3 Sheets--Sheet 1.

G. CROMPTON & H. WYMAN.

Looms for Weaving Pile-Fabrics.

No. 147,105. Patented Feb. 3, 1874.

Fig. 3.

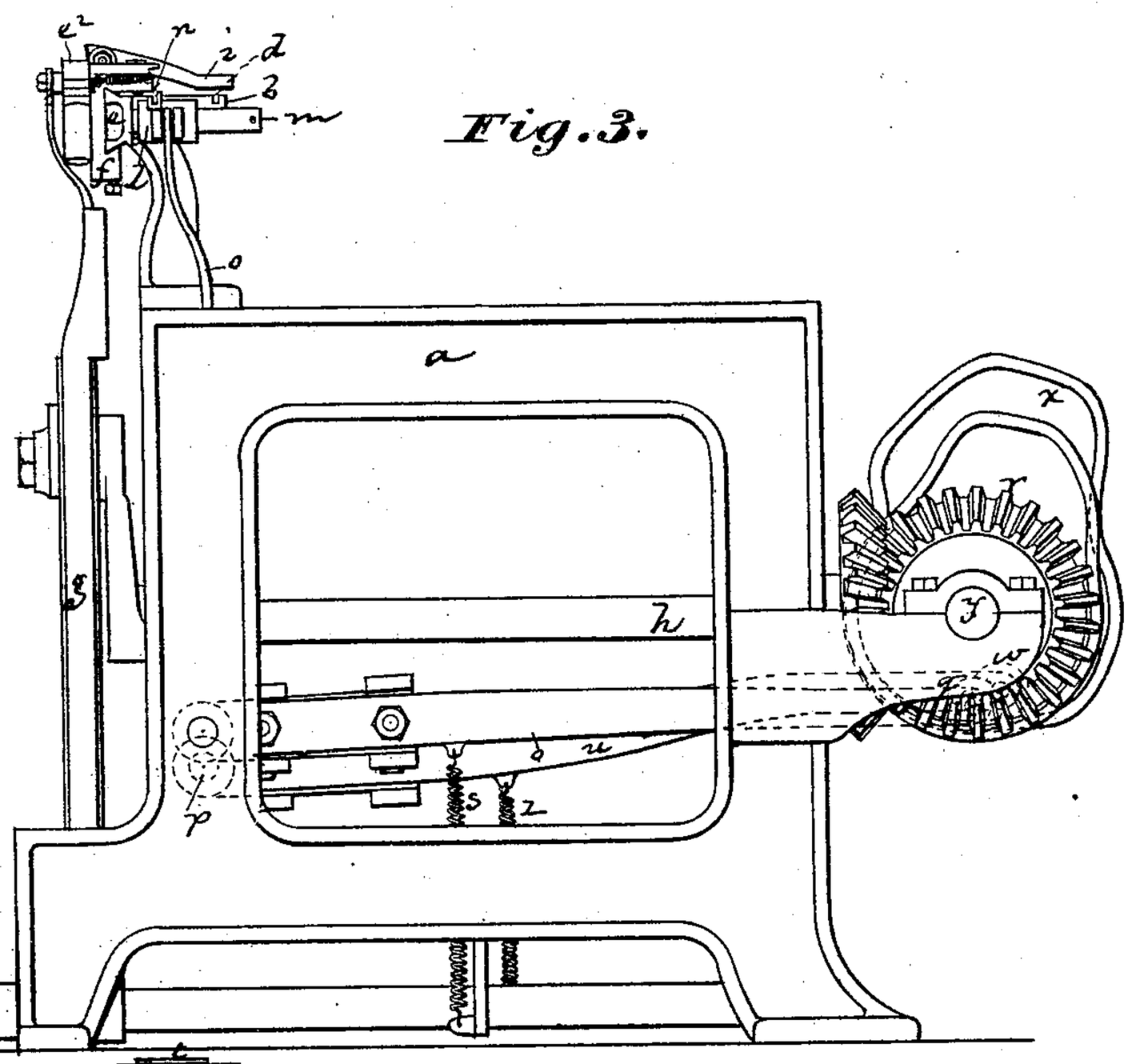
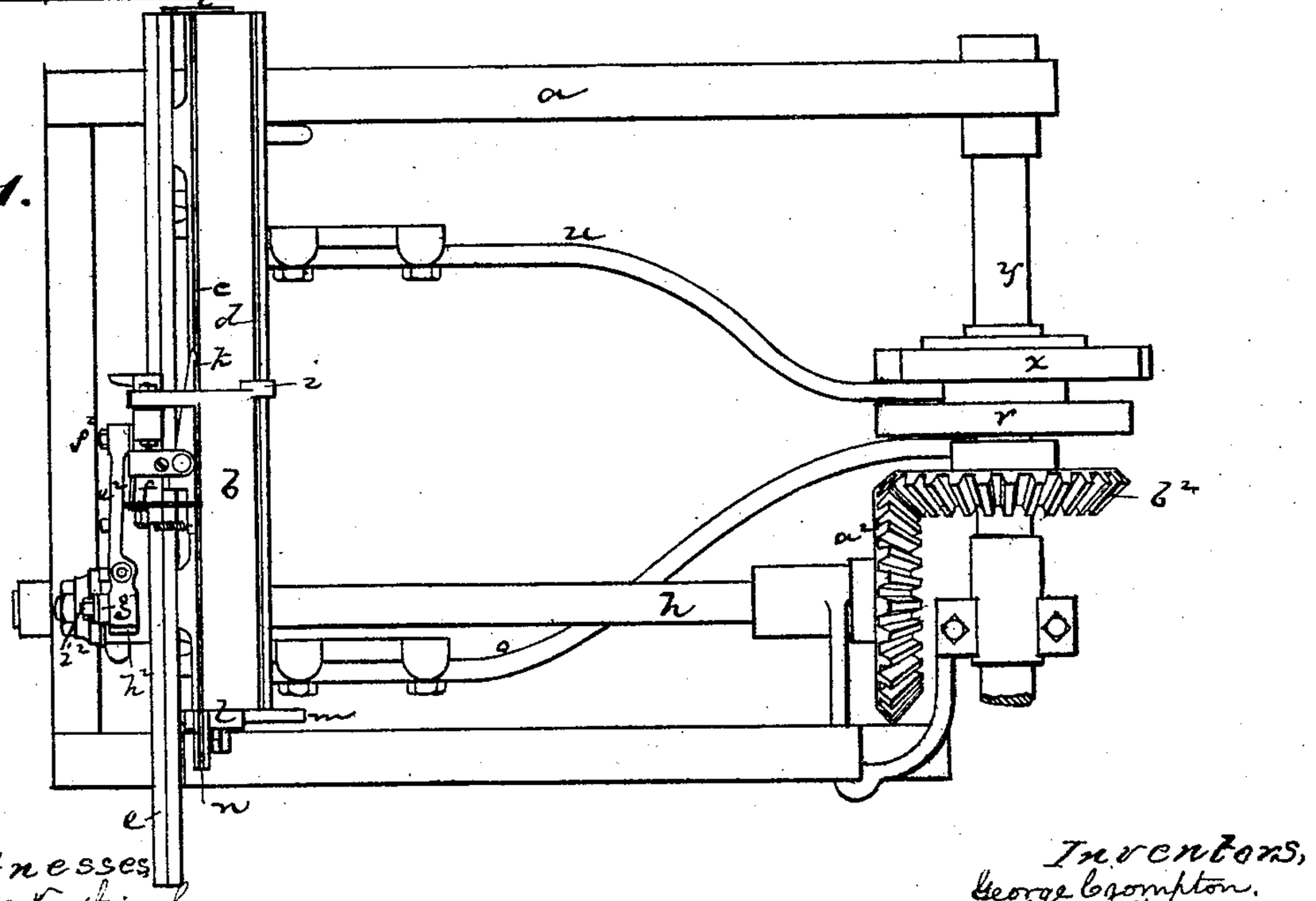


Fig. 1.



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3 Sheets--Sheet 2.

G. CROMPTON & H. WYMAN.

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Fig. 2.

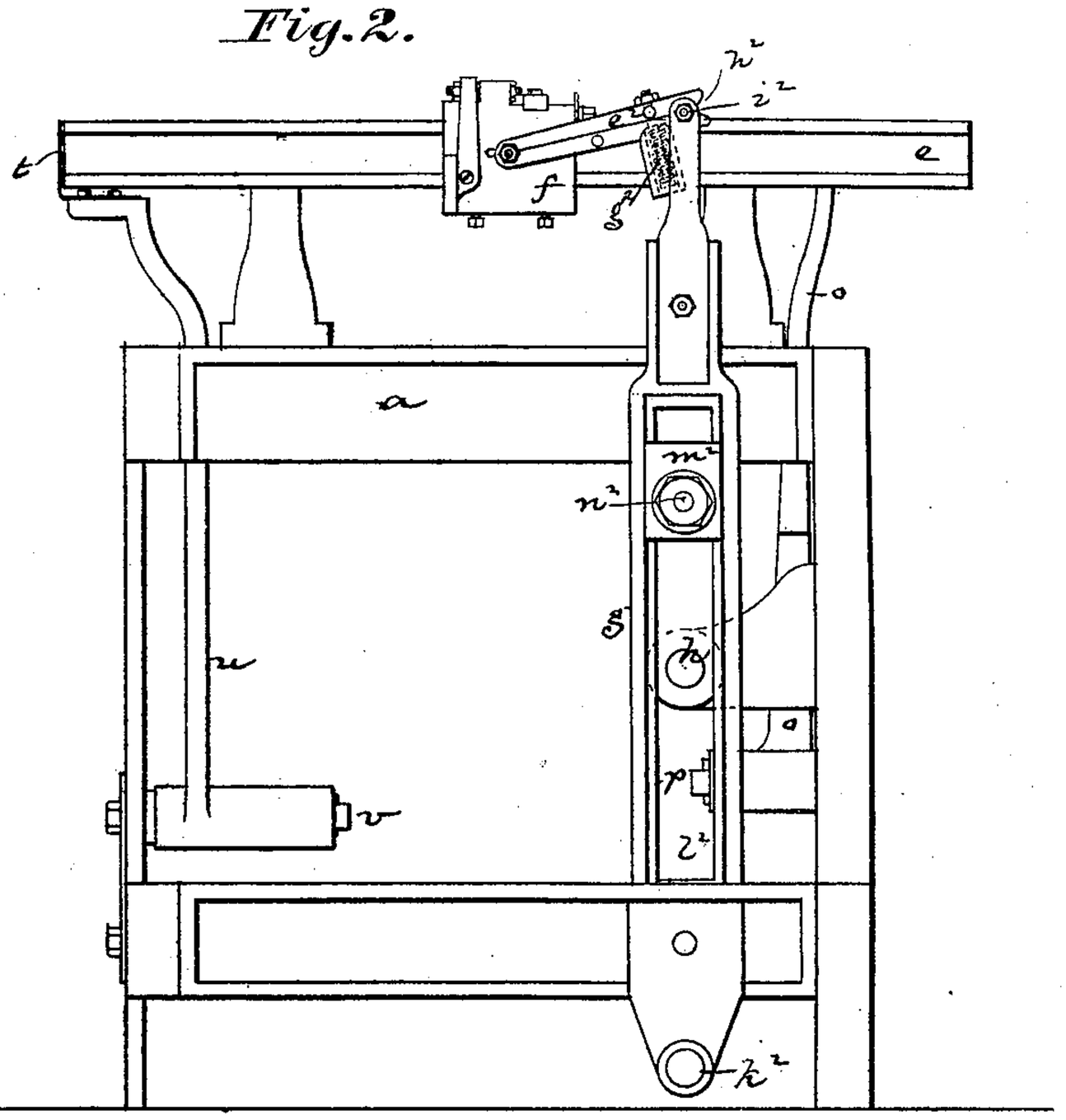
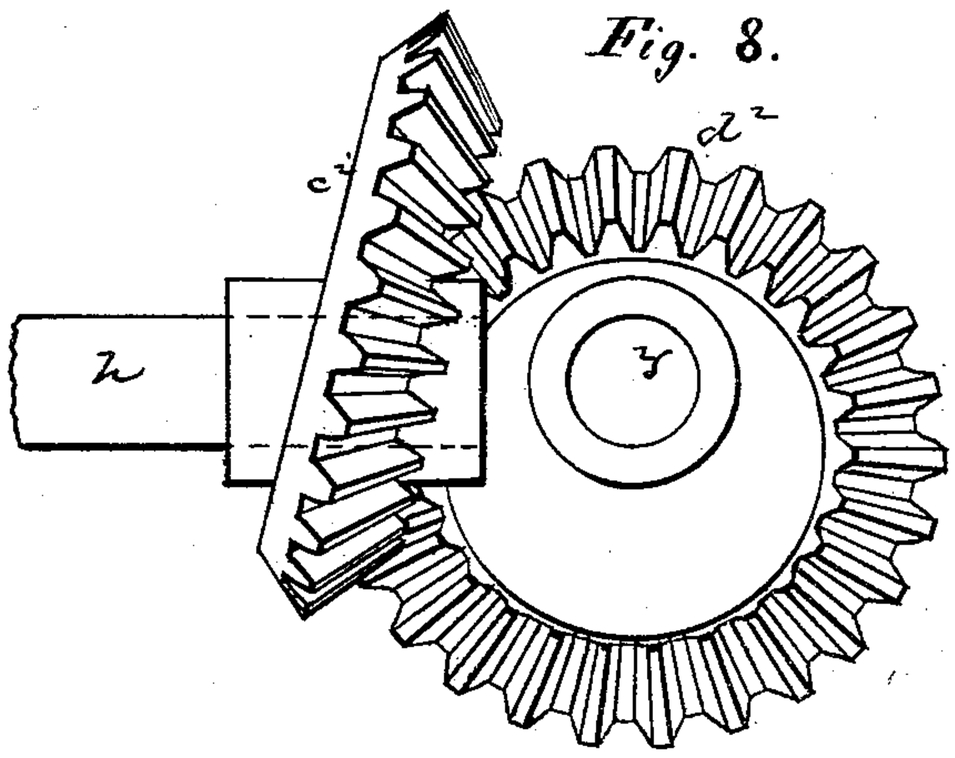


Fig. 8.



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3 Sheets--Sheet 3.

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Looms for Weaving Pile-Fabrics.

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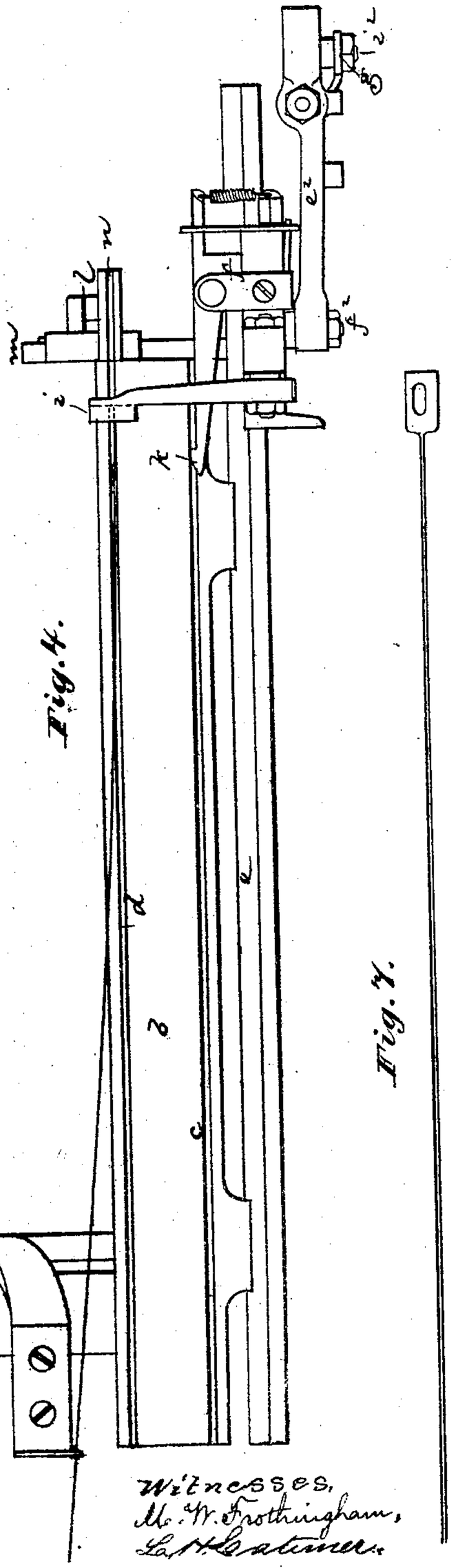

Fig. 4.

Fig. 7.

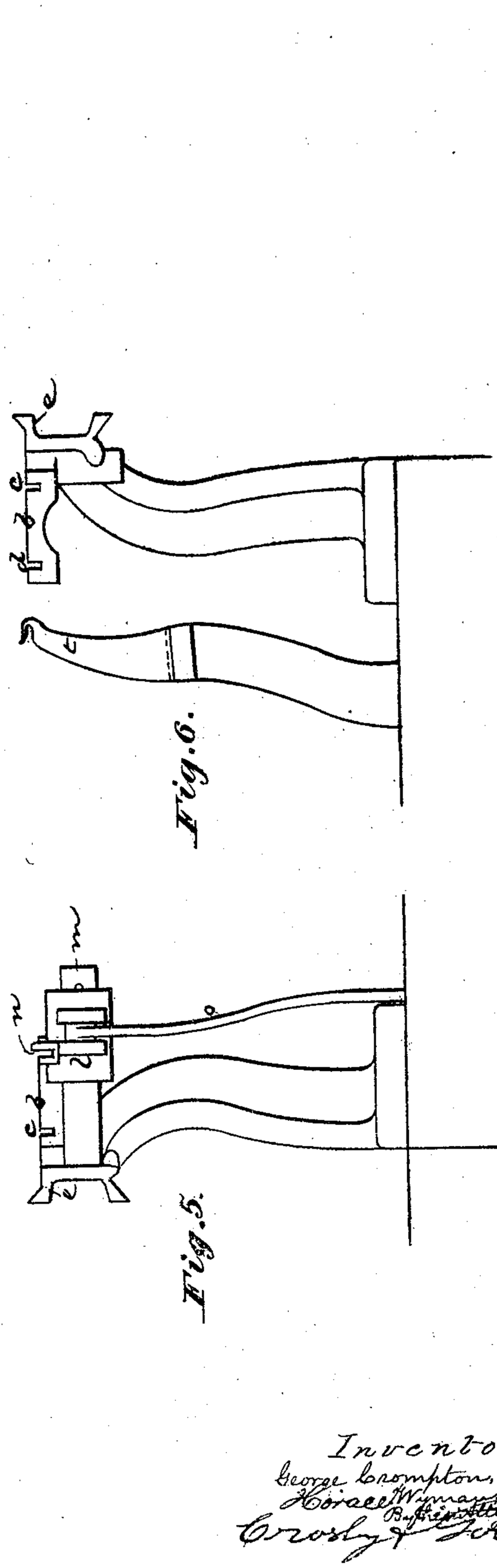

Fig. 6.

Fig. 5.

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UNITED STATES PATENT OFFICE.

GEORGE CROMPTON AND HORACE WYMAN, OF WORCESTER, MASS.

IMPROVEMENT IN LOOMS FOR WEAVING PILE FABRICS.

Specification forming part of Letters Patent No. **147,105**, dated February 3, 1874; application filed February 21, 1873.

To all whom it may concern:

Be it known that we, GEORGE CROMPTON and HORACE WYMAN, both of Worcester, in the county of Worcester and State of Massachusetts, have invented an Improvement in Looms for Weaving Pile Fabrics; and we do hereby declare that the following, taken in connection with the drawings which accompany and form part of this specification, is a description of our invention, sufficient to enable those skilled in the art to practice it.

In the drawing we show a horizontal and stationary support-bar having two guide-grooves, and a reciprocating block having a short groove, which is intermittently brought into connection first with one groove, and then with the other groove, of the support-bar, the head of a wire drawn from the cloth through one wire-groove entering the short groove, and the block then moving to bring its groove (and the wire-head) into line with the other or inserting-groove, a mechanism at the opposite end of the grooved bar, in connection with the block, lifting the whole wire and transferring it from the withdrawing-groove, so that the point is brought into position to enter the shed, while its head is brought opposite to the inserting-groove, through which groove the head is pushed to insert the wire.

Figure 1 shows the machine in plan. Fig. 2 is a front elevation of it. Fig. 3 is a side elevation of it. Figs. 4, 5, and 6 show, respectively, a plan and opposite-end views of the grooved wire-support and the inserting, withdrawing, and transferring mechanism. Fig. 7 shows the wire.

a denotes the loom-frame; *b*, the stationary support-bar, having the two guide-grooves *c d* opening from its upper surface. At the front of the bar is the guide-rail *e*, upon which slides the carriage *f*, that drives the wires into the shed and draws them from the cloth in the ordinary manner, the carriage being actuated by a lever, *g*, which receives its motion from a crank-shaft, *h*, this carriage having a pusher, *i*, that drives the pile-wire into the shed, and a hook, *k*, for withdrawing the wire, said hook hooking into an eye in the wire-head. At the outer end of the bar *b* is the slide or transferrer block *l*. This block slides on a short guide-rail, *m*, and has a short groove, *n*, to receive the wire-head, the block having intermittent slide movements, its extreme motion in one direction bringing its groove into connection with the withdrawing-groove *c* of the bar, and its extreme of movement in the opposite direction connecting its groove with the inserting-groove *d*. The block is actuated by a lever, *o*, pivoted at *p*, the end of one arm of which lever connects with the block, while the end of the other arm carries a roll, *q*, operated by the flange of a cam-wheel, *r*, the roll being held to the flange by a spring, *s*.

When the wire is withdrawing from the cloth, the groove *n* of the transferrer-block is in line, or is brought into line, with the groove *c*, and, as the wire-head reaches the end of the groove *c*, it passes into the block-groove *n*. In this movement the pusher slides beyond the wire-head, and as soon as the head is within the block-groove the cam turns the lever *o*, and the block is slid toward the groove *d*, bringing the two grooves *d n* into connection, or the wire-head into line with the inserting-groove *d*. The carriage *f* then starts forward, and the pusher slides the wire-head through the groove *d*, and thereby inserts the wire into the open shed.

To transfer the point of the wire to position to enter the shed, a hook, *t*, moves up against the wire as the wire withdraws, or before it starts forward, this hook lifting the wire out of or over both grooves, and carrying the point into angling position to pass into the shed, the hook holding and guiding the wire until its point is well inserted, and then falling back into position to permit the head of the next wire to be withdrawn, to pass by it and into the groove *c*. The hook *t* is actuated by a lever, *u*, fulcrumed at *v*, the hook being attached to the top of the vertical arm of the lever, and the end of the other arm carrying a roll, *w*, held to the flange of a cam-wheel, *x*, on the cam-shaft *y*, by a spring, *z*. After the wire-head has been pushed from the groove *n* of the transferrer-block, the lever *o* is actuated by the cam to carry the groove into position to receive the head of the wire next to be withdrawn. The shafts *h y* are geared together by twin gears a^2 b^2, each reciprocation of the carriage being accompanied by a rotation of the cams, and consequent for-

ward and back movement of the block *l* and hook *t*, and the cams are so formed as to always bring the block into position with reference to the movements of the carriage and of the wire-head and wire. The timing of the respective movements of the carriage, relatively to those of the block *l* and hook *k*, is on the supposition that a wire is to be inserted at every other pick. But to insert a wire only at every third pick, the wire must be driven forward substantially as described; but the withdrawal of a wire must occupy twice the length of time, or must permit two picks to be inserted before the wire-head reaches the outer end of the groove. For this purpose we use two eccentric bevel-gears, c^2 d^2, Fig. 8, instead of the bevel-gears a^2 b^2, they being so arranged upon the respective shafts *h y*, that when the wire is being driven in the part of the gear d^2 of greatest diameter is operating upon the part of the gear c^2 of least diameter, thereby driving the wire rapidly forward, while as the lesser diameter of the driving-gear intermeshes with the greater diameter of the other gear, the motion of the carriage *f* is "slowed," the carriage occupying the usual time in inserting the wire; but withdrawing a wire with sufficient slowness to enable a new pick to be inserted while the carriage is moving back. The lever *g*, that drives the carriage, is connected to the carriage by a link, e^2. This link is composed of two arms hinged together at one end by the pin f^2, and held together at their opposite ends by a spring, g^2. The extreme ends of the arms are inclined so as to form jaws with an open mouth, h^2. If, when the carriage is being drawn back, it is arrested by any obstruction, the pressure of the joint-pin i^2 will open the jaws and let the lever free itself from the link and carriage, the jaws opening against the stress of the spring, thereby preventing breakage. To reconnect the link and lever, the pin i^2 is pressed into the mouth h^2, opening the jaws against the stress of the spring until the pin reaches the bearing, when the jaws close over it. The vertical lever *g*, that actuates the carriage *f*, is pivoted at k^2, and for its connection with the crank-shaft, the lever is formed with a long slot, l^2, in which reciprocates a slide, m^2, the crank-pin n^2 extending through the slide which forms the connector and a bearing for the crank-pin. The differential speed for the forward and back movements of the carriage *f* may be produced by using the twin gears a^2 b^2, placing one of these gears, to be operated by the other or driving-gears, on a stud-pin, said driven gear having fixed to it, or forming part of it, an eccentric spur-gear that meshes into and drives an eccentric spur-gear on the crank-shaft *h*, that drives the arm *g*, movements of said arm produced by this connection, being the same as with the eccentric bevel-gears, the only difference being that eccentric spur-gears intervene to produce the respective movements, instead of eccentric bevel-gears.

We claim—

1. The combination of the cams *r x*, levers *g o u*, and shafts *h y*, operating to produce the respective movements of the carriage *f*, block *l*, and guide or hook *t*, substantially as described.

2. The eccentric spur or bevel gears, substantially as described, in combination with the cam-shaft *y*, shaft *h*, lever *g*, and carriage *f*.

3. The disconnecting-link e^2, in combination with the carriage *f* and lever *g*, substantially as described.

4. The vertical slotted lever *g*, substantially as shown and described, in combination with the crank-shaft and the carriage connected with the lever, and carrying the pusher *i*, and withdrawing-hook *k*, substantially as described.

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