

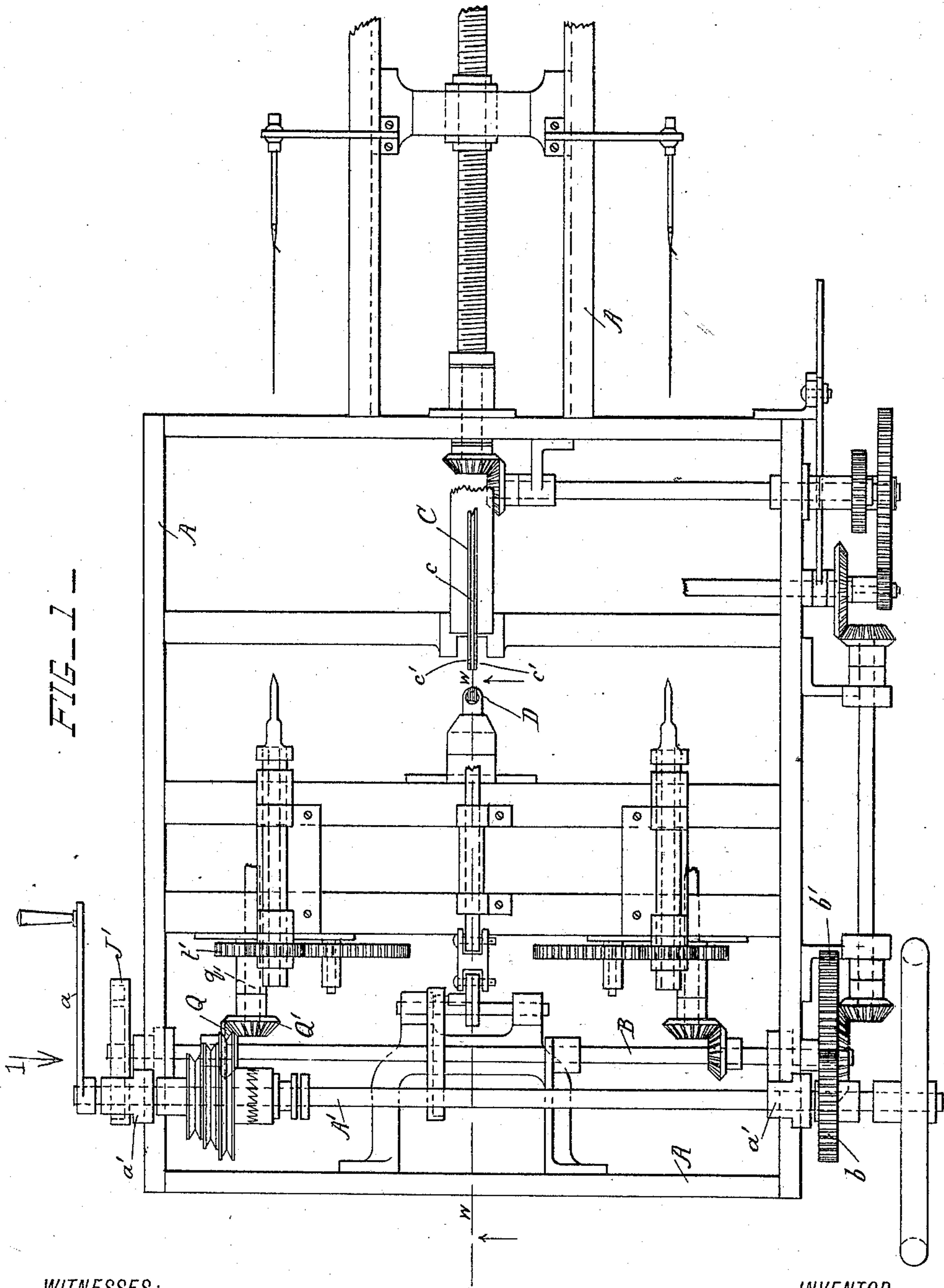
(No Model.)

4 Sheets—Sheet 1.

E. HAAST.
MACHINE FOR MAKING LOOM HARNESS.

No. 500,653.

Patented July 4, 1893.



WITNESSES:

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(No Model.)

4 Sheets—Sheet 2.

E. HAAS.

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FIG. 2.

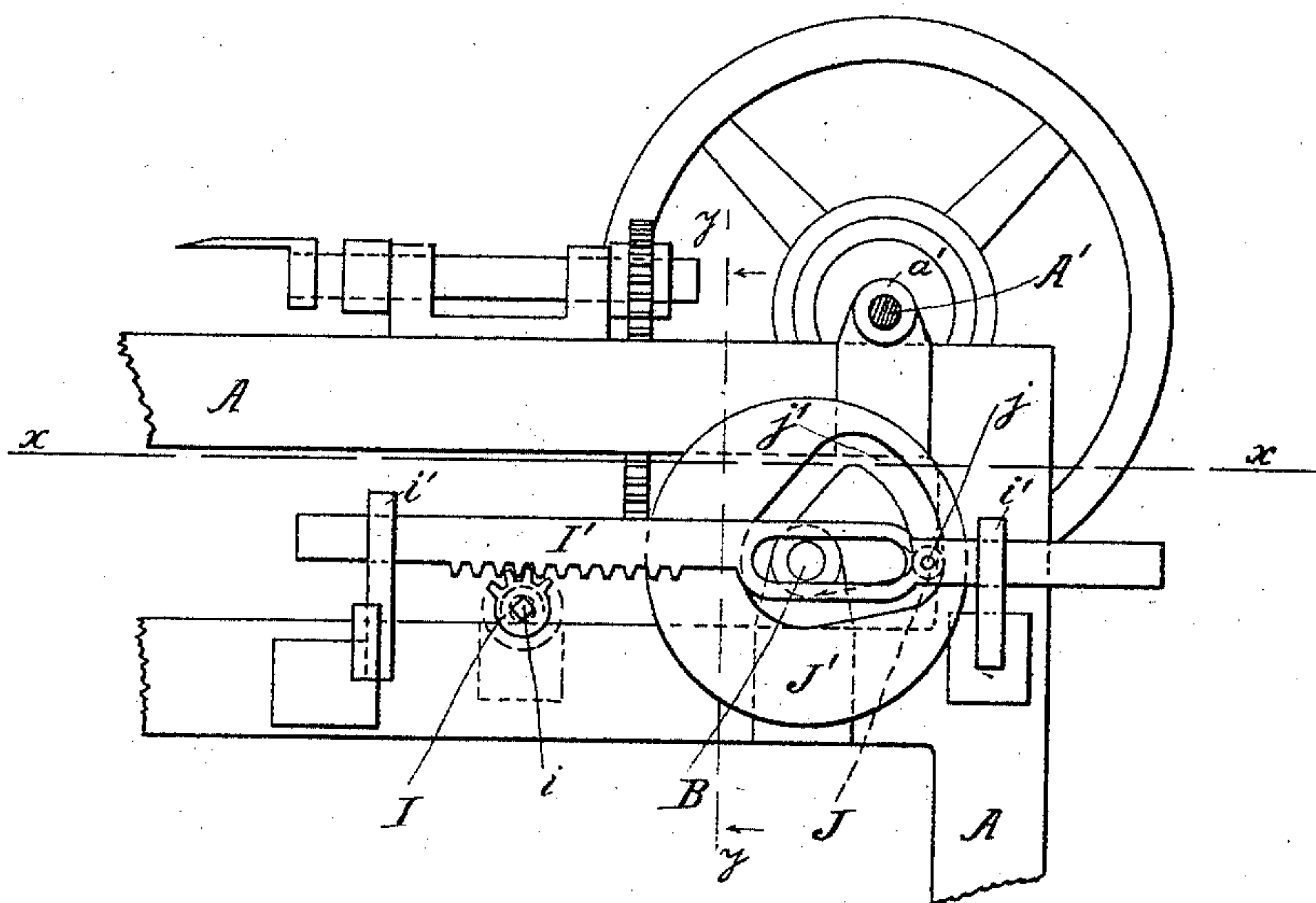
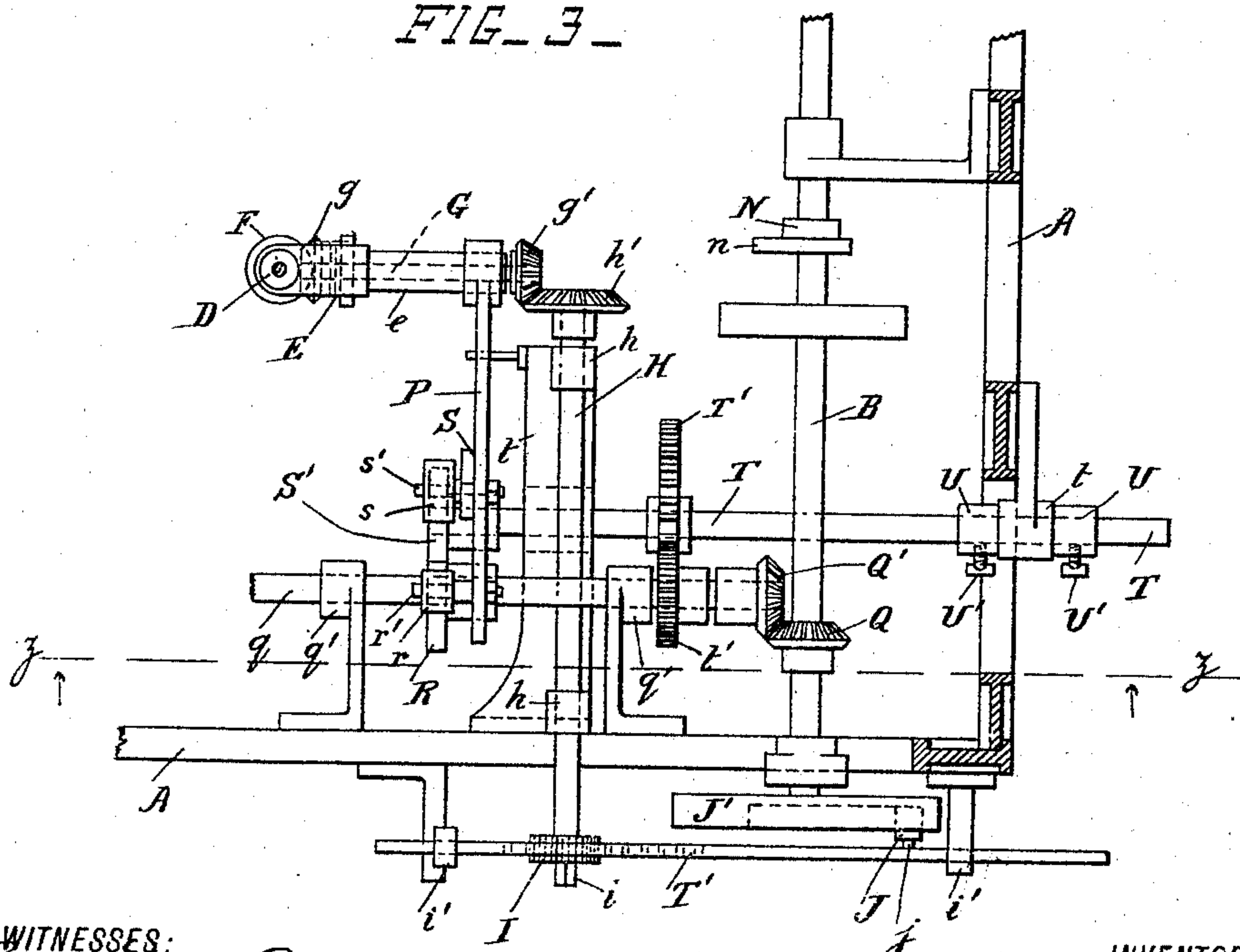


FIG 3.



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4 Sheets—Sheet 3.

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FIG. 4.

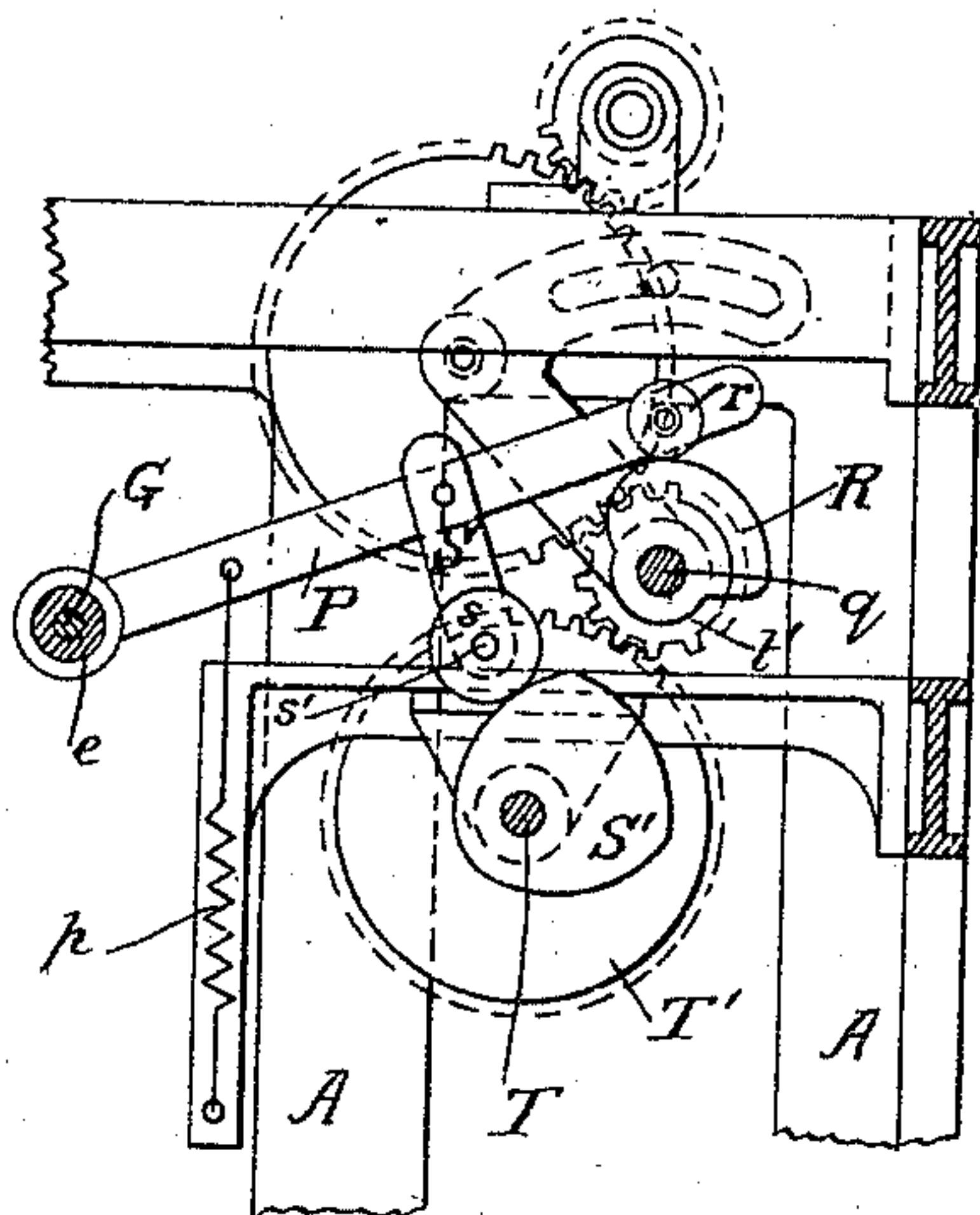


FIG. 5.

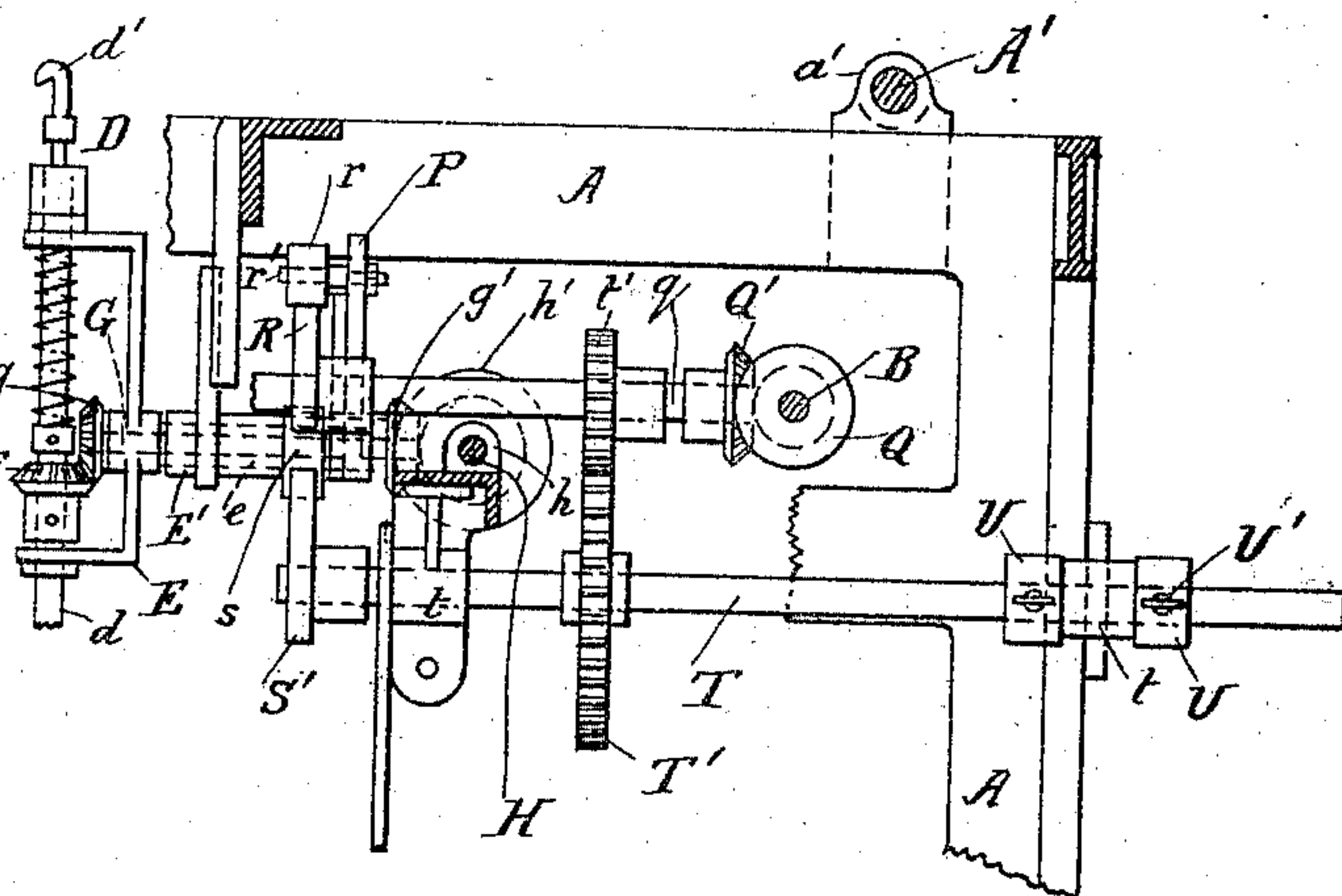


FIG. 6.

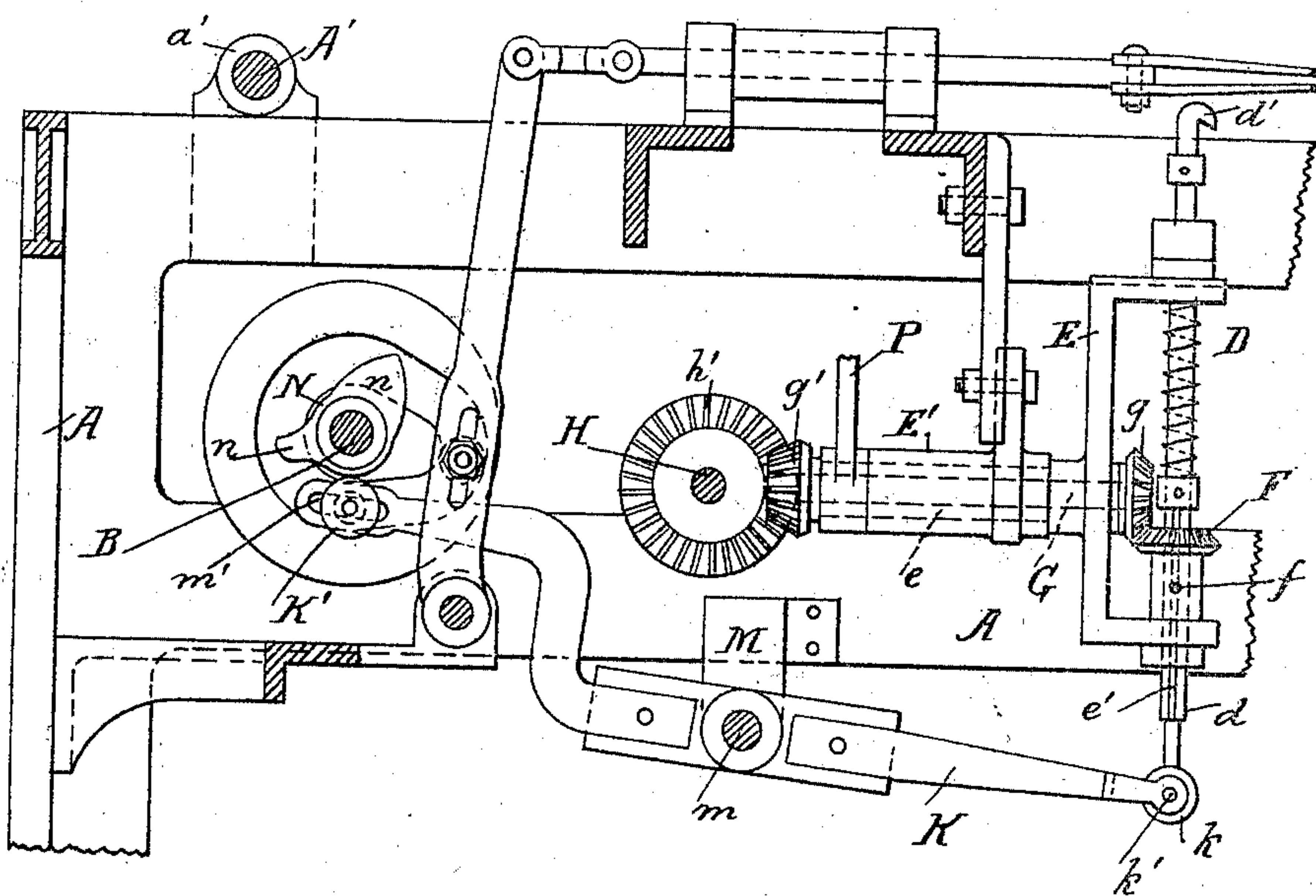
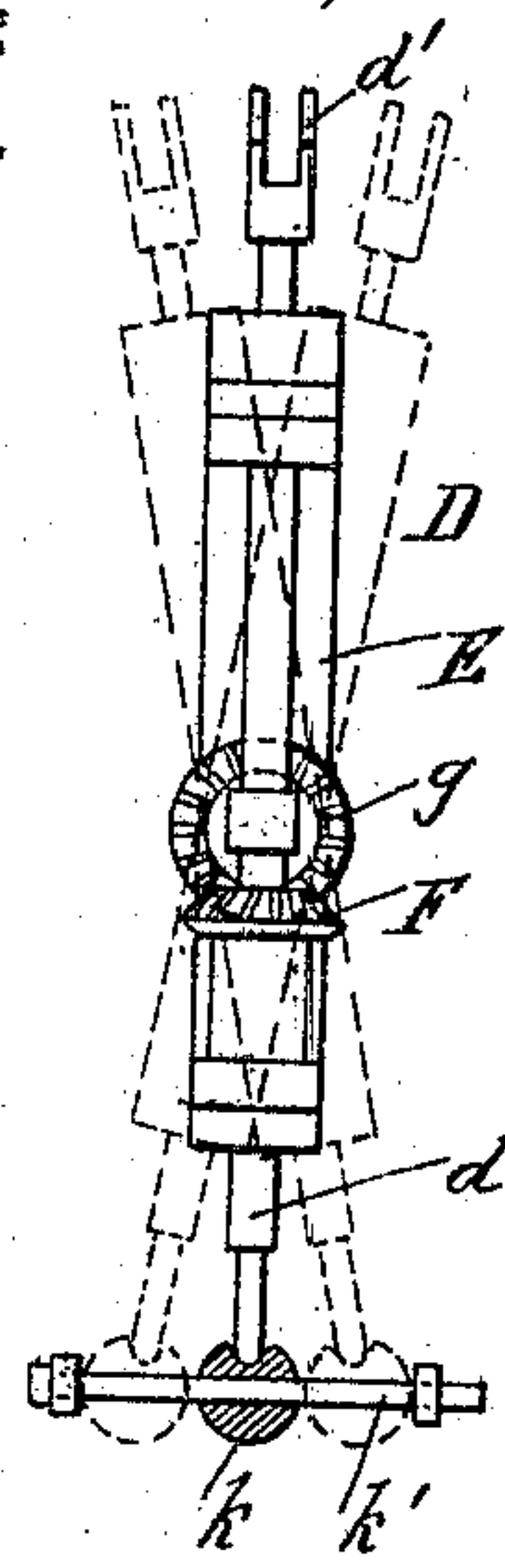


FIG. 7.



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FIG. 8.

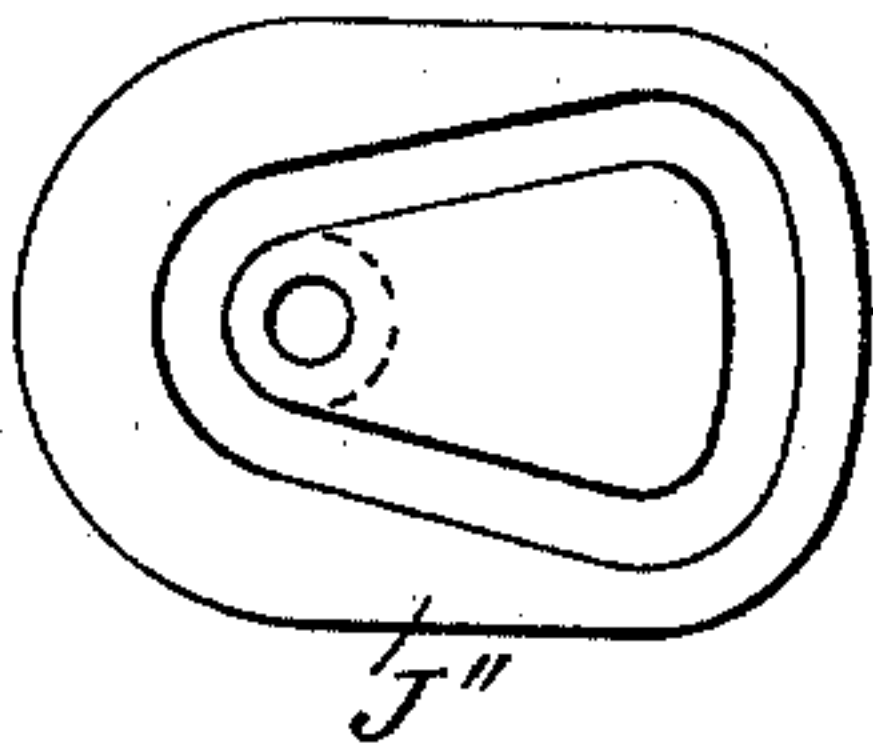


FIG. 9.

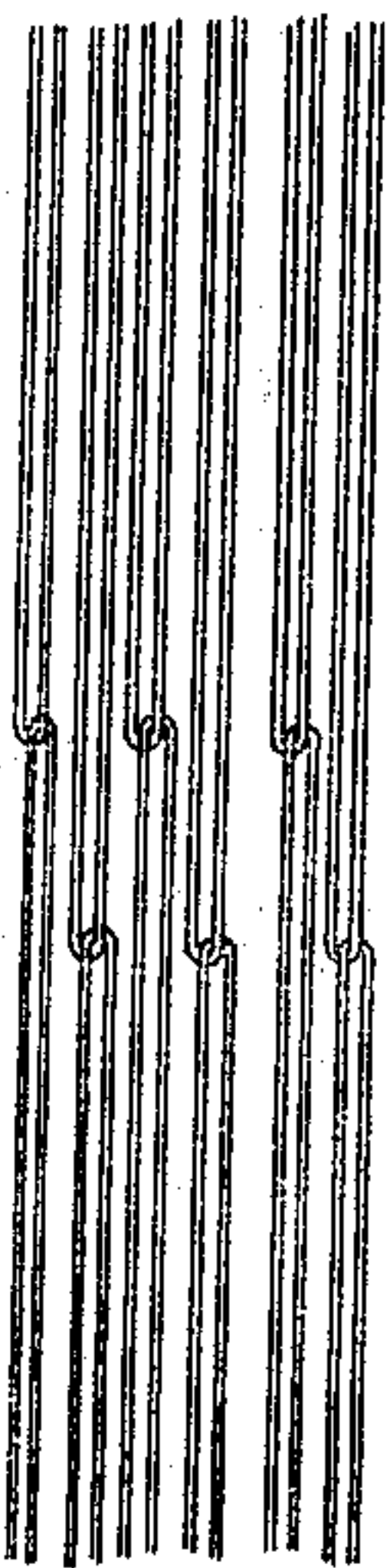


FIG. 10.

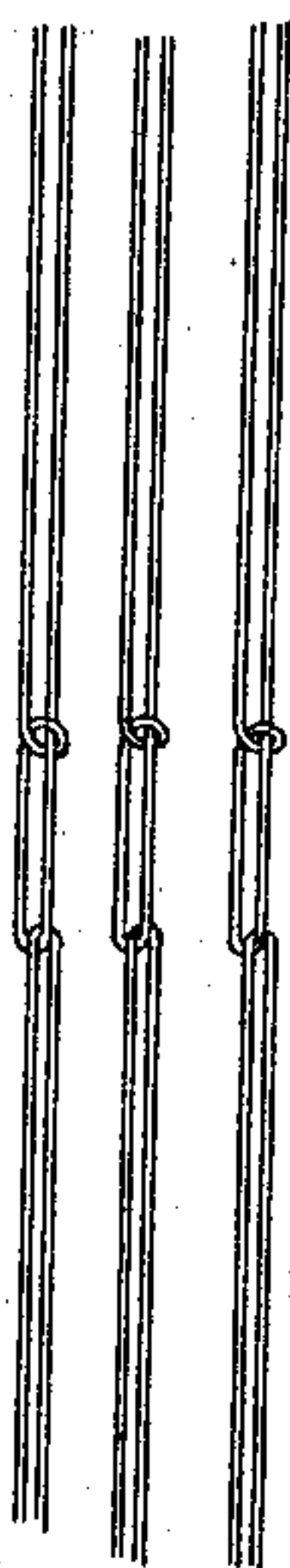


FIG. 11.

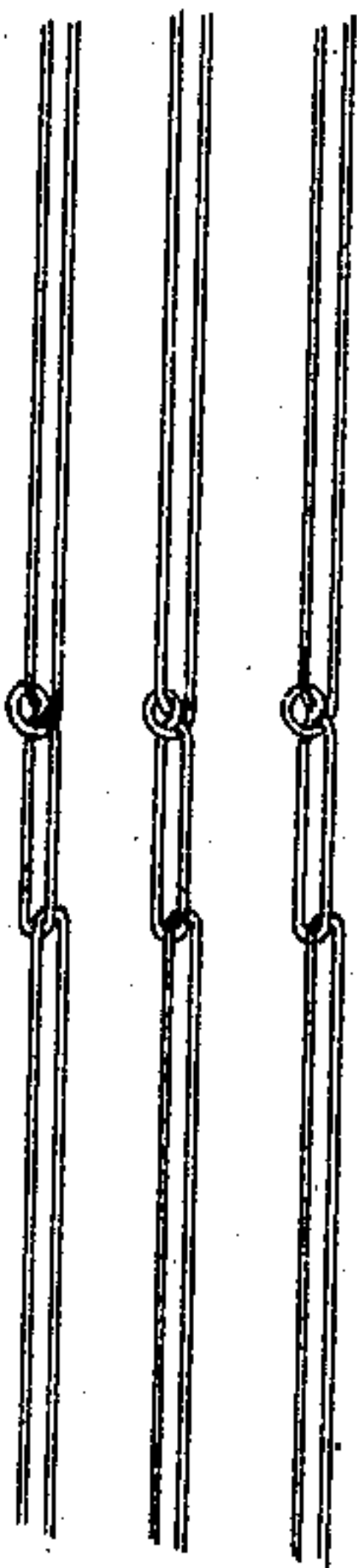
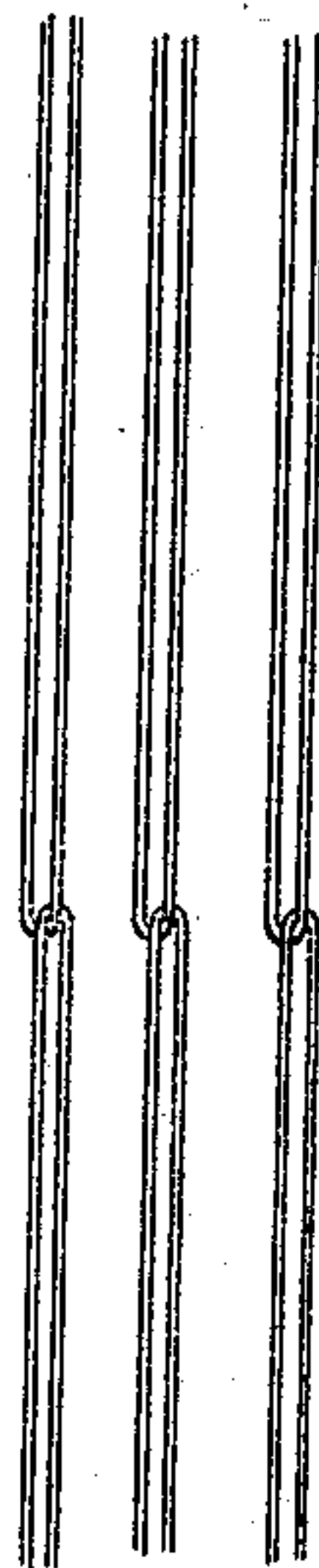


FIG. 12.



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UNITED STATES PATENT OFFICE.

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SAME PLACE.

MACHINE FOR MAKING LOOM-HARNES.

SPECIFICATION forming part of Letters Patent No. 500,653, dated July 4, 1893.

Application filed March 20, 1891. Serial No. 385,809. (No model.)

To all whom it may concern:

Be it known that I, EMIL HAAST, residing at Paterson, in the county of Passaic and State of New Jersey, have invented certain new and
5 useful Improvements in Machines for Making Loom-Harness, of which the following is a specification.

This invention relates to machines of the class shown and described in the patent issued
10 to J. Sladdin, No. 306,114, and dated October 7, 1884.

This invention consists in the novel construction and combination of the parts hereinafter fully described and claimed, whereby
15 French harness, standard harness, and "single knot" and "knot and a half" English harness are formed in the same machine. These four different kinds of harness can be made in sections, one after another, so as to produce what may be called "striped harness."
20 This striped harness is a useful form in which harness can be sold, said striped harness being adapted for use in weaving "necktie" goods, in which the warp threads are of various material and of different quality. Each
25 kind of warp thread can then be provided with heddles of the kind best suited to it.

In the drawings: Figure 1 is a plan view of a machine of the general structure shown and
30 described in the said patent, and containing the improvements hereinafter described, certain parts being omitted. Fig. 2 is a side view of a portion of the machine looking at it from the direction of the arrow 1, Fig. 1, the operating handle being omitted. Fig. 3
35 is a plan view, from above, taken in section on the line $x x$ in Fig. 2. Fig. 4 is a cross-section taken on the line $y y$ in Fig. 2, and looking in the direction of the arrows. Fig.
40 5 is a section taken on the line $z z$ in Fig. 3. Fig. 6 is a section on the line $w w$ in Fig. 1, looking in the direction of the arrows and drawn to a larger scale. Fig. 7 is a rear view of the eye-former, showing it in three different
45 positions. Fig. 8 is a front view of the substitute cam J'' . Figs. 9, 10, 11 and 12 are detail views showing the eyes or loops of the heddles formed by the machine in making French harness, single knot English harness,

knot and a half English harness, and standard harness, respectively.

A is the frame of the machine.

A' is the driving shaft provided with a crank handle a for revolving it, and journaled in the bearings a' . A toothed wheel b is secured
55 on the shaft A'.

B is a shaft journaled in the frame below and parallel with the shaft A', and having a toothed wheel b' secured on it and gearing into the toothed wheel b .
60

A single heddle needle C is used in this machine. This needle has a channel c in its upper side for the harness threads and an eye c' on each side near its front end, one for each thread to pass through.
65

D is the eye-former which forms the loops of the various kinds of harness upon the heddle needle. The eye-former has a spindle d which is provided with a forked and hooked upper end d' . This spindle d is journaled in the carrier E, which is provided with a tubular shaft e which is journaled in a bearing E' secured to the frame A. The spindle d has a longitudinal groove e' , and F is a beveled toothed wheel splined on the spindle by means
70 of the pin f which enters the groove e' .
75

G is a shaft which is journaled in the tubular shaft e . A beveled toothed wheel g is secured on the end of the shaft G and gears into the wheel F. On the other end of the
80 shaft G a beveled toothed wheel g' is secured. A shaft H is journaled in bearings h parallel with the said shaft B. A beveled toothed wheel h' is secured on one end of the shaft H and gears into the wheel g' . On the other
85 end of the shaft H, outside the frame A, there is a removable toothed pinion I. This pinion is slid on the square end i of the shaft H, or it may be secured to it by a set-screw, or in any other way that will permit it to be re-
90 moved when it is desired that the shaft H should not revolve.

A toothed rack I' is adapted to gear into the pinion I when on the shaft. This rack slides longitudinally in the brackets i' secured to the frame A. A roller J is journaled on a pin j projecting from the rack. This roller projects within the groove j' of the cam
95

J', which is secured on the end of the shaft B. The throw of the cam J' is such as to turn the eye-former spindle half a revolution in forming "single knot" English harness.

5 The cam slides the rack bar, which turns the shafts H and G, and the spindle *d*, by means of the toothed wheels hereinbefore described.

In order to make "knot and a half" English harness, the cam J' is taken off the shaft 10 B and another similar cam J'', Fig. 8, is substituted for it. This substitute cam has a greater throw and is adapted to revolve the eye-former spindle one whole revolution.

When no knots are required in the harness, as in making French, or in making 15 standard harness, the pinion I is removed and the eye-former spindle is not revolved. The lower end of the eye-former spindle *d* is hemispherical and rests in a cavity in the 20 block *k* which is free to slide longitudinally on the pin *k'* in the forked end of the lever K. The lever K is pivoted on the pin *m* of the bracket M which is secured to the frame A, and the said lever is provided with a roller 25 K' at its other end. The pin on which the roller K' revolves is longitudinally adjustable in the slot *m'* in the lever, so that the lever may be operated at the precise moment required. The shaft B has a cam N secured on it which is provided with two oper- 30 ating projections *n* and *n'* of unequal throw. These projections operate the lever K as will be more fully described hereinafter. The spindle *d* is oscillated by means of a lever P 35 secured on the end of the tubular shaft *e*. This lever is normally pulled downward by means of a spring *p* secured to it and to any stationary part of the machine, thus holding the forked end *d'* of the eye-former spindle 40 to one side of the heddle needle C. A beveled toothed wheel Q is secured on the shaft B, and gears into a beveled toothed wheel Q', secured on a shaft *q* which is journaled in brackets *q'* secured to the frame A.

45 The shaft *q* has a cam R secured upon it, and the said cam operates on the roller *r* which is journaled on a pin *r'* projecting from the end of the lever P. This cam R oscillates the eye-former from one side position to the 50 center of the needle, and then lets it return to its original side position. This motion is all the oscillating movement that is required in making standard or in making English harness, but when French harness is made 55 the eye-former is also required to be oscillated from the center of the needle to the opposite side so that it may assume the three positions indicated in Fig. 7. The sliding block *k* permits the spindle *d* to be thus oscillated without moving the lever K. 60

To effect the supplemental oscillating movement of the eye-former required in making French harness, an arm S is secured to the lever P. A roller *s* is journaled on a pin *s'* 65 projecting from the arm S. The roller *s* is raised at intervals by means of a cam S' se-

cured upon a shaft T. The shaft T is journaled in bearings *t* supported by the frame A, and is revolved by means of a toothed wheel T' which is secured on the shaft T and 70 which gears into the toothed wheel *t'* secured upon the aforesaid shaft *q*. The cams R and S' are set so that when the cam R has raised the lever P and placed the eye-former in its central position, the cam S' is ready to raise 75 the lever P for the additional amount necessary to move the eye-former to its opposite side position.

When the machine is not required to make French harness, the shaft T is slid longitudinally in its bearings until the cam S' is clear 80 of the roller *s*. The shaft is slid by hand, and is retained in either position by the loose collars U provided with thumb-screws U', or by any other approved means which will accom- 85 plish the same result.

The simple movement of sliding the cam S' clear of the roller *s* adapts the machine to make standard harness, and then by simply sliding the pinion I into gear with the rack I', 90 so as to revolve the eye-former spindle as hereinbefore described, the machine is adapted to make English harness.

The operation of the mechanism is as follows: If English harness is to be made, the 95 hooked end *d'* of the eye-former being in its normal position to one side of the needle, is first forced upward by the projection *n* of the cam N which has a greater throw than the projection *n'*. The top of the hooked end *d'* 100 is curved so that it pushes aside one of the heddle threads. The hooked end ascends past the thread, and the thread slips under the hooks. The hooks descend and drag the thread down with them. The spindle *d* then commences 105 to revolve in one direction under the action of the mechanism for that purpose hereinbefore described, the amount of the revolution being half a revolution or a whole revolution according to whether "single knot" or "knot 110 and a half" harness is required. As soon as the spindle *d* ceases to revolve, the cam R operates the lever P and turns the tubular shaft, thereby moving the eye-former into its vertical position as shown in full lines in Fig. 7. 115 While the cam R is so operating, the projection *n'* is also operating and lifts the eye-former spindle as hereinbefore described, and the forked end *d'* is brought in front of the 120 needle. The eye-former pauses in this position. The looped thread is pushed off the hooked end *d'* onto the heddle needle by approved mechanism for that purpose, and the eye-former spindle is then revolved in the opposite direction and is restored to its original 125 side position.

In making standard harness the operation of the parts is similar, but the eye-former has no circular reciprocating motion imparted to it. 130

In making French harness, the eye-former spindle has no circular reciprocating motion,

and after it leaves the vertical position in which it pauses in front of the heddle needle, it is not restored to its original side position, but is moved into a corresponding side position on the other side of the needle; and is moved from one side position to the other at each successive stroke, or stitch.

The remaining parts of the machine do not differ essentially from those heretofore used, as made clear in the said patent.

What I claim is—

1. In a loom harness machine, the combination, with the eye-former, and the eye-former carrier provided with a shaft; of the lever secured to the said shaft and having a roller *r*, the arm secured to the said lever and provided with a roller *s*, a revoluble cam operating the roller *r* to move the eye-former from one side position into a vertical position, and a second revoluble cam operating the roller *s* to move the eye-former from its vertical position to its correspondingly opposite side position, substantially as and for the purpose set forth.

2. In a loom harness machine, the combination, with the eye-former, and the eye-former carrier provided with a shaft; of the lever secured to the said shaft and provided with the arm *S* and the rollers *r* and *s*, a revoluble cam operating to raise the roller *r*, and a laterally movable cam adapted to raise the roller *s* when placed opposite to it, substantially as and for the purpose set forth.

3. In a loom harness machine, the combination, with the eye-former, and the eye-former carrier provided with a shaft; of the lever secured to the said shaft and provided with the arm *S* and the rollers *r* and *s*, the cam *R* and its revoluble shaft *q* operating to raise the roller *r*, the toothed wheel *t'* secured on the shaft *q*, the movable shaft *T*, and the toothed wheel *T'* and the cam *S'* secured on the shaft *T*, said cam *S'* operating to raise the roller *s*

when the shaft *T* is slid so as to place the said wheels in gear and the roller opposite the cam, substantially as and for the purpose set forth.

4. In a loom harness machine, the combination, with the eye-former, and the eye-former carrier provided with a tubular shaft, a lever secured on the said shaft, a revoluble cam adapted to raise the lever and thereby to move the eye-former from its normal side position into a vertical position, and mechanism operating to raise the eye-former spindle at intervals, to permit the formation of "standard" harness; of the shafts and the toothed wheels substantially as set forth, the toothed rack provided with a roller, and a cam adapted to engage with the said roller and thereby to impart a reciprocating rotary motion to the eye-former spindle through the said shafts and wheels, to permit the formation of "English" harness; and a disengagable cam adapted to raise the said lever after it has been raised by the aforesaid cam, thereby moving the said spindle from its vertical position to its opposite side position, to permit the formation of "French" harness; whereby "striped harness" may be made in the machine, substantially as set forth.

5. In a loom harness machine, the combination, with the eye-former, and the pivoted eye-former carrier; of mechanism operating to raise the eye-former spindle at intervals; and driving devices, substantially as set forth, operating to oscillate the eye-former and its carrier on both sides of their vertical position, and to move them back and forth from one side to the other continuously, whereby "French" harness may be formed in the machine.

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