Sheet 1. 2 Sheets.

H. A. Chapin.

Spinning Flax, etc.

No. 106,466. Patented Aug 16. 1870.

Fig. 5.

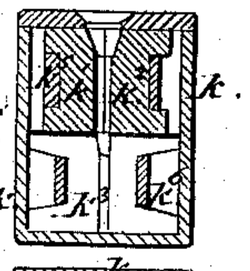

Fig. 4.

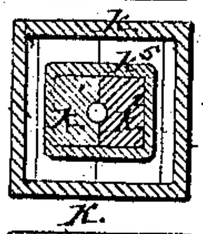

Fig. 6.

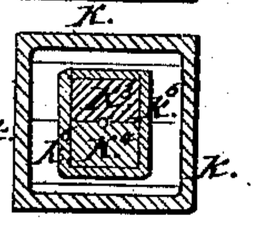

Fig. 1.

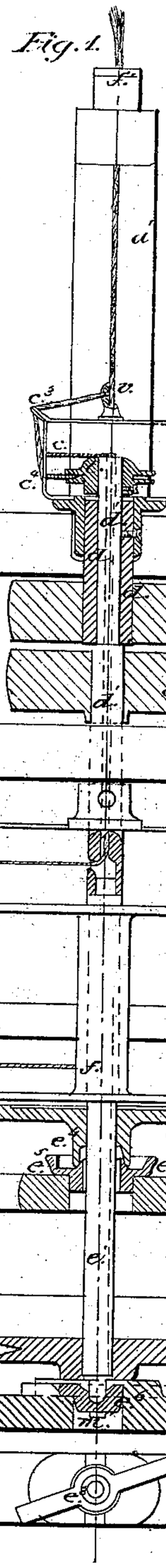

Fig. 6.

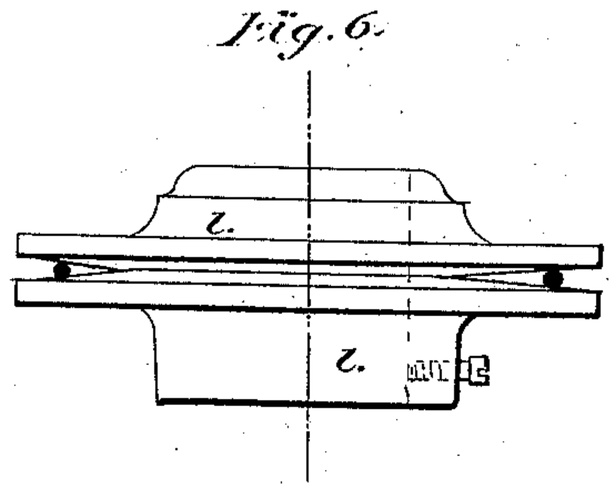

Fig. 7.

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Sheet 2, 2 Sheets.

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Spinning Flax, etc.

No. 106,466. Patented Aug 16. 1870.

Fig. 2.

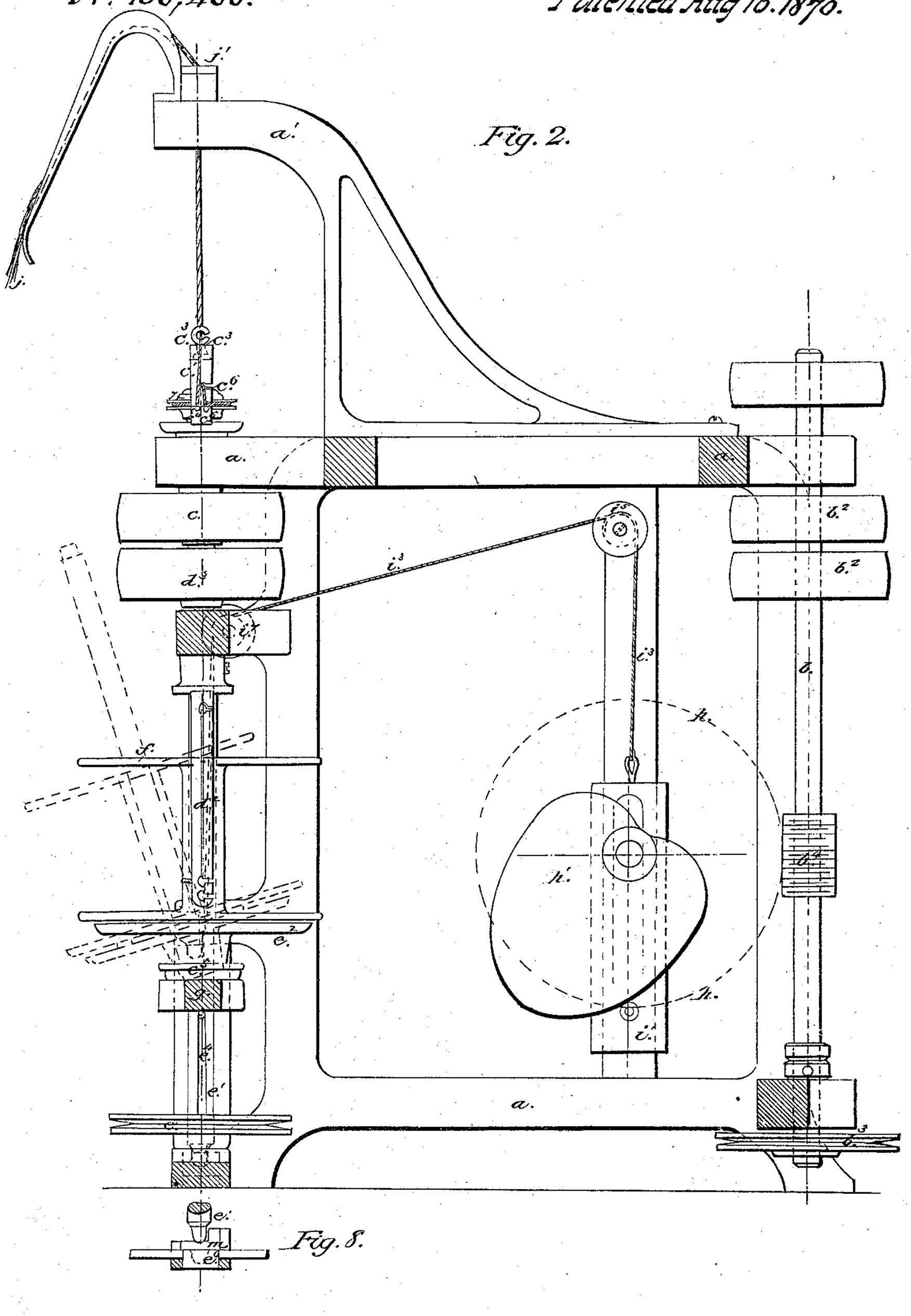

Fig. 8.

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UNITED STATES PATENT OFFICE.

HENRY A. CHAPIN, OF BRIDGEPORT, CONNECTICUT, ASSIGNOR TO WILLIAM SPARKS THOMSON, OF NEW YORK.

IMPROVEMENT IN MACHINE FOR SPINNING FLAX, HEMP, &c.

Specification forming part of Letters Patent No. **106,466,** dated August 16, 1870.

To all to whom it may concern:

Be it known that I, HENRY A. CHAPIN, of Bridgeport, in the State of Connecticut, have invented a new and Improved Method of Spinning Hemp, Flax, or other Similar Fibers; and I do hereby declare that the following is a full and exact description thereof, reference being had to the accompanying drawing, and to the letters of reference marked thereon.

The nature of my improvements consists in compressing devices, hereinafter described, arranged in advance of the flier, and operating on the sliver to prevent any twist therein, except between it and the twisting devices; and they also consist in a pulley provided with a V-shaved groove, around which the yarn, after it has been twisted, is passed, and which, in passing, is compressed between the upper and lower surface of the groove, but does not touch the bottom thereof, and it thus receives as fast as it is produced, and as will be more fully described hereafter, an even tension and compression throughout its whole length.

Figure 1 is a front elevation of the spinning-machine containing my improvements; Fig. 2, a sectional elevation; Figs. 3, 4, and 5, details of the organ comprising the first improvement; Fig. 6, enlarged section of the grooved pulley, with section of a yarn shown therein; Figs. 7 and 8, detailed plan and elevation of the step of the bobbin-spindle.

The like letters of reference correspond throughout all the figures.

a is the framing of the machine; *b*, the shaft, the source of motion to the machine. The shaft *b* carries three pulleys, b^1 b^2 b^3, and the screw b^4. The pulley b^1, by a cord or band, gives motion to the pulley *c*, attached, by a sleeve, *d*, to the yarn-carrier c^1, both turning upon the hollow spindle d^1.

The pulley b^2 imparts an independent motion to the hollow spindle d^1 by cords or bands acting upon the pulley d^3, to which the spindle d^1 is attached. To the spindle d^1 are fixed the flier d^2 and the V-shaped pulley *l*.

The pulley b^3, by a cord or band, gives the motion to the pulley *e*, which, by a fixed key, acting in a slot in the axle or shaft e^1, carries the bobbin friction-plate e^2.

The shaft e^1 turns in the step e^3, and is held during its rotation, at its reduced upper extremity, by the hollow spindle d^1; but the shaft e^1 has a quicker motion than the spindle d^1, in order to give the necessary draft to the bobbin friction-plate on which the bobbin rests, thus, by its draft upon the bobbin, taking up the yarn as it is spun.

The bobbin *f* turns freely upon the spindle d^1 and shaft e^1, and rests upon the bobbin-plate e^2. The bobbin-plate e^2 is bored out to allow it to pass freely up and down the shaft e^1, but is rotated with it by means of a fixed key, acted on by the slot e^3 in the shaft e^1.

The bobbin-plate, at its lower part, is formed into the cylindrical bearing e^4, turning in the annular step e^5. The annular step e^5 rests upon or may be formed in the cross-bearer *g*, which is made to rise and fall, lifting and lowering the bobbin with it by means of a screw, b^4, acting on the spur-wheel *h*, driving the two cams h^1 h^2, which depress the vertical sliding pieces i i^1, connected, by the cords i^2 i^3 and pulleys i^4 i^5 i^6 i^7, with the cross-bearer *g*.

When the cams have depressed the pieces i i^1 to their lowest point the bobbin is lifted to its highest point, and the further revolution of the cams releasing the vertical pieces i i^1 of the pressure, the bobbin *f* and cross-bar *g* overbalance the weight of the vertical sliding pieces i i^1, and descend by the force of gravity, again to be raised by the action of the cams, and in like manner allowed to descend.

In this manner, or by the use of any mechanism usually employed for this purpose, I am able to distribute the yarn evenly and regularly over the bobbins.

j is the yarn coming from the sliver-can, and at *j'* it enters the organ set forth as my first improvement. This apparatus is supported by the framing *a*. It is composed of four pieces of metal, arranged in two pairs, one pair above the other, each pair pierced vertically with a cylindrical hole for the passage of the yarn, each pair acted upon by an annular ring of caoutchouc or other elastic compressor, so that the yarn may always meet with a certain amount of resistance in its passage through and prevent the ribbon from receiving any twist before passing this organ. Fig. 3 is an elevation of this part in section; Fig. 4, a plan in section, and Fig. 5 a plan in cross-section.

It will be seen that the horizontal dividing-

line of the two pairs is at right angles with each other. The employment of two pairs so placed insures, by compression on all sides, a perfectly cylindrical yarn.

k is the metal frame supporting the upper pair of metal blocks, k^1 k^2, and the lower pair, k^3 k^4, each pair compressed by its caoutchouc rings k^5 k^6.

When the yarn passes from this organ it begins to receive its twist. Passing through the eye c^2 of the yarn-carrier c^1, the yarn passes through the outer notch, c^3, of the yarn-carrier, enters by the notch c^4, and round the grooved pulley *l*. This pulley is made with a deep, sharp groove or cut, the groove so made that the yarn in passing half around it, and being therein tightly pinched, so that it cannot slip, is thus drawn with a regular unvarying speed through the tube above in the yarn-carrier, and thence down the sides of the yarn-carrier.

The grooved pulley, by means of the groove formed by the two surfaces, fulfills the part of a perfectly self-acting regulator of the twist, as will be seen by reference to the drawing, Fig. 6; for if, as it often occurs, the sliver or ribbon of the material being spun is not regular in size, upon reaching the pulley it will of necessity be drawn nearer to or farther from the bottom of the groove.

As a large yarn requires less number of twists in a given length than a small one, it will be seen that the large yarn, being nearer the outer edge of the pulley, is drawn faster, and consequently receives less twist, than the small yarn, which would be nearer to the bottom of the groove. Thus the pulley works automatically in giving the necessary degree of twist to the yarn without any change in the relative speeds of the flier, the thread-carrier, and bobbin-spindle, upon the latter of which this pulley is carried. From this pulley the yarn comes out through the notch c^5, thence through the notch c^6, and down through the center of the grooved pulley *l*, down the hollow spindle d^1, and, coming out, passes along the flier d^2, and thence to the bobbin *f*.

The bobbin, when full of yarn, is removed by partial rotation of the lower step, e^6, which then drops into the cavity *m*. The shaft e^1 falls away from the spindle d^1, and, being inclined forward, the shaft can be drawn out of the bobbin, bobbin-plate, and pulley *e*. The full bobbin can then be taken away and replaced by an empty one.

Having now described my invention, I claim—

1. The combination, with, and arranged in advance of, the flier, of the stationary frame *k* and its compressing-blocks, as and for the purpose described.

2. The grooved pulley for griping and drawing the yarn at a variable rate of action, substantially as described.

2. The combination of the yarn-carrier with the grooved pulley, constructed as described, and for the purpose set forth.

HENRY A. CHAPIN.

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