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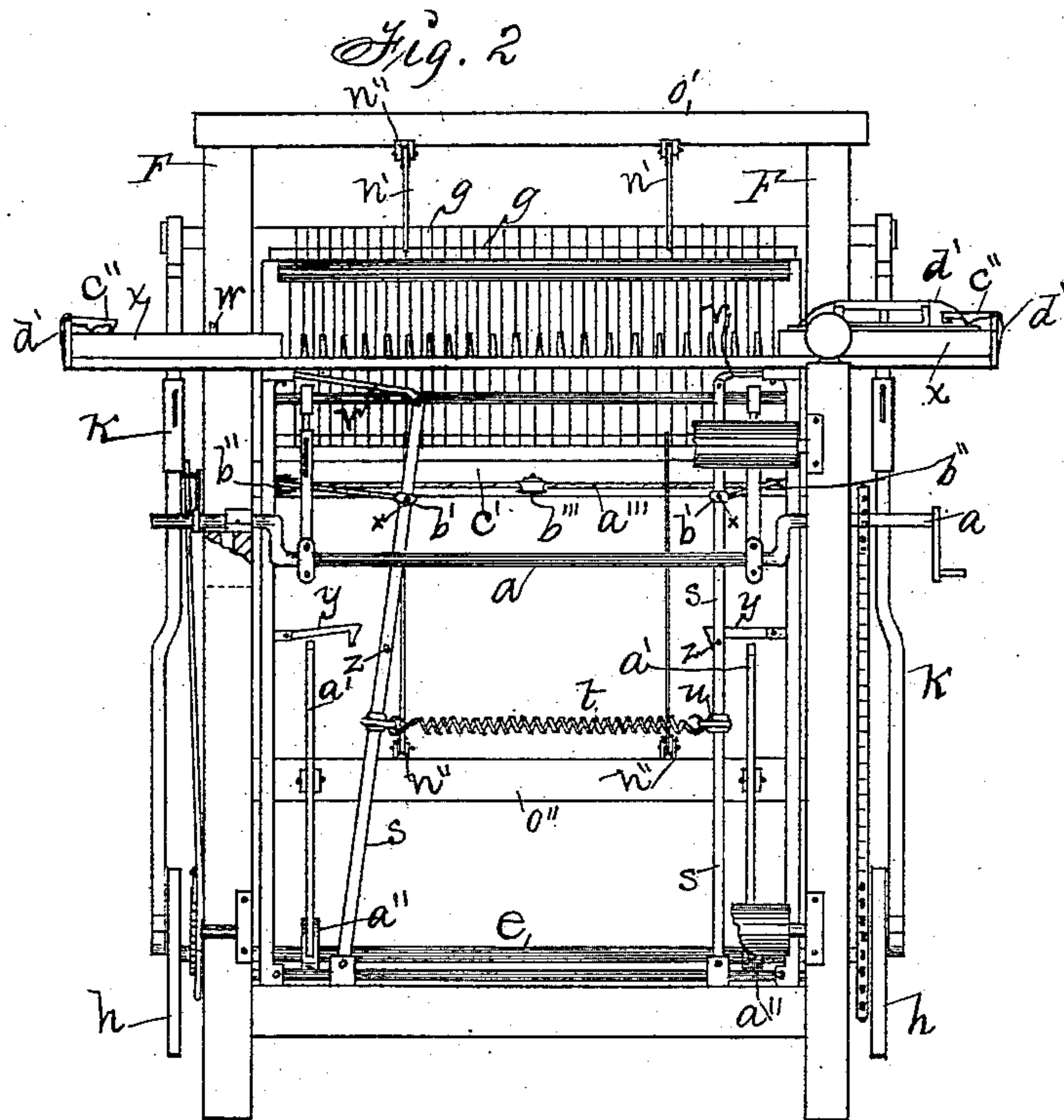
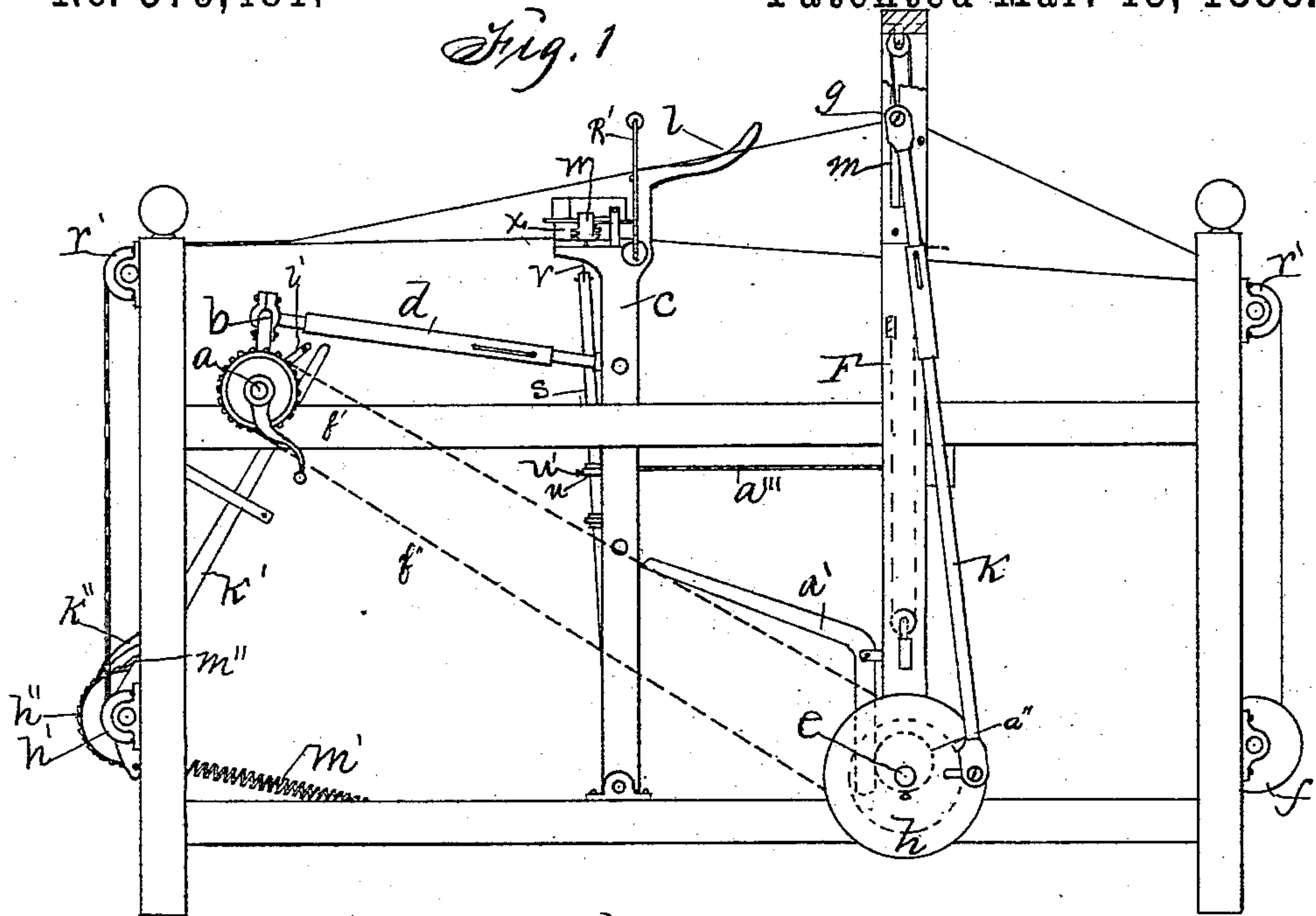
3 Sheets—Sheet 1.

J. A. MATTERN.

LOOM.

No. 379,481.

Patented Mar. 13, 1888.



Witnesses:

E. D. Hudgens
A. R. Stiles

Inventor:

Jacob A. Mattern
By Thomas G. Orwig, Attorney

(No Model.)

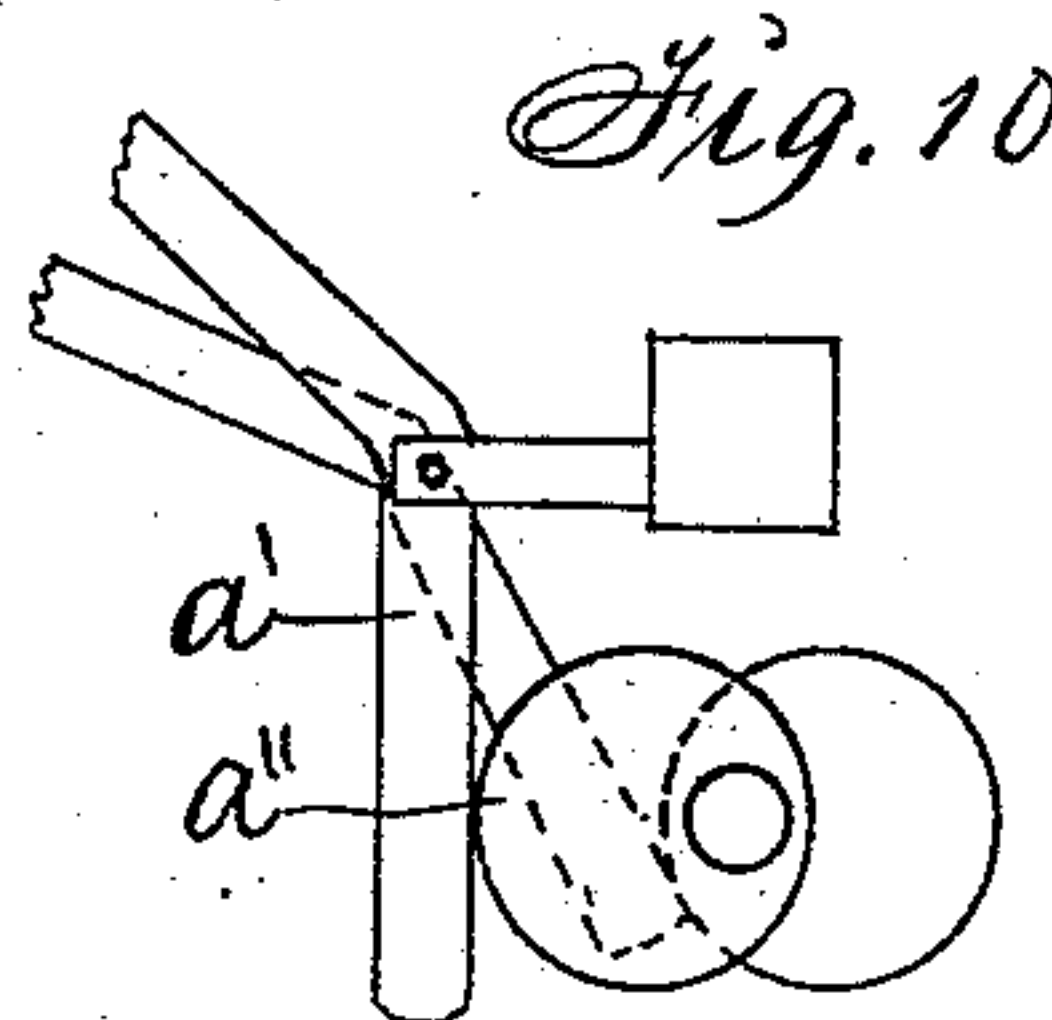
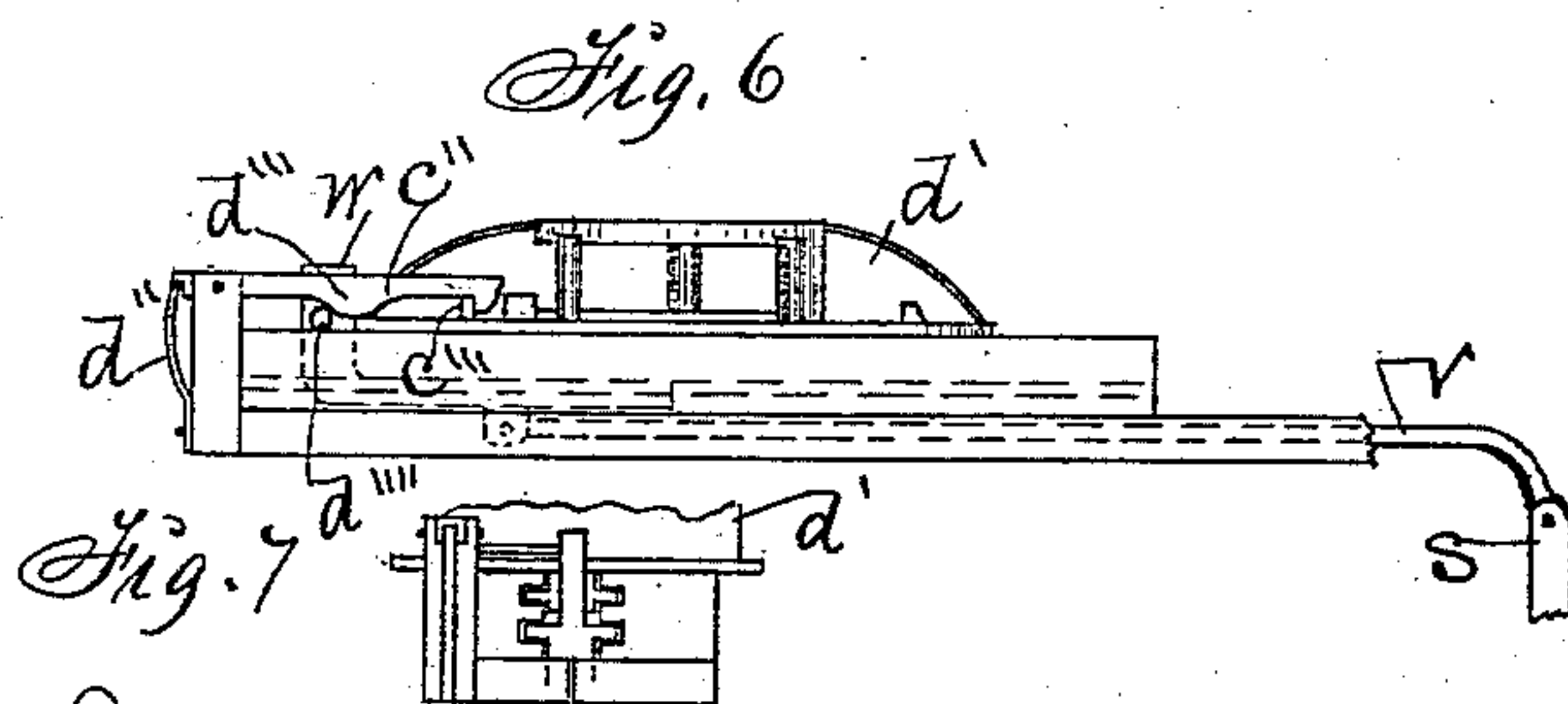
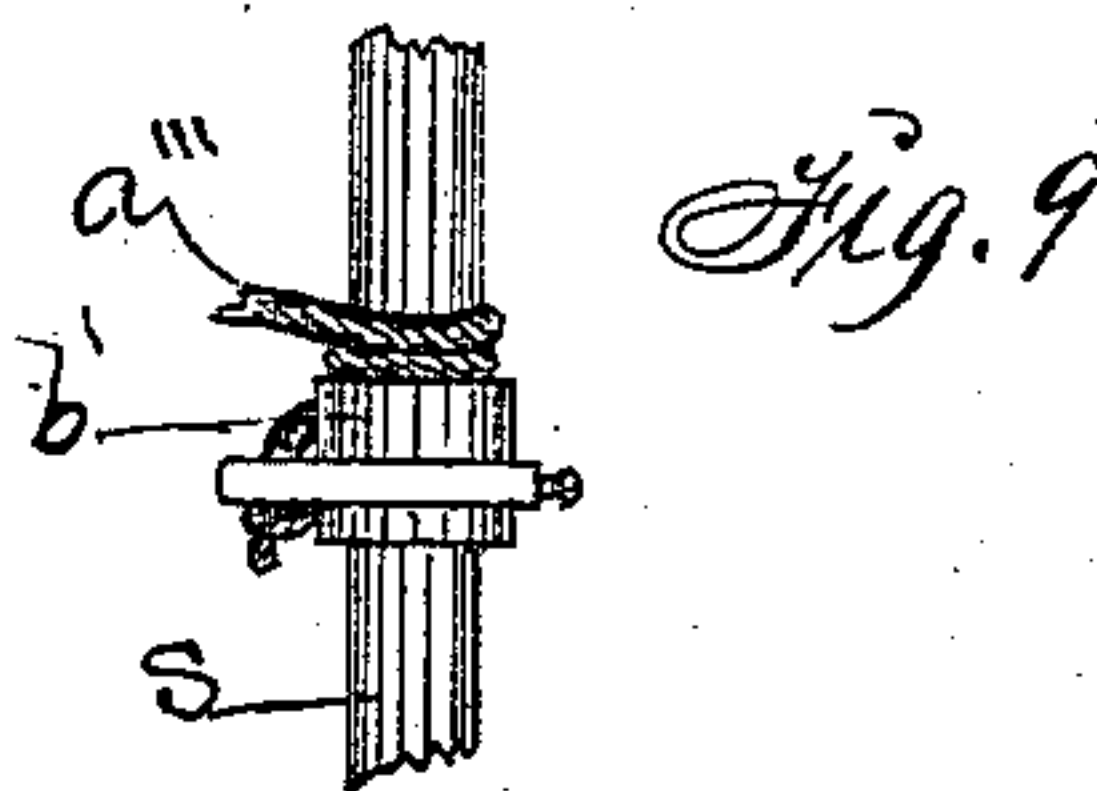
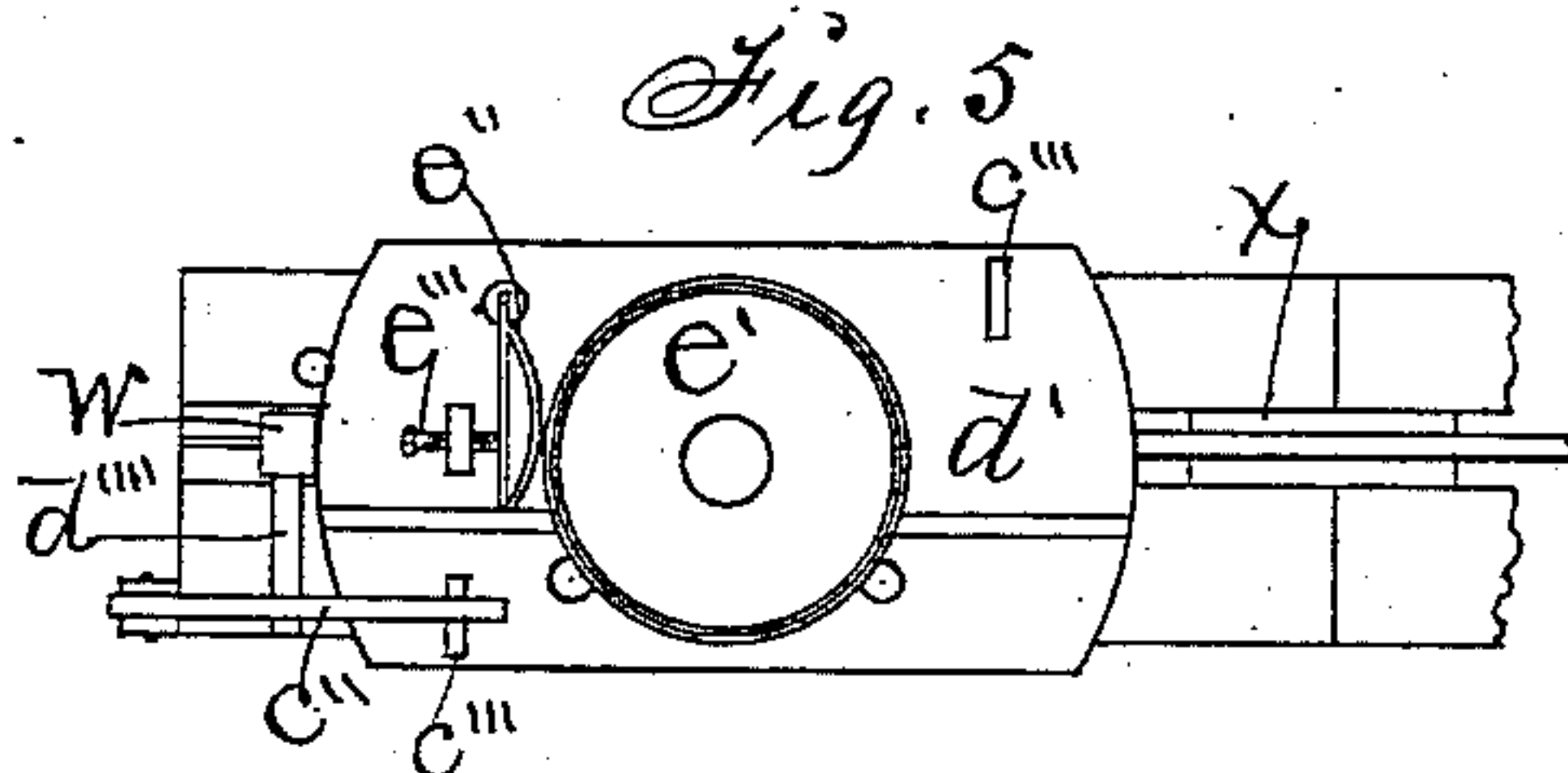
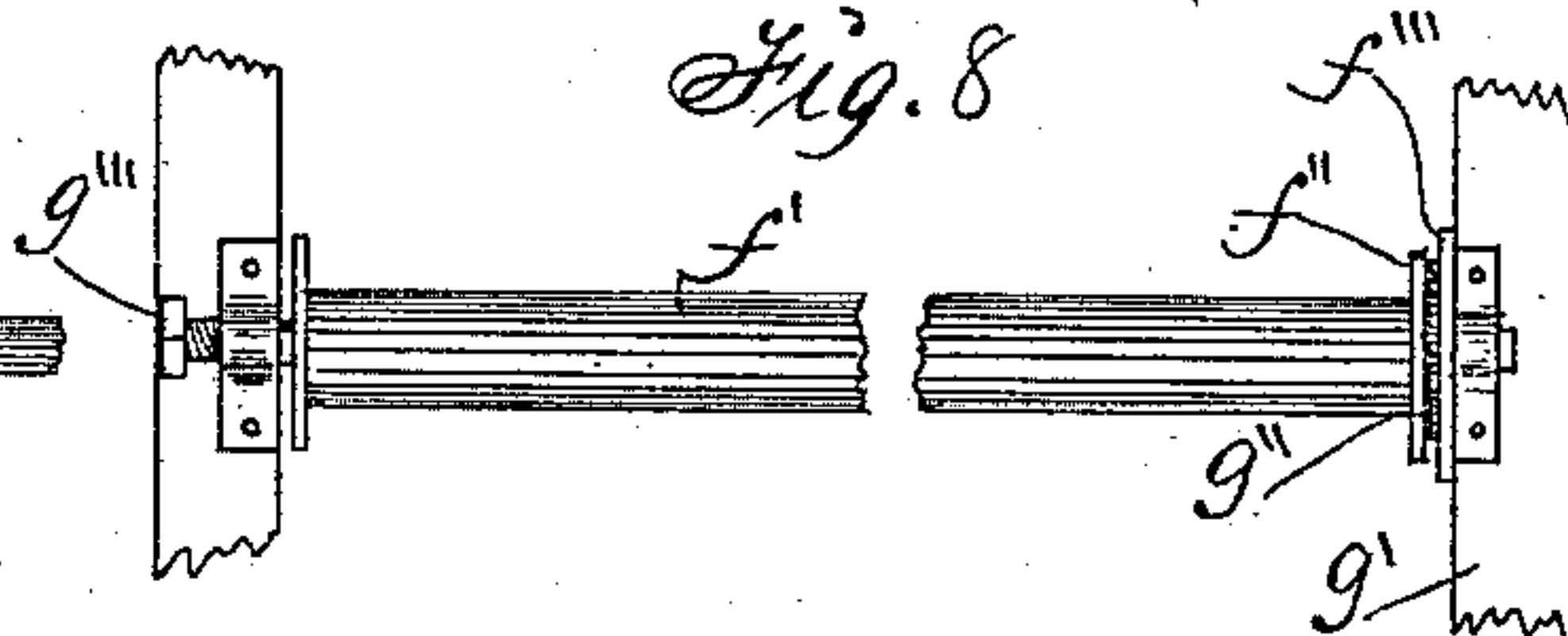
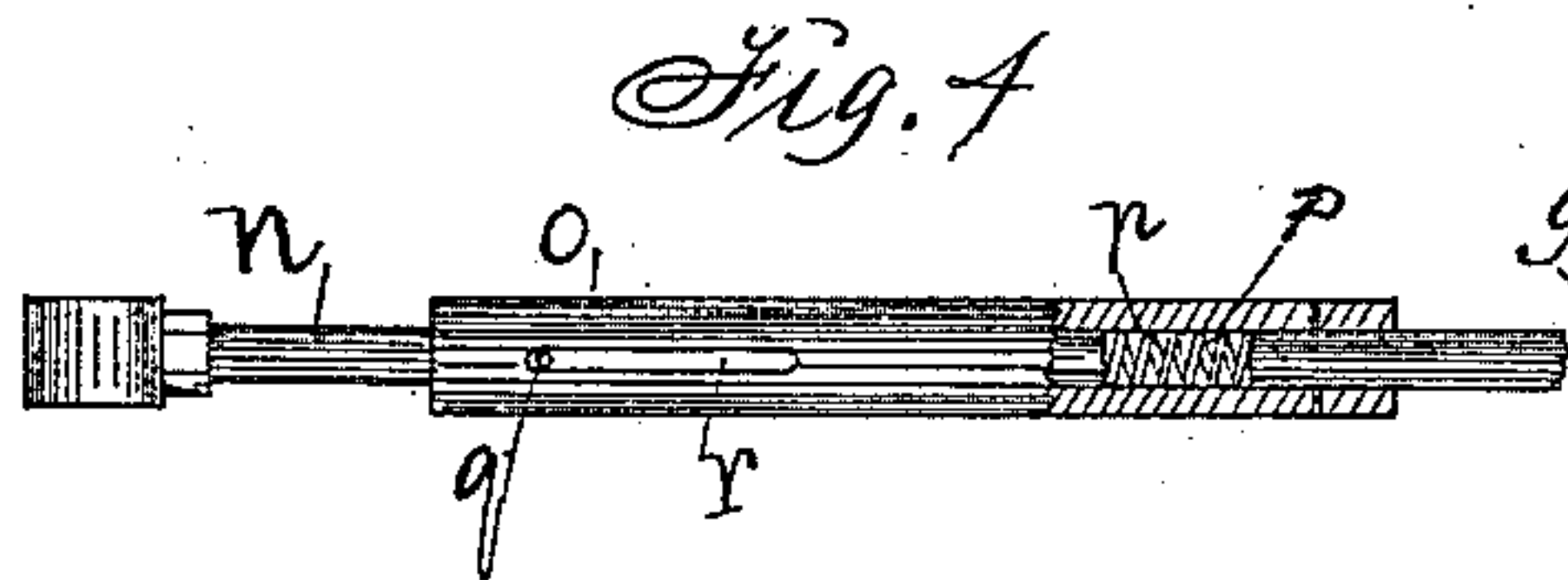
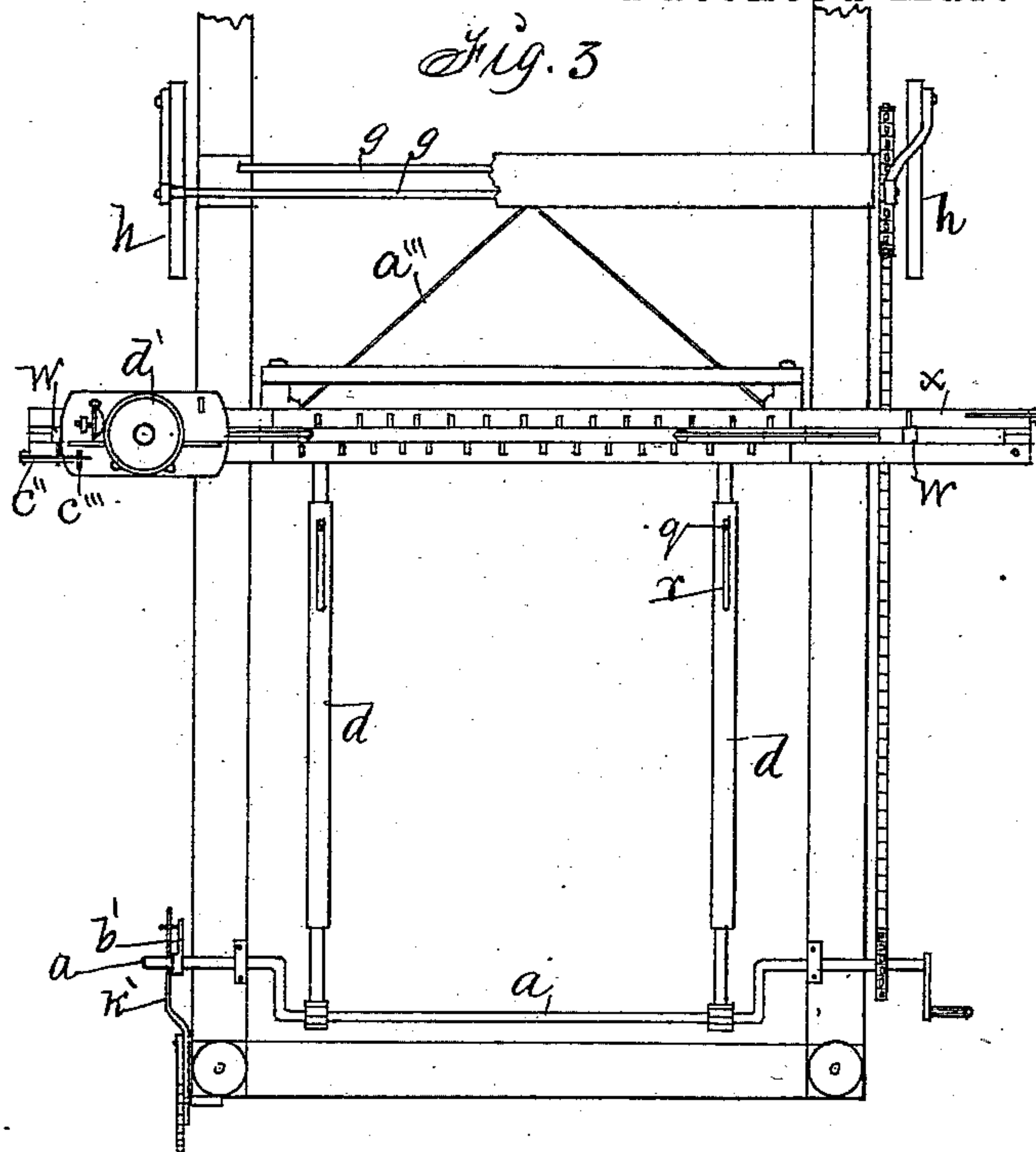
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J. A. MATTERN.

LOOM.

No. 379,481.

Patented Mar. 13, 1888.



Witnesses:
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(No Model.)

3 Sheets—Sheet 3.

J. A. MATTERN.

LOOM.

No. 379,481.

Patented Mar. 13, 1888.

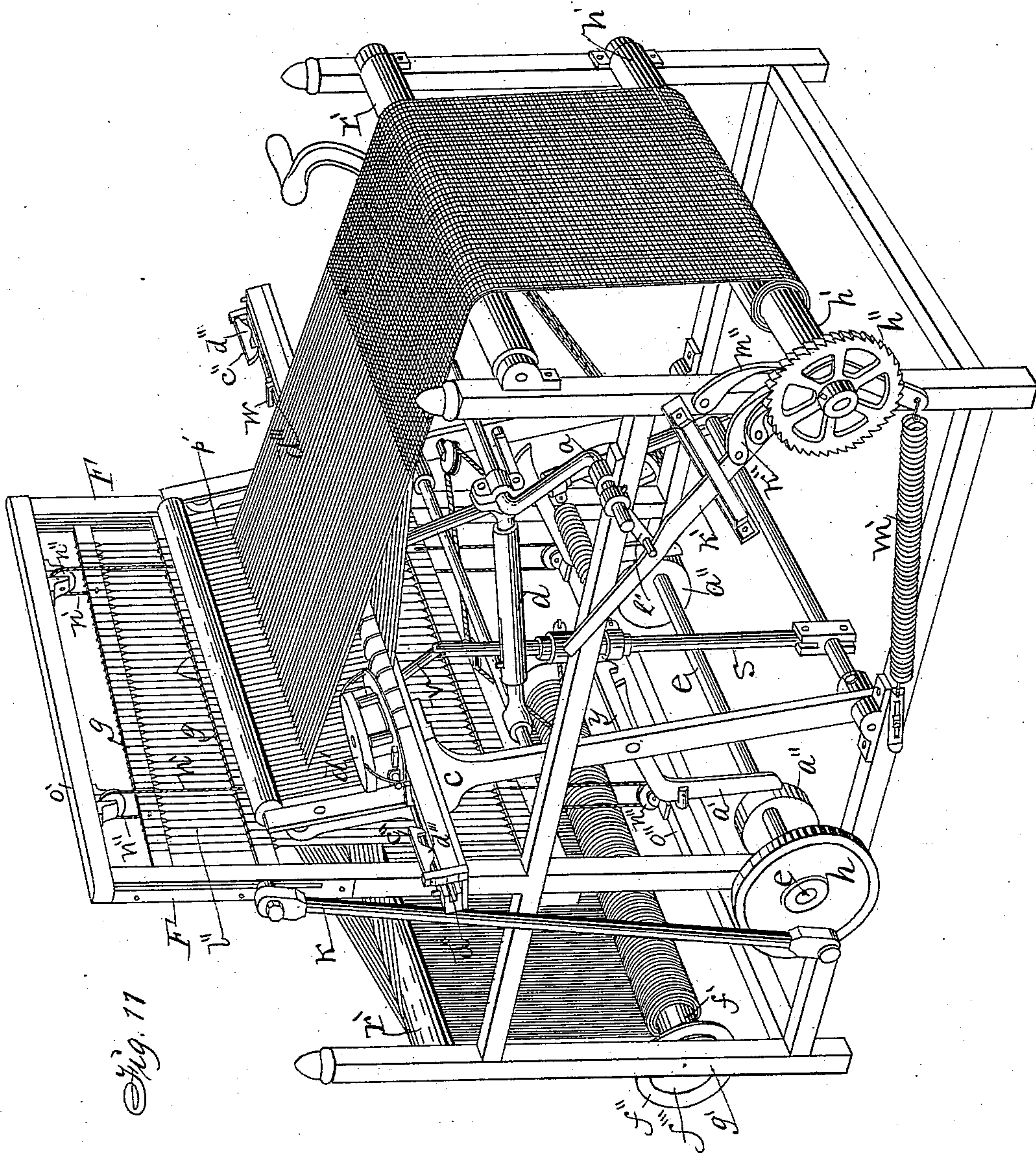


Fig. 11

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UNITED STATES PATENT OFFICE.

JACOB A. MATTERN, OF COLFAX, IOWA.

LOOM.

SPECIFICATION forming part of Letters Patent No. 379,481, dated March 13, 1888.

Application filed July 9, 1886. Serial No. 207,555. (No model.)

To all whom it may concern:

Be it known that I, JACOB A. MATTERN, a citizen of the United States, residing at Colfax, in the county of Jasper and State of Iowa, have invented new and useful Improvements in Looms, of which the following is a specification.

My invention relates to the loom for which United States Letters Patent No. 319,475 were issued June 9, 1885, and my object is to simplify and perfect the same to a greater degree of efficiency by the several features which cooperate to produce results, as follows: first, the combination of cranks with connecting-rods so constructed as to impart intermittent vibratory motion to the batten and intermittent reciprocating motion to the heddles in such a manner as to bring both simultaneously fore and aft while the shuttle carries the woof through the shed of the warp in passing from end to end of the race; second, the combination of the spiral-spring motor for throwing the shuttle, together with latches and cam devices for operating the same in unison with the other parts; and, third, the frictional tension device, hereinafter described, for the warp-roller. These united advantageous results I accomplish by the mechanism illustrated in the accompanying drawings, in which—

Figure 1 is a side view of the complete loom; Fig. 2, an end view of the same; Fig. 3, a top view of the front end of the loom. Each of these three figures shows parts of the loom broken away. Fig. 4 is a detail of the pitmen and connecting-rods for effecting an intermittent motion of batten and heddles; Fig. 5, a detail top view of shuttle and latch device; Figs. 6 and 7, side and end views of the same. Each of these three figures, 5, 6, 7, shows portions of the batten and shuttle-throwing device. Fig. 8 is a detail frictional warp-roller; Fig. 9, a detail of adjustable collar and cord for regulating spring-motor device, and Fig. 10 a detail of cams and rocker-arms for tripping spring-motor. Fig. 11 is a perspective view of the complete loom.

Similar letters refer to similar parts throughout the several views.

a is the main shaft, at the upper and front portion of the frame, which is provided with cranks *b b*, and connected to the batten *c* by

the compressible connecting-rods *d d*. The main shaft *a* is also connected by means of sprocket-wheels *b'* and an endless chain to the shaft *e* at the bottom of the main posts *F F*, which support the heddles *g g*, and which shaft *e* carries at its ends the crank-wheels *h h*, provided with compressible pitmen *k k*, for operating the heddles in concert with the batten *c*. The compound intermittent movement of the batten and heddles is an important feature of my invention and operates as follows:

The continuous rotary motion of the main shaft *a* by means of the rods *d d* throws the batten rearward until the bumpers *l l* strike the posts *F F* and stop an instant for the shuttle to pass through the shed of the warp. This momentary rest of the batten is permitted by the compressibility of the connecting-rods *d d*, which are allowed to shorten by means of the spiral springs in their bodies while the cranks *b b* of the main shaft *a* are passing their dead-center, thus transforming the constant rotary motion of the cranks into an intermittent motion of the batten. In conjunction with this intermittent motion of the batten the heddles also are given an intermittent movement by means of the crank-wheels *h* and compressible pitmen *k k*, which move the heddle to which they are attached to the upper ends of its guides *m m*, where it strikes and rests while the crank-wheels *h h* of the pitmen pass their dead-centers. These movements of the battens and heddles are simultaneous, and both the batten and the heddles are motionless while the shuttle carries the woof through the shed of the warp. In consequence the risk of obstruction or friction against the woof is diminished. In weaving rag carpets this is particularly important, the rag woofing being commonly very weak and not very smooth. The construction of one of the compressible pitmen is shown in Fig. 4, in which the head *n* of the connecting-rod or pitman moves freely in the sleeve *o* and compresses the spiral spring *p*, thus allowing the whole to shorten when the parts which it may be moving come to rest by contact with some immovable part of the machine. As soon as the cranks which operate the same pass their dead-centers, the draw on the head *n* removes the pressure from the spring *p* and the rod as-

sumes its former length, which is limited by the stationary pin *q* of the head *n* in its movement to the end of the slot *r*.

The device for throwing the shuttle consists of the vibrating arms *s s*, pivoted at their lower extremities and connected at or near their centers by the spiral spring *t*, which is attached by the adjustable collars *u u*, which may be moved up and down the arms *s s* to regulate the throw of the shuttle. Said collars *u* are clamped fast to the arms *s* by means of set-screws *u'* in a common way. The upper ends of the arms *s s* are attached by means of rods *v v* to pickers *w w*, which slide in grooves in the ends of the shuttle-race *x*. The arms *s s*, when set for operation, are held parallel, with the spring *t* distended for action, by means of hinged latches *y y*, mounted on the frame of the batten *c*, which engage the pins *z z* in the arms *s s*. When the batten has moved over against the main posts *F F* to the position where it stops momentarily, one of the latches *y* is lifted by means of one of the rocker-arms *a'* operated by one of the eccentric cams *a''* on the pitman-shaft, and by the contraction of the spring *t* the shuttle is thrown to the opposite end of the race. As the batten moves forward to beat the woof, the arm *s* is drawn back to the latch *y* by means of the cord *a'''*, which is attached to the arms *s s* by the adjustable collars *b' b'*, and passes around the pulleys *b'' b''*, attached to the frame of the batten *c*, and the pulley *b'''*, attached to the stationary cross-bar *c'* of the frame of the machine. When the cord *a'''* becomes so stretched that it does not bring the arms *s s* within reach of the latches, it may be sufficiently shortened by loosening the collars *b' b'*, which are held by set-screws *x*, and winding the cord, as shown in Fig. 9. Said collars *b'* are clamped fast to the arms *s* by means of set-screws in a common way. The eccentric cams *a'' a''* are so set on the shaft that they alternately trip the latches *y y* by the rocker-arms *a' a'* at the instant the batten and heddles come to rest, as required in throwing the shuttle from end to end of the race. As the shuttle *d'* (shown in detail in Figs. 5, 6, and 7) travels to the opposite end of the race, it strikes the pickers *w*, and is caught and retained by the spring-latch *c''*, which engages with one of the lugs *c''' c'''* of the shuttle. The spring *d'' d''* of the latch *c'' c''* prevents its rebounding.

The latches *c'' c''* are provided with cams *d''' d'''* on their under sides. The pins *d'''' d''''* of the pickers *w w*, by coming in contact with these cams, raise the latches and liberate the shuttle when the latches *y y* are tripped. The bobbin *e'* of the shuttle is provided with the spring friction-brake *e''*, which is adjusted by the set-screw *e'''* to regulate the unwinding of the woof from the bobbin and to prevent slack in the passage of the shuttle from end to end of the race.

In Fig. 8 I show my frictional tension device of the warp-roller, which consists of an ordinary roller, *f'*, with the plate *f''* on one

end and a second plate, *f'''*, on the frame post *g'*, between which is the leather or rubber washer *g''*, which is compressed by means of the set-screw *g'''* in the box at the opposite end of the roller *f'*, thus causing the roller to turn with greater or less difficulty, according as the set-screw is tight or loose.

At the front end of the frame in Figs. 1 and 2 is the take-up roller *h'*, which is operated so as to move a certain distance, as required, to take up the cloth or carpet at each revolution of the main shaft. This is accomplished by means of the ratchet-wheel *h''* on the end of the roller *h'* and the lever *k'*, bearing the pawl *k''*, which lever is operated by a cam-crank, *b'*, on the end of the main shaft *a*. The lever *k'* rocks on the end of the roller-shaft, and, after being thrown back by the crank *l'*, is again drawn forward by the spring *m'*, attached to the other end and to the frame of the machine. A second pawl, *m''*, is attached to the post of the frame to hold the ratchet-wheel while the pawl *k''* is gaining a new cog.

The heddles *g g* are constructed with looped wires or rods *l'* of the ordinary form for guiding the warp, and are operated by the connection of one of them to the pitmen *k k*. The second one is attached to the first by the cords *n'*, which pass around pulleys *n''* of the cross-bars *o'* and *o''* of the frame of the machine, thus giving one an upward movement while the other moves downward, and vice versa, as required in crossing the warp.

The batten *c* is provided with the reeds *p'* for guiding the warp and beating the woof when the batten moves backward.

r' r' are guide-rollers for the warp and woven cloth.

I claim as my invention—

1. The combination of the main shaft *a*, formed with cranks *b b*, with the compressible connecting-rods *d d*, the batten *c*, the shaft *e*, with crank-wheels *h h* and cams *a'' a''*, the rocker-arms *a' a'*, the machine-frame, the wheels *b'* and chains *b''*, the latches *y y*, arms *s s*, the spring *t* and cord for distending the same, the pulleys around which said cord passes, the bars *v v*, pickers *w w*, the heddles *g g*, and cords *n' n'*, with pulleys *n''*, and compressible pitmen *k k* for operating the same, the crank *l'*, with lever *k'*, and the take-up roller, all substantially as shown and specified, for the purposes stated.

2. The combination of the spiral spring *t* with the pivoted arms *s s*, the adjustable collars *u*, the cord *a'''*, the pulleys *b''* and *b'''*, the bars *v*, the pickers *w*, and the latches *y*, the rocker-arms *a'*, pins *z*, cams *a''*, and shaft *e*, to operate substantially as set forth, for the purposes stated.

3. The combination of the shaft *e*, the cams *a''*, the rock-arm *a'*, the spring *t*, the latches *y*, the arms *s*, and pins *z* on the arms *s*, substantially as set forth, for the purposes stated.

4. The combination of the shaft *e*, crank-wheels *h*, the pitmen *k*, with heads *n*, sleeves *o*, having slots *r'*, springs *p*, and pins *q*, with the

heddles *g*, substantially as shown and described, for the purposes specified.

5 5. The combination of the roller *f'* with the plates *f''* and *f'''*, the washer *g''*, and the set-screw *g'''*, to operate as specified, for the object stated.

6. The combination of the arms *s*, the latches *y*, the spring *t*, cord *a'''*, the pulleys *b''* and *b'''*, and the adjustable collars *b'*, for winding

and shortening the cord, as required, in drawing the arms *s s* to the latches *y y*, and the batten and set-screws for fastening said collars *b'* to the arms *s*, substantially as specified, for the purposes stated.

JACOB A. MATTERN.

Witnesses:

T. B. PIERSON,

THOMAS G. ORWIG.