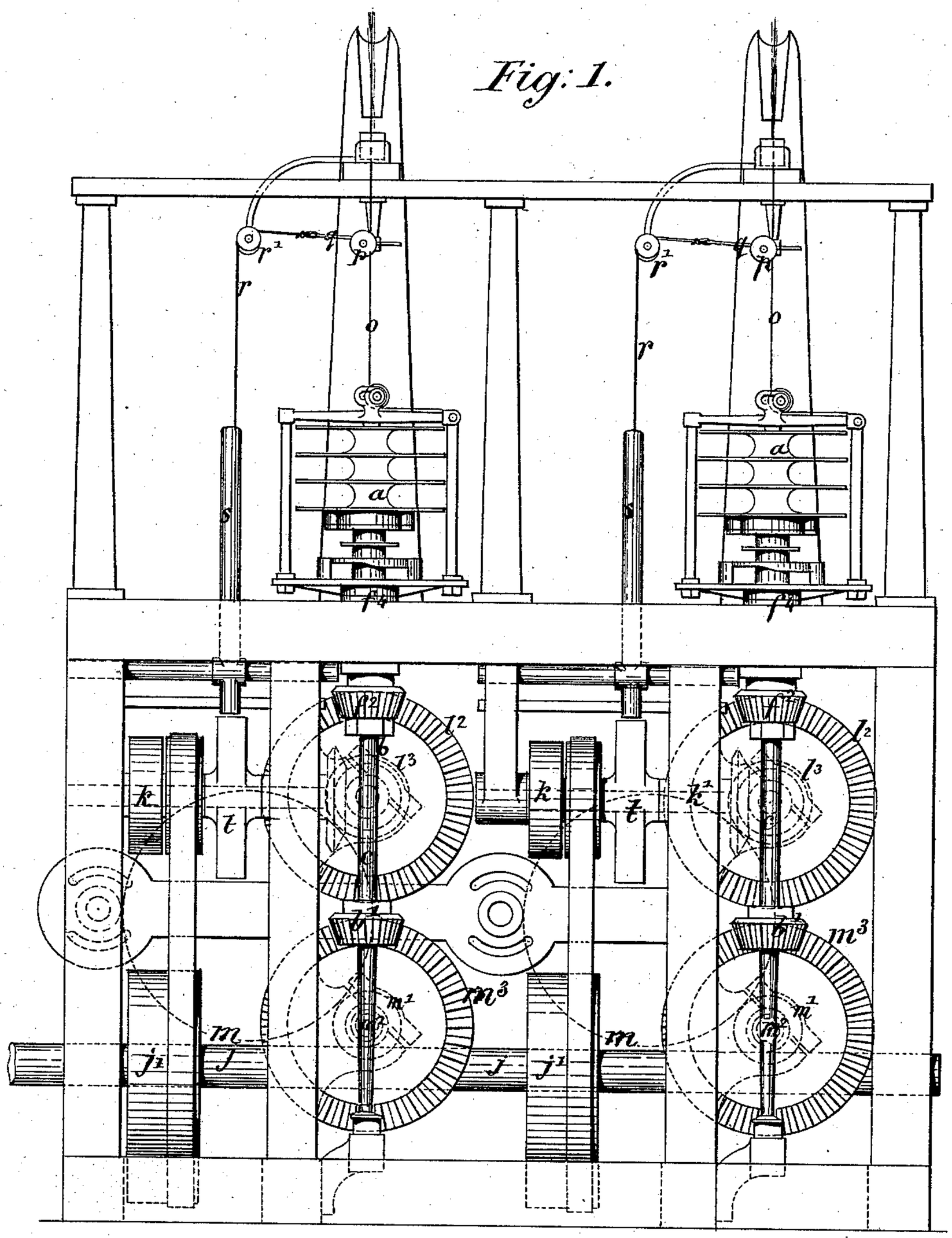
Spinning-Machines.

No. 157,413. Patented Dec. 1, 1874.

Fig. 1.



Witnesses:
Michael Ryan
Fred Haynes

Pierre Motiron
by his Attorneys
Brown & Allen

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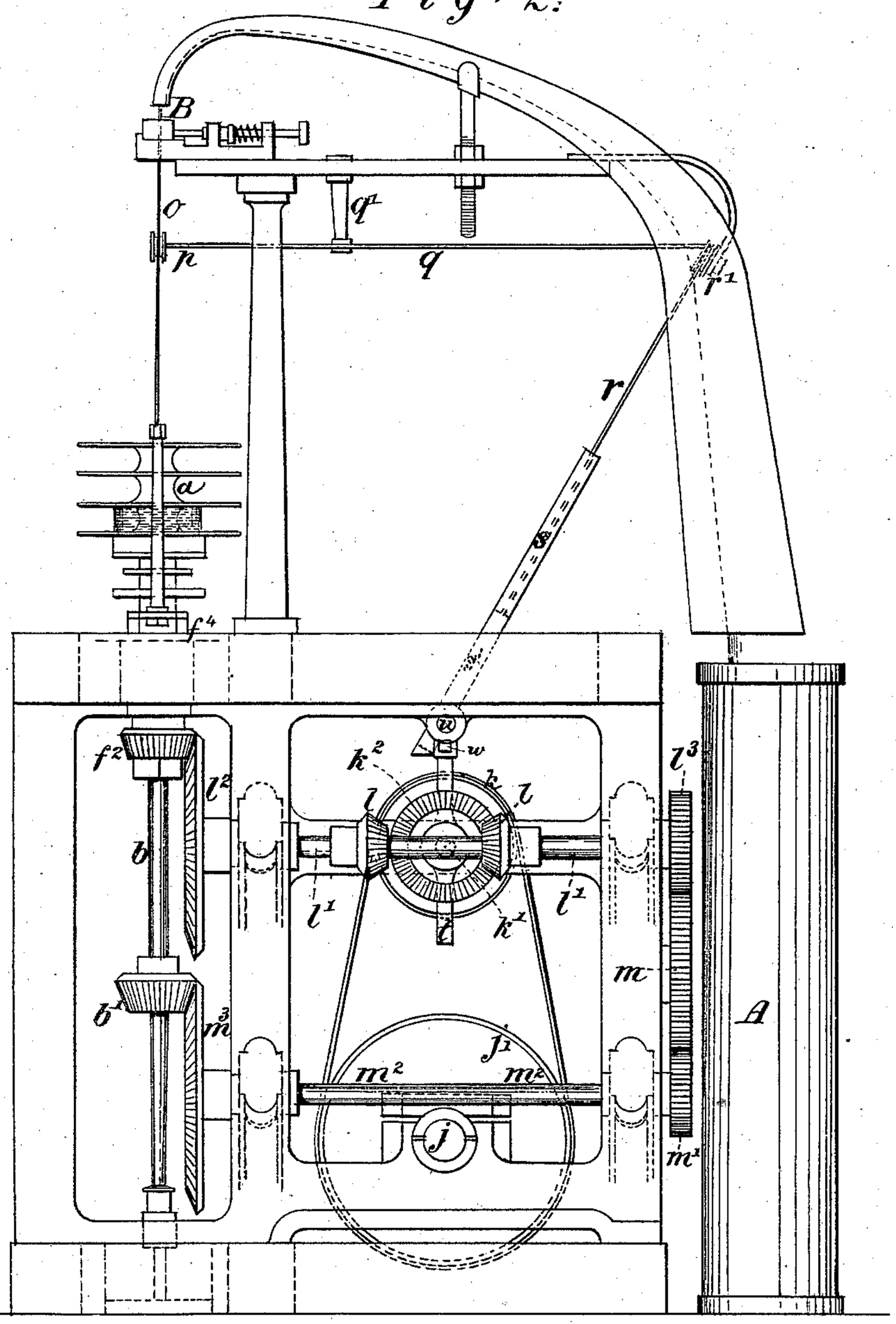
Fig: 2.



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Fred Haynes

Pierre Motiron
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Fig: 3.

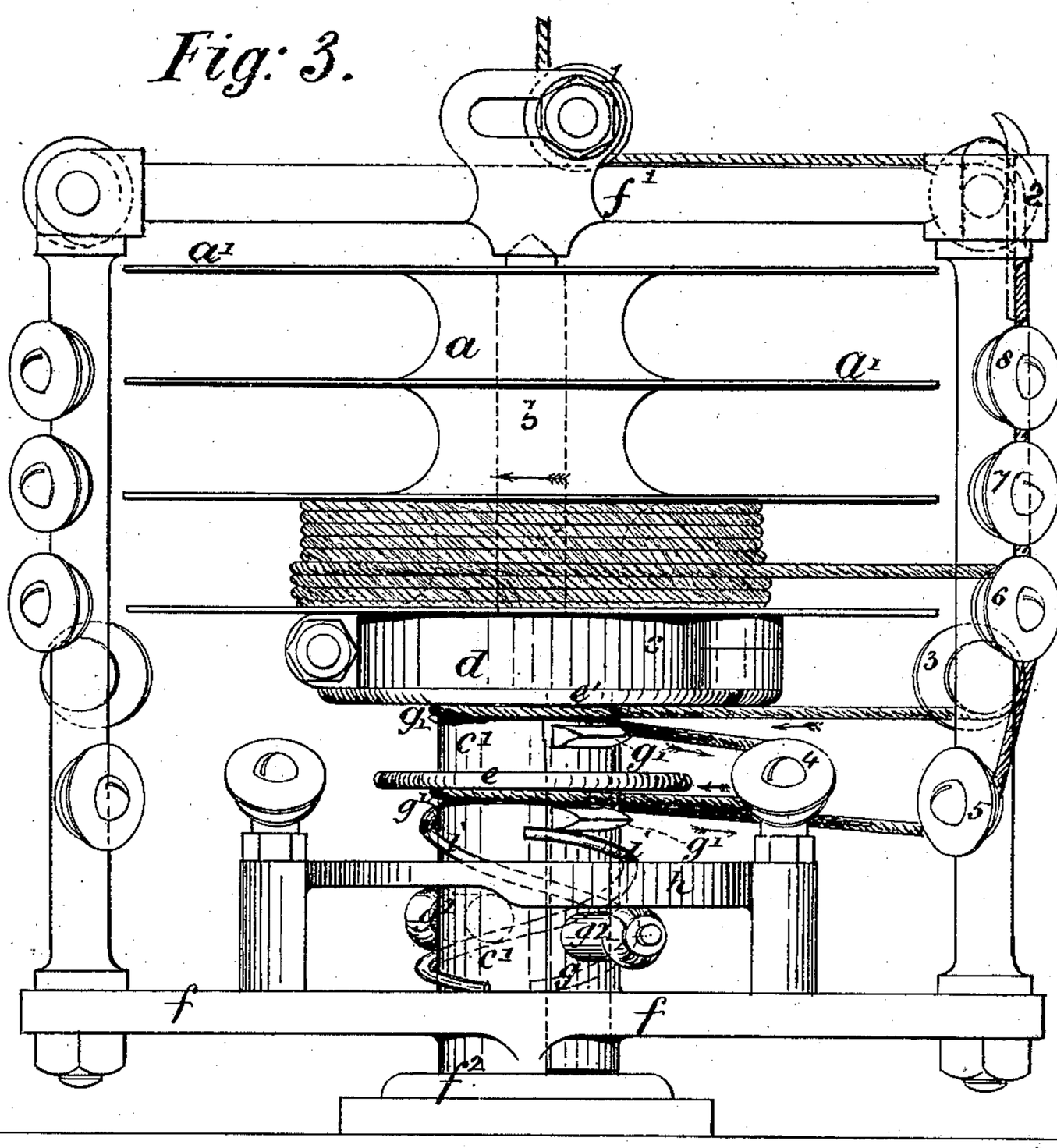


Fig: 4.

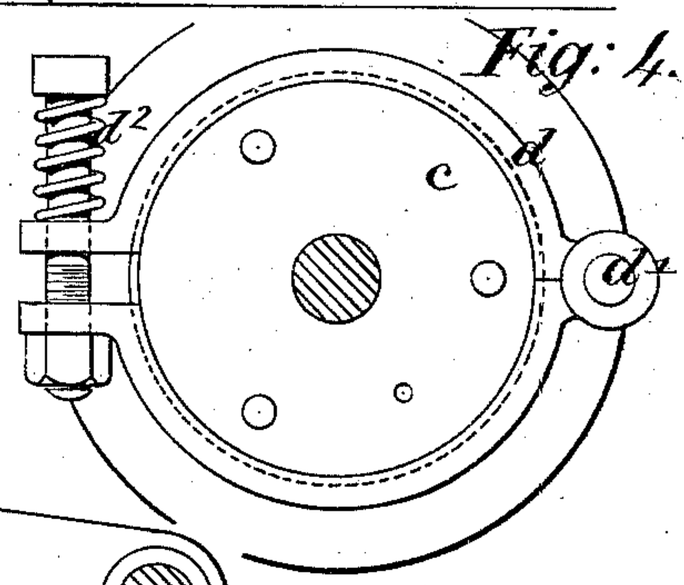


Fig. 6.

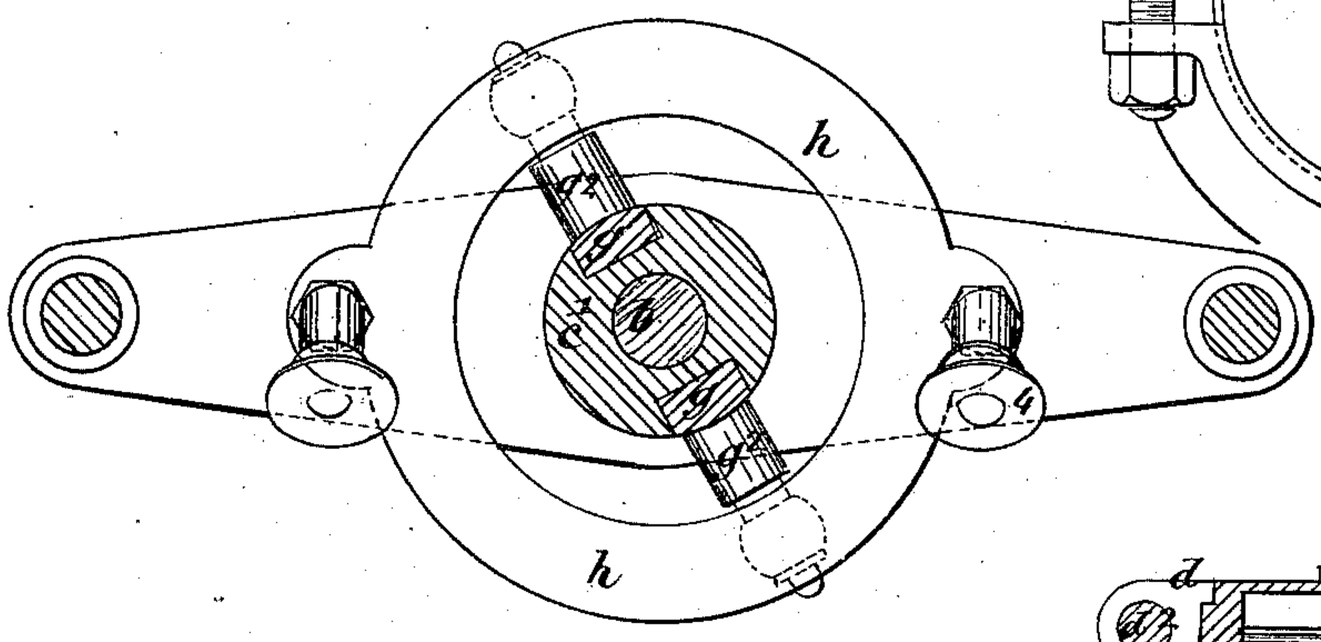
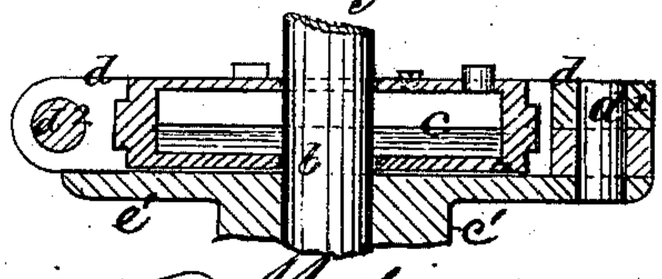


Fig: 5.



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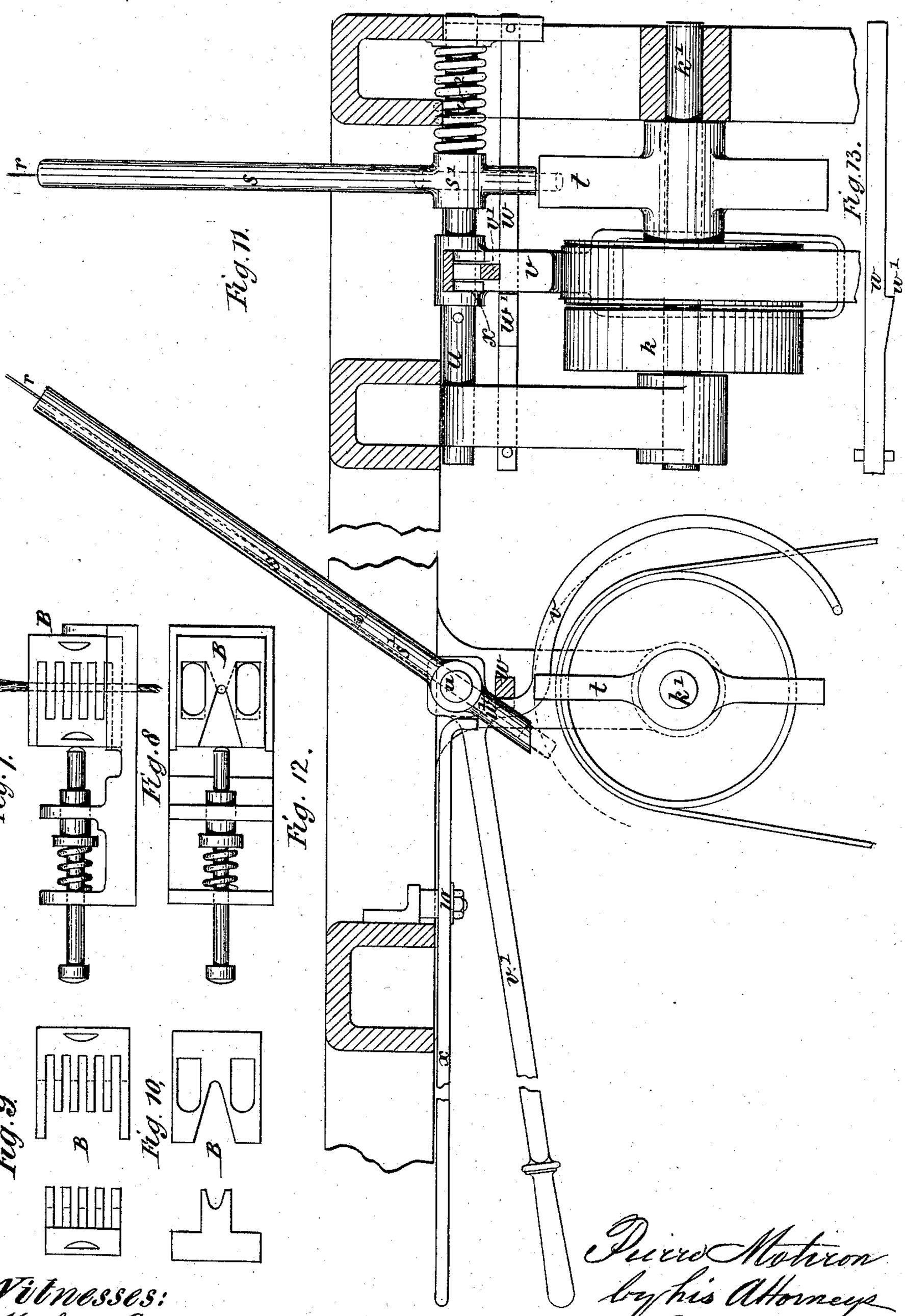

Fig. 11.

Fig. 13.

Fig. 7.

Fig. 8

Fig. 9

Fig. 10

Fig. 12.

Witnesses:
Michael Ryan
Fred Haynes

Peter Motiron
by his Attorneys
Brown & Allen

THE GRAPHIC CO. PHOTO-LITH. 39 & 41 PARK PLACE, N.Y.

UNITED STATES PATENT OFFICE.

PIERRE MOTIRON, OF LILLE, FRANCE.

IMPROVEMENT IN SPINNING-MACHINES.

Specification forming part of Letters Patent No. **157,413**, dated December 1, 1874; application filed May 15, 1873.

To all whom it may concern:

Be it known that I, PIERRE MOTIRON, of Lille, in the Republic of France, but at present of Fenchurch street, in the city of London, England, have invented certain Improvements in Machinery for Spinning or Twisting Fibrous Substances, of which the following is a specification:

This invention consists of various improvements in machinery for spinning or twisting various fibrous substances, the main object of the invention being to produce a better and more uniform yarn than heretofore.

The various parts of the spinning mechanism are so constructed, arranged, and operated that the yarn or sliver to be operated upon may have either a right or left handed twist given to it, as may be desired.

In the accompanying drawings these several improvements are shown in detail.

Figure 1, Sheet I, is a front elevation of part of a machine, in which two spindles are shown constructed and worked according to the present improvements. Fig. 2, Sheet II, is an end view of the same. Fig. 3, Sheet III, is an elevation, drawn on an enlarged scale, of the upper part of one of the spindles. Figs. 4, 5, and 6, Sheet III, are sectional detailed views of some of the parts.

In order that the present improvements may be more clearly understood, I will proceed to describe the operation of spinning with the apparatus, and the manner in which the novel parts act.

The bobbin *a*, on which the spun yarn when properly twisted is wound, is divided into four or more compartments by circular horizontal metal disks *a'*, as shown best in the enlarged view, Fig. 3. It is placed on the spindle *b*, Figs. 1 and 2, and shown by dots in Fig. 3, and rests on a box, *c*, Figs. 3, 4, and 5, on the top of a sleeve, *c'*, through which the spindle *b* passes. This box *c* is surrounded by a spring-brake, *d*, which is formed of two parts hinged together by a pin, d^1, which attaches them to a flange or annular plate, *e'*, which is formed on the top of a sleeve, *c'*, which is fast to the spindle *b*. The top of this box is provided with three or more pins, which enter into corresponding holes in the bottom of the bobbin *a*, so that, as the box *c* rotates, it carries around the bobbin with it. As, however, the box is loose on the spindle it is only driven to wind on the spun yarn by the friction of the brake *d*, which is attached to the flange *e'* of the sleeve *c'*, and thereby to the spindle *b*. The spring-bolt d^2, Fig. 4, which draws the two halves of the brake *d* together, regulates the friction of the brake, so that it, by clasping the box *c*, will drag it around, but at the same time admit of the box slipping in the brake *d*, the amount of slip being regulated by the tension put on the yarn by the spring-bolt d^2.

It will be seen, on reference to Fig. 2, that the sliver from the can or basket A is conducted up a trough or guide to the spring-gage B, (the construction of which will be hereafter explained,) and from thence it passes down to a guide-pulley, 1, on the top of the flier, (seen best in the enlarged view, Fig. 3,) and over a second pulley, 2, at the top of one of the side arms of the flier *f*, and under a third pulley, 3, from which it passes around the sleeve *c'* of the box *c*, and over a pulley, 4, mounted on the top of a short standard fixed in the cross-frame *f* of the flier; again around the sleeve *c'* to a pulley, 5, on the vertical side arm of the flier; thence to a guide-pulley, 6, over which it passes to the lower compartment of the bobbin *a*. When this compartment of the bobbin is full, the yarn will be transferred by the attendant from the guide-pulley 6 to the pulley 7, and so on over 8, until all the compartments of the bobbin are full. When this is the case the bobbin may be removed from the machine by turning up the hinged cross-bar f^1 of the flier, and lifting the bobbin *a* off the spindle.

In order to draw the yarn with uniform regularity from the flier, the sleeve *c'* is grooved vertically at opposite sides to receive two sliding pieces, *g g*, which are each provided with two projecting fingers, g^1, and with studs g^2, which bear against the under side of a circular cam-plate, *h*. The sleeve *c'* is provided with two annular plates, *e e'*, against the under sides of which the projecting fingers g^1 g^1 of the vertical sliding pieces *g* are pressed by the coiled springs *i i*. A differential motion being given by the driving-gear to the spindle *b* and flier *f*, the former will cause the studs g^2 of the sliding pieces *g* to travel over the

face of the cam-plate h, and thereby raise and lower the fingers g^1, and thus cause the latter to alternately nip and release the yarn, and draw it from the flier in short lengths in a uniform and regular manner.

The parts above described, and operated in the manner just explained, will put a uniform twist in the yarn always in the same direction. In order, however, that either a right or left handed twist, as may be desired, may be given to the yarn, the flier is provided with a second set of guide-pulleys, corresponding to those just described, and marked 2, 3, 4, 5, 6, and 7, &c. The central pulley 1 is mounted in a slot in the hinged bar f^1 of the flier, and may be adjusted therein either to the right or left of the center, as may be required.

It will now be understood that, if the sliver be removed from the guide-pulleys on the right-hand arm of the flier, (where it is shown in the drawing at Fig. 3,) and be transferred to the corresponding pulleys on the left-hand side, and the motion of the machine be reversed, a twist in the opposite direction will be given to the yarn.

The mechanism whereby the differential motion in either direction is imparted to the spindle and flier will be best seen and understood by reference to Figs. 1 and 2, in which j is the main driving-shaft, on which are mounted a series of band-wheels, j', which communicate motion, by means of belts, to the fast and loose pulleys $k\ k$ on the counter-shafts k^1. On one end of each of these counter-shafts is a bevel-wheel, k^2, which gears into and drives one or other of the bevel-pinions $l\ l$ on the cross-shaft l^1. On one end of this shaft l^1 is mounted a large bevel-wheel, l^2, which gears into and drives a bevel-pinion, f^2, on the lower end of the sleeve f^4, and, consequently, communicates rotary motion to the flier and its accessories.

On the other end of the shaft l^1 is a toothed pinion, l^3, which gears into an intermediate wheel, m, and through it drives a pinion, m^1, on the second cross-shaft, m^2. At the opposite end of this shaft is another large bevel-wheel, m^3, which gears into and drives a pinion, b', on the spindle b. The pinion m^1 being of smaller size than the pinion l^3, it follows that the shaft m^2 will be driven at greater speed, and consequently the differential motion necessary to draw and wind the yarn onto the bobbin will be obtained.

It will be obvious that the direction of rotation of the parts of the spinning mechanism will depend upon which of the two bevel-pinions $l\ l$ is in gear with the bevel-wheel k^2 on the counter-shaft k^1, and, therefore, a right or left handed twist may be given to the yarn, as may be desired, by merely shifting the position of the bevel-pinions $l\ l$.

In order to produce a perfectly round and homogeneous yarn with a uniform twist, it is necessary to pass the sliver through a gage or clip, which will hold it and allow the drag on the yarn to draw out the fibers longitudinally, and thereby straighten them, and supply them in a regular manner to the spinning or twisting mechanism just described. This object is effected by means of the spring gage or clip B, which is shown detached, and drawn upon an enlarged scale at Figs. 7, 8, 9, and 10, Sheet IV.

Fig. 7 is a side view, and Fig. 8 a plan view, of the gage and holder complete. Fig. 9 is a side, and Fig. 10 a plan, view of the two jaws of the gage taken out of the holder and separated.

It will be seen that the gage consists of two parts, one of which is stationary in the holder, while the other is kept up to its work by the pressure of a spring at the back, but is capable of yielding, so as to allow a lumpy part of the sliver to enter the holder, and be held there while the fibers of such lumpy part are being drawn out and straightened. The sliver will, as it becomes reduced in bulk, gradually pass out of the holder, and the thickness of the yarn will thus be gaged and made uniform.

The two jaws of the spring gage or holder are formed of a series of interlocking plates, each pair of which will form a holder, and will hold or retain the sliver in the conical or trumpet shaped opening formed by the interlocking of the two jaws until the sliver is drawn down to the proper gage. The sliver or yarn o, before reaching the spinning mechanism, bears against a pulley, p, at the end of the lever q, which turns on a pivot at q', fixed to the frame of the machine, and is connected by a cord, r, which passes over a guide-pulley, r', to a rod or long weight, s', contained in the tube s, as indicated by dots in Figs. 11 and 12. So long as the yarn or sliver is unbroken the pulley p will be held back thereby, and the rod or long weight s' in the tube s will be drawn up and retained within the tube; but, should the yarn break, and fail to support the pulley p, (in the position shown in Figs. 1 and 2,) the latter will fall back and allow the rod or long weight s' in the tube s to descend therein and project beyond the lower end, as shown in Figs. 11 and 12, Sheet IV. This rod will thus come into the path of a bar or flier, t, which is keyed onto the shaft k^1, and consequently rotates therewith. When the bar t strikes the end of the long weight s' in the tube s, the latter will be rocked on its center of motion, which is a rocking shaft, u. Keyed onto this shaft is the belt-shifter v and hand-lever v' for working the same; and when it is required to keep the spinning mechanism in action, the belt-shifter v is held in position by means of a notch, w^1, on the bar w. (Shown detached in plan at Fig. 13.) It will, therefore, be seen that when the bar t strikes the projecting end of the weight s', and causes the tube s and shaft u to rock, the belt-shifter will be lifted out of the notch w^1, and the shaft w will be shogged laterally in the direction of the arrow by means of the spring w^2, and will thereby shift the driving-band from the fast to the loose pulley and stop the spinning mechanism.

When the broken yarn has been repaired, and it becomes necessary to set the mechanism in motion again, this is effected by means of the hand-lever *x*, which turns on the stud 10, fixed on the frame-work of the machine.

Whenever it be required to stop any particular spindle or section of the spinning mechanism otherwise than automatically, this may be done by raising the hand-lever *v'*, which will lift the belt-shifter out of the notch w^1 of the fixed bar *w*.

Having now described my invention, and having explained the manner of carrying the same into effect, I claim—

1. The combination, with the bobbin *a*, of the box *c*, the sleeve *c'*, and the spring-brake *d*, for the purpose set forth.

2. The combination and arrangement of the differential driving-gear, consisting of the counter-shafts k^1, bevel-wheel k^2, pinions *l l*, cross-shaft l^1, bevel-wheel l^2, pinions f^2 and l^3, intermediate wheel *m*, pinion m^1, cross-shaft m^2, bevel-wheel m^3, and pinion *b'*, by which the direction of rotation of the parts of the spinning mechanism may be reversed, and a right or left handed twist may be put into the yarn, as may be desired.

3. The combination of parts consisting of the horizontal rock-lever *q*, the guide-pulley *r'*, the tube *s*, carried by the sliding rock-shaft *u*, the weight *s'*, the belt-shifter *v*, the catch-bar *w*, and the operating-spring w^2, for automatically stopping any section of the spinning mechanism on the breakage of the yarn or sliver belonging to such section.

P. MOTIRON.

Witnesses:
H. K. WHITE,
66 *Chancery Lane.*
THOMAS GODFREY,
66 *Chancery Lane.*