(No Model.)

4 Sheets—Sheet 1.

J. D. WILBER & A. B. SMITH.

STAPLING MACHINE.

No. 330,950. Patented Nov. 24, 1885.

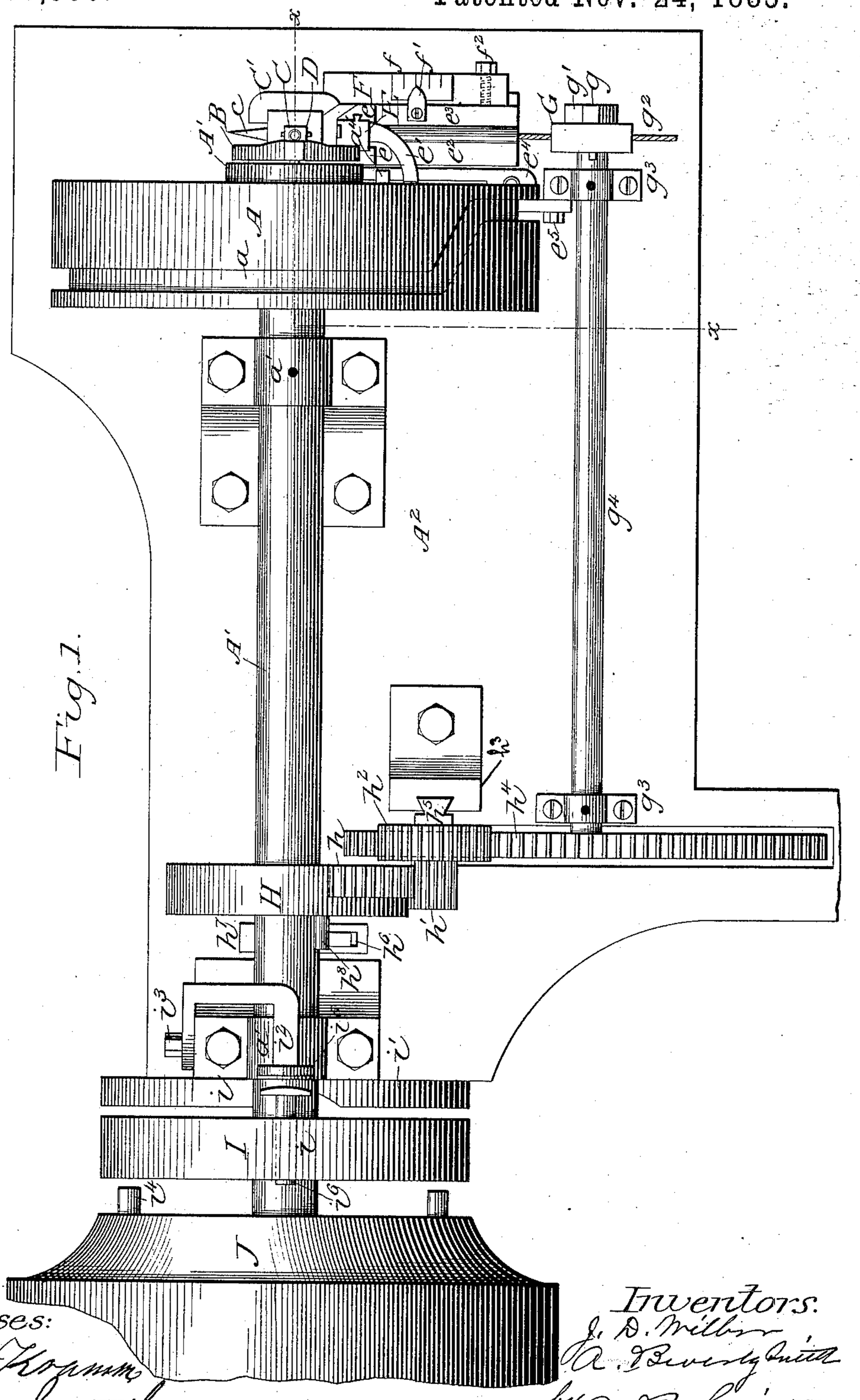

Fig. 1.

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(No Model.)

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J. D. WILBER & A. B. SMITH.

STAPLING MACHINE.

No. 330,950. Patented Nov. 24, 1885.

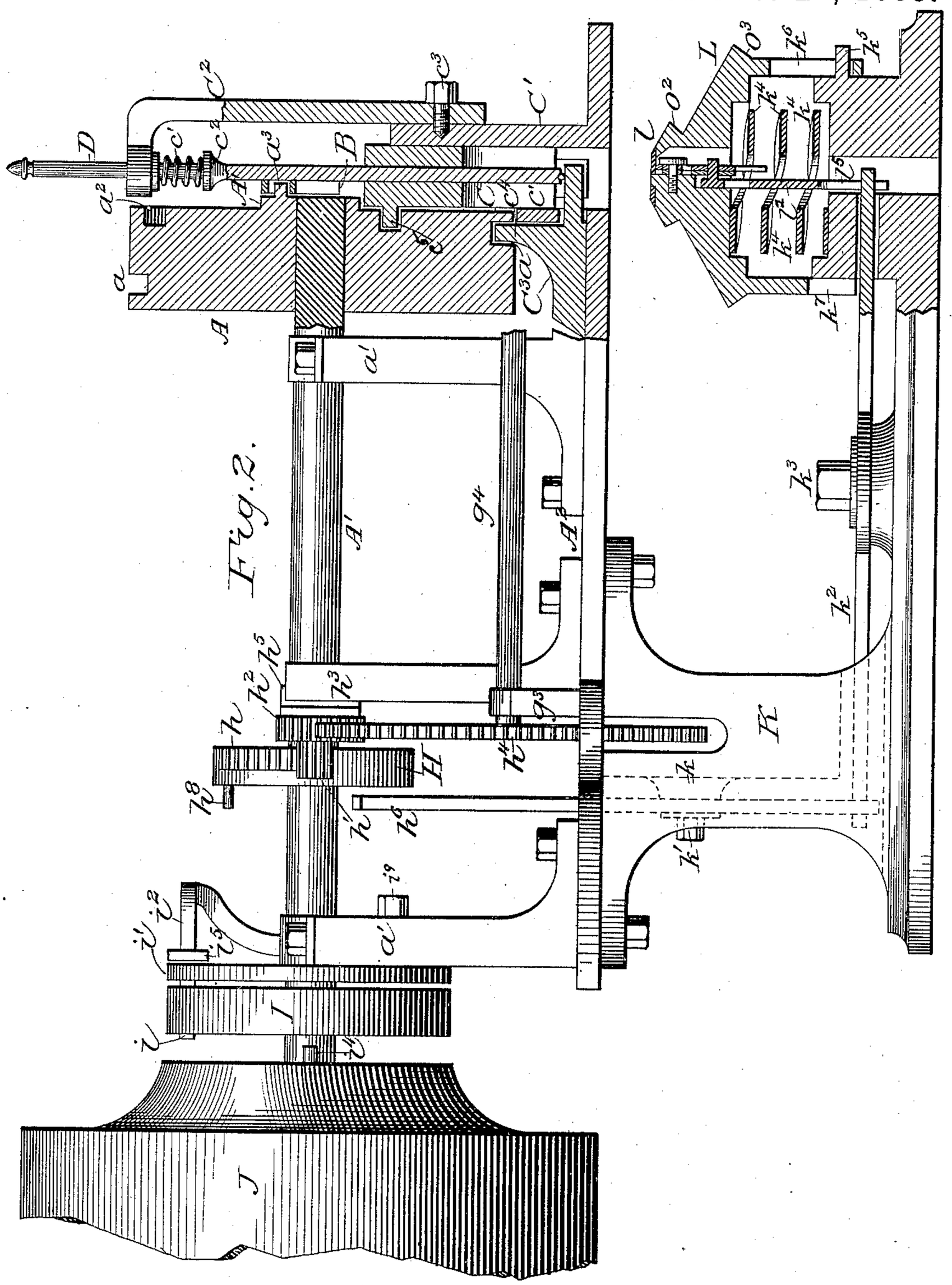

Fig. 2.

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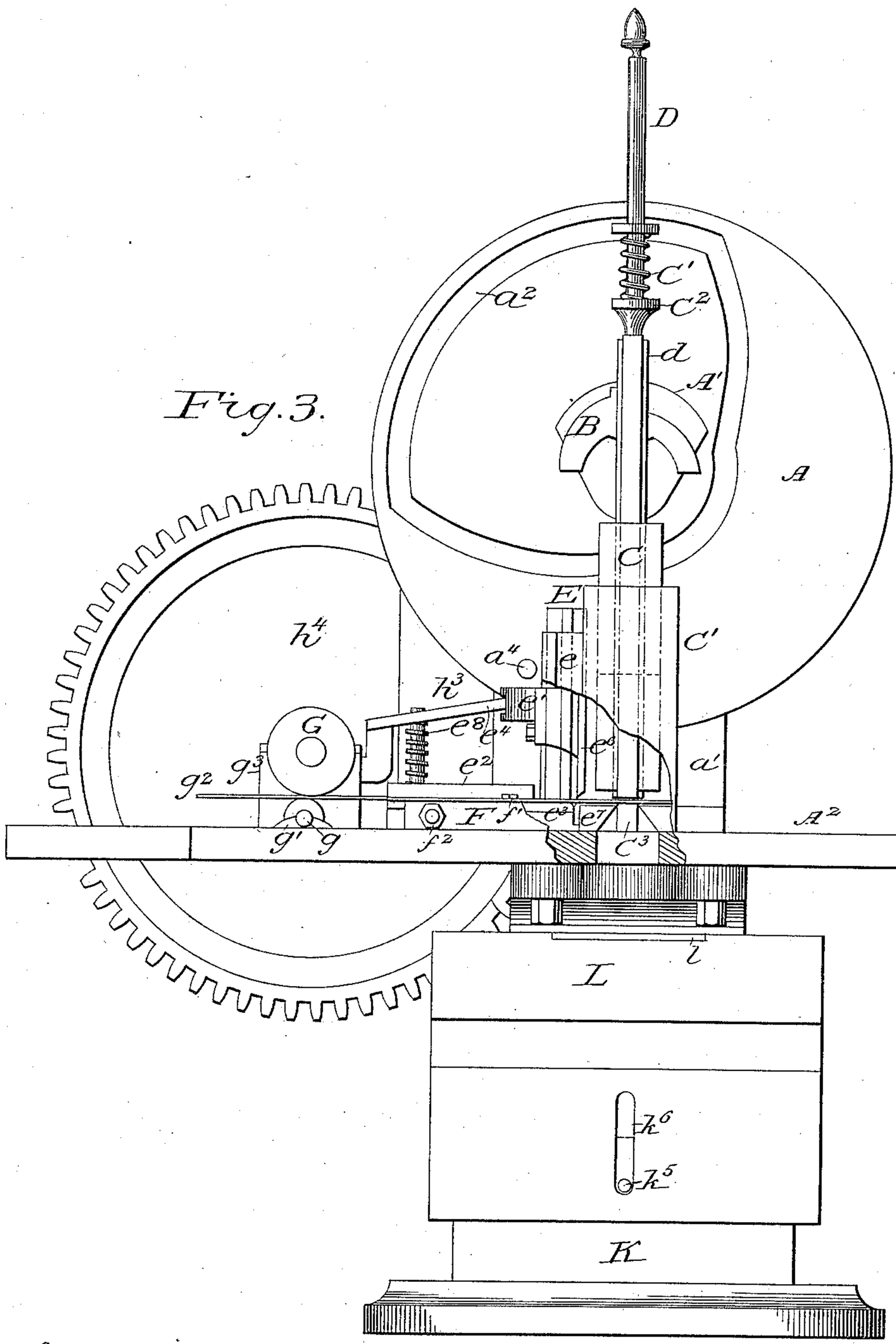
(No Model.) 4 Sheets—Sheet 3.

J. D. WILBER & A. B. SMITH.

STAPLING MACHINE.

No. 330,950. Patented Nov. 24, 1885.

Fig. 3.



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J. D. WILBER & A. B. SMITH.

STAPLING MACHINE.

No. 330,950. Patented Nov. 24, 1885.

Fig. 4.

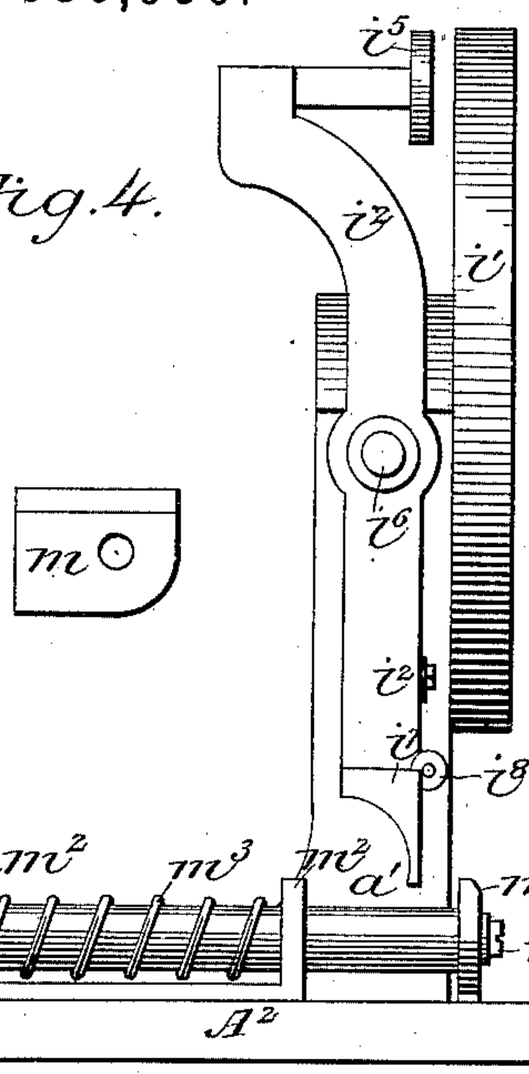


Fig. 5.

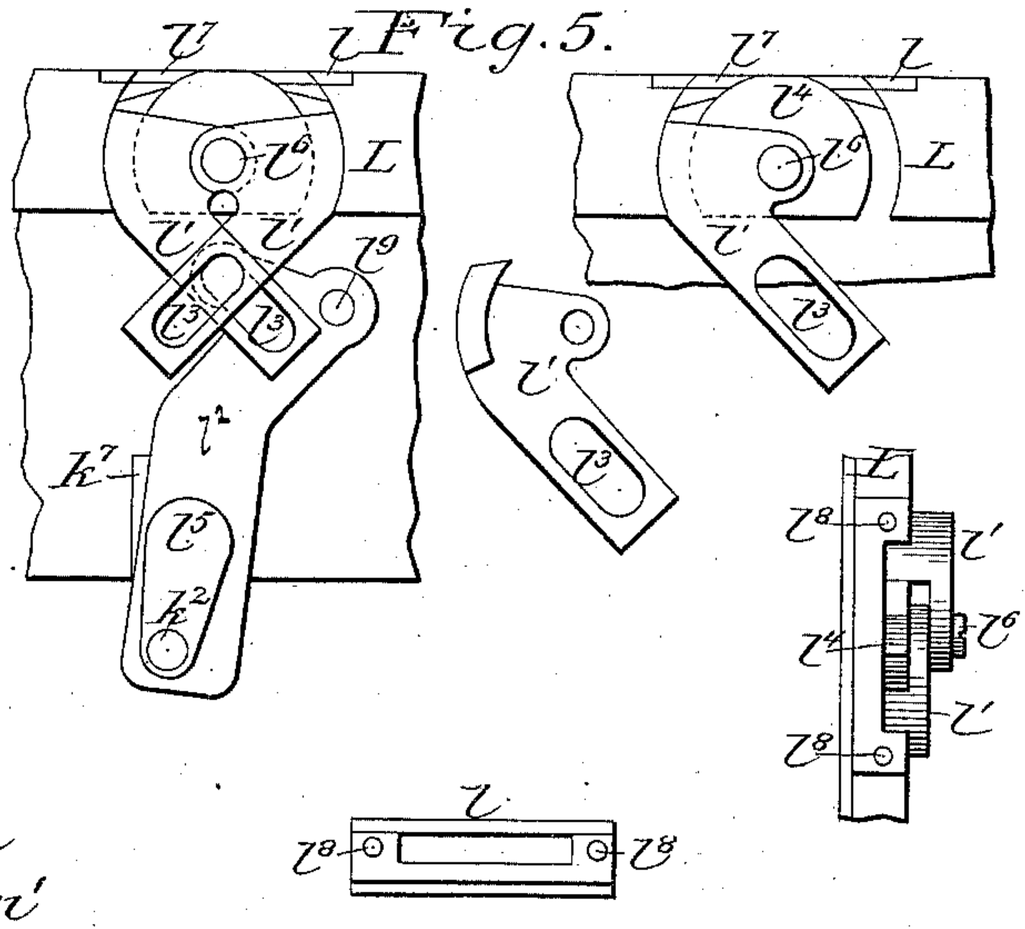
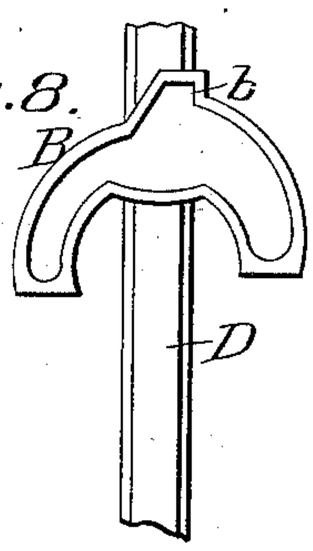


Fig. 6.

Fig. 8.



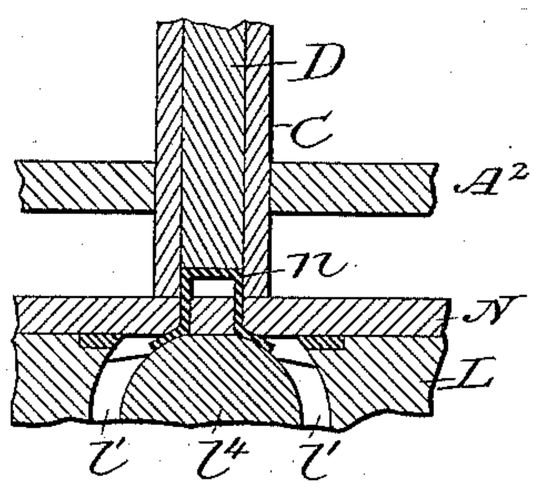


Fig. 7.

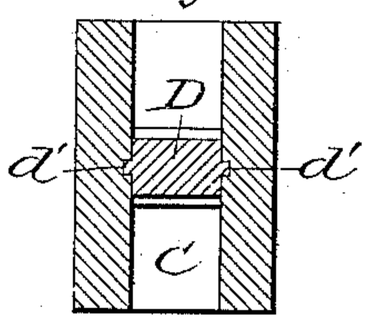


Fig. 9.

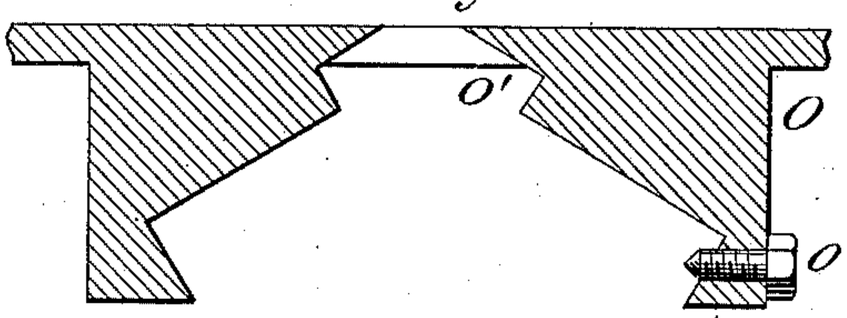
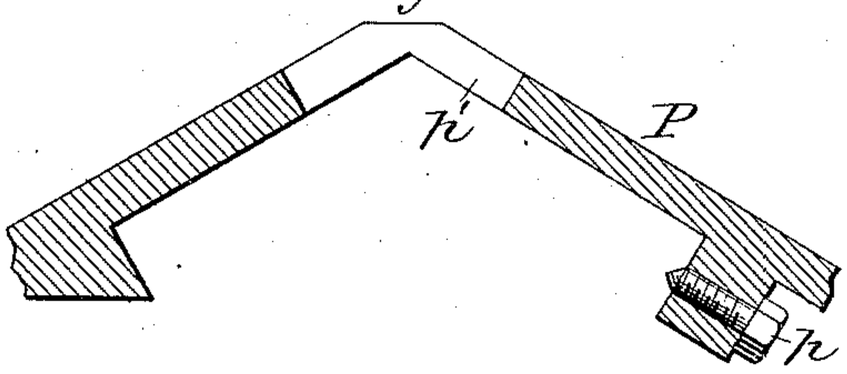


Fig. 10.



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UNITED STATES PATENT OFFICE.

JOHN D. WILBER AND A. BEVERLY SMITH, OF TOWANDA, PENNSYLVANIA.

STAPLING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 330,950, dated November 24, 1885.

Application filed April 17, 1882. Serial No. 58,487. (No model.)

To all whom it may concern:

Be it known that we, JOHN D. WILBER and A. BEVERLY SMITH, citizens of the United States, residing at Towanda, county of Bradford, State of Pennsylvania, have invented a new and useful Improvement in Stapling-Machines, of which the following is a specification.

In the accompanying drawings, Figure 1 is a top view of the machine. Fig. 2 is a side elevation, partly sectional, through the line *x x*, Fig. 1. Fig. 3 is a front elevation of the machine with portions broken away to show staple forming, cutting, and driving mechanism. Fig. 4 is a detailed view of clutching mechanism. Fig. 5 shows details of the clinching mechanism. Fig. 6 shows manner of driving and clinching staples. Fig. 7 is a sectional view of staple former and driver, showing grooves in former in which staple rests after being formed and in which ribs on staple-driver slide. Fig. 8 is a section of staple-driver with cross-head. Fig. 9 shows adjustable plane table. Fig. 10 shows adjustable angular table.

Similar letters refer to similar parts throughout the several views.

On shaft A′ is rigidly secured wheel A, of sufficient diameter and thickness to carry the proper cams in; also, wheel H, carrying mutilated gear *h*, for operating wire-feeding mechanism, and stud h^8, for operating clinching device; also, wheel I, containing spring *i* and bolt i^6; also, on shaft A′ loosely runs the band-wheel J, which, when engaged by clutch-pins i^4 i^4 with clutch-bolt i^6 in wheel I, gives motion to the entire machine.

In face of wheel A, Fig. 3, is cam-groove a^2, in which works stud c^5, Fig. 2, attached to staple-former C. In periphery of wheel A is cam-groove *a*, Figs. 1 and 2, in which works stud C^4 on staple-mandrel C^3. The mutilated gear *h* on wheel H engages with pinion *h′*, secured to gear-wheel h^2, both running on a journal adjustably secured by dovetailed piece h^5 to standard h^3. Gear-wheel h^2 engages with gear-wheel h^4, secured to shaft g^4, revolving in journals g^3 g^3, Fig. 1. On the other end of shaft g^4 is the milled wheel G, rigidly secured. Underneath milled wheel G is idler *g*, also milled, and running in journals *g′* at proper distance from G. If desired, the journals of idler *g* can rest upon a rubber or other suitable spring to allow for variation in the size of wire used. Block e^3, sliding in ways F, Figs. 1 and 3, has secured to its end knife e^7, also ways *e e*, in which slides block E, having secured to it knife e^6, and carrying forked arm *e′*. On block e^3 is wire-guide e^2, also pointer *f′*, sliding over scale *f* on ways F. The block e^3 can be secured in any desired position by set-screw f^2 in ways F. The curved lever e^4, hinged to journal g^3 by pin e^5, extends through the forked arm *e′* sufficient distance to engage with pin a^4 on wheel A. Lever e^4 is sustained in position by spring e^8 resting on way F. Staple-former C slides freely in ways C′ C′. On the inner faces of its forks or prongs, and extending its entire length, are grooves *d′ d′*, Fig. 7, in which staple is pressed when formed, and in which ribs *d d*, Figs. 3 and 7, of staple-driver D work. Former C and standard C^2 form guides, through which the staple-driver D works. On staple-driver D is shoulder c^2, on which rests spiral spring *c′*. Cross-head B, of proper shape, containing in its upper portion the angular recess *b*, is attached to driver D, Figs. 3 and 8. In B works pin a^3, extending from projection A′ on wheel A. On plate A^2 is staple-mandrel C^3, sliding in dovetailed ways formed in lower portion of standard *a′*. On C^3 is stud c^4, which works in cam-groove *a* on periphery of wheel A. Below plate A^2, directly under staple forming and driving mechanism, is table-standard L, supported by spring k^4 k^4 k^4, Fig. 2, which rests on base K. In standard L, Fig. 3, is slot k^6, working over stop k^5, which limits the upward movement of standard L by spring k^4. The base K is made so as to form a support for the spring k^4 and guides or ways for standard L. Attached to standard L is the clinching mechanism, (shown in its various detail in Fig. 5,) in which l' is a circular groove in which clinchers l' l' vibrate around pin l^6, forming common center. The lower portions of l' l' contain slots l^3 l^3, through which projects a pin on the end of lever l^2. The clinchers l' l' are so formed as to cross each other. Lever l^2 is fulcrumed at l^9 and extends downward, having in its lower part opening l^5, in which one end of lever k^2 works. k^2 is fulcrumed on pin k^3, Fig. 2, and engages with lower end of lever h^6, which is fulcrumed on stud *k′*. The upper end of h^6

engages with pin h^8 on wheel H. The plane table, Fig. 9, designed for flat work, is attached to standard L and secured by set-screw *o*. The shouldered projection o^2 on standard L, Fig. 2, enters recess *o'*, Fig. 9, the throat-plate *l* forming part of the table. The angular table, Fig. 10, fits on and is secured to standard L in a similar manner to the plane table, Fig. 9, and is intended for use in work requiring staples to be driven through the center of a fold, as through the center of a pamphlet, the angular-shaped table being preferable for that purpose. In Fig. 4 lever i^2 is fulcrumed on pin i^6, and carries on its upper end the plunger i^5. On lower end of i^2 is catch i^7, hinged at i^3 with i^2, and is held in position by spring i^9. M is a rod sliding in standards m^2 m^2, and connected at one end with a treadle or other suitable mechanism, and having secured to its other end plate *m* by set-screw *m'*. The coiled spring m^3 encircles M between supports m^2 m^2, holding M in proper position.

In operation motion is given the band-wheel J, which carries on its face pins i^4 i^4. The rod M, Fig. 4, being drawn forward, the plate *m* engages with catch i^7, and through lever i^2 thrusts plunger i^5 against clutch-bolt i^6, forcing it through wheel I and clutching against pin i^4. Plate *i'*, secured to standard *a'* by bolt i^9, contains a slot, through which plunger i^5 works, and into which at each revolution bolt i^6 is thrust by spring *i'*, thereby unclutching wheel I from band-wheel J. As the rod M is drawn forward after making the clutch, the point of the catch i^7 slips over the edge of plate *m*, thereby releasing the lever i^2 and allowing the plunger i^5 to be forced back by the bolt i^6 on its arriving opposite the slot in plate *i'*. The rod M being released, spring m^3 forces it back to its original position, the hinge of catch i^7 allowing plate *m* to pass readily underneath the point of i^7. Should continuous motion be desired, plate *m* is revolved until its longer face will engage with clutch i^7 and not pass under, thereby retaining the lever i^2 in position to keep the machine in clutch. On motion being given, the mutilated gear *h* engages with pinion *h'*, which is secured to wheel h^2, which in turn engages wheel h^4, giving sufficient rotation to milled wheel G to feed the proper length of wire. For different-sized staples, requiring different lengths of wire, the necessary variation in movement of milled wheel G is obtained by changing the sizes of intermediate gear-wheel, h^2. Gear-wheels of the required sizes, having pinions *h'* of a standard size, are attached to dovetailed blocks, h^5 fitting in standard h^3. The wire g^2, being fed by rotation of milled wheel G, passes through guide e^2, between knives e^6 and e^7, Fig. 3, passing the proper distance beyond and over the mandrel C^3. At this point the stud a^3 on wheel A enters the angular recess *b* in cross-head B, allowing spring *c'* to force driver D down firmly upon wire g^2, clamping it upon mandrel C^3, a small groove in bottom of driver D centering the wire and holding it rigidly while being cut and formed. The angular recess *b* in cross-head B allows the said dropping of D, independent of action of stud a^3, during a portion of its revolution. At this moment the pin a^4 strikes lever e^4, forcing down knife e^6 past knife e^7, and thus severing the wire by a shear cut. At this instant cam-groove a^2, operating on former C, forces it down and over mandrel C^3, forming the staple, and clamping the material to be stapled between it and the table. At this point cam *a* in periphery of wheel A retracts the mandrel C^3 a proper distance. At this time stud a^3 engages cross-head B, forcing driver D down, driving the staple into and through the article to be stapled. The ends of the staple striking the semicircular anvil l^4, Fig. 6, are forced outwardly over the inclined faces of clinchers *l' l'*. At this moment, and while the article to be stapled is held firmly between the ends of former and driver and the spring-table, stud h^8 on wheel H strikes lever h^6, and through levers k^2 and l^2 a quick upward thrust is given to clinchers *l' l'*, bending the prongs of the staple outward at right angles and firmly against the article stapled. The stud h^8 having disengaged from lever h^6, the clinching mechanism is brought to its first position through the action of a suitable spring or counter-weight on lever h^6. The former C and driver D are then raised by cam a^2 and stud a^3, and C^3 is thrust forward by cam *a*, all in readiness for another staple. The object of supporting the tables by spring-standard L and spring k^4 is to make an automatic adjustment for the varying thickness of work. The proper distance for inserting the work between plate A^2 and the table is maintained by stop k^5 on base K. Staple-former C and driver D are brought down sufficiently to compress spring k^4 in stapling the thinnest work. The spring is of sufficient strength to properly clamp the thinnest work to be stapled, and, as thicker material requires heavier clamping, this object is attained by the proportionate greater or less compression of the spring k^4 by the varying thickness of the work inserted. The advantages of supporting the table on a spring or springs are, obviating the adjustment of the machine to each thickness of work and the liability to breakage through imperfect adjustment or accidental insertion of any extra thickness of material, which objections attach to every machine having a positive adjustment to its table.

The irregular V-shaped opening l^5 in l^2, in which lever k^2 works, is for the purpose of giving the same thrust to the clinchers *l'* in whatever position the table may be, through having thicker or thinner material on it for stapling. This is accomplished by widening the opening C^5 in proportion to the lessening of the working radius of lever l^2.

Having thus described our invention, what we claim as new therein, and desire to secure by Letters Patent, is—

1. The mutilated gear h, changeable wheels h' h^2, and gear-wheel h^4, in combination with the milled feed-wheels G and g, substantially as and for the purpose specified and shown.

2. In a wire-stapling machine, the pin a^4, spring e^8, lever e^4, arm e', block E, and knife e^6, in combination with ways e e, slide e^3, and knife e^7, all arranged substantially as shown and specified.

3. In a wire-stapling machine, the recessed cross-head B, in combination with driver D, spring c', and mandrel C^3, substantially as and for the purpose set forth.

4. The staple-driver D, with its cross-head B, guide C^2, spring c', shoulder c^2, and crank-pin a^3, in combination with mandrel C^3 and staple-former C, substantially as and for the purpose set forth.

5. In a wire-stapling machine, the table-standard L, with angular shoulders o^2 o^3, and throat-plate l, so arranged as to form an attachment to suitable tables, substantially as set forth and shown.

6. In a wire-stapling machine, the table-standard L, throat-plate l, shoulders o^2 o^3, in combination with table P, having opening p', and secured by set-screw p, and shoulder o^3, substantially as and for the purpose set forth and shown.

7. The anvil l^4, with circular sides forming ways, in combination with the clinchers l' l', arranged substantially as shown and specified.

8. In a wire-stapling machine, the clinchers l' l', with slots l^3 l^3, working on a common center, l^6, in combination with anvil l^4 and lever l^2, substantially as and for the purpose set forth.

9. The lever l^2, containing V-shaped slot l^5, in combination with clinchers l' l', anvil l^4, throat-plate l, and lever k^2, substantially as and for the purpose shown and described.

10. In a wire-stapling machine, the pin h^8, levers h^6 k^2, in combination with lever l^2 and clinchers l' l', substantially as and for the purpose specified.

11. The combination of lever k^2 and lever l^2, for operating the clinchers, and having opening l^5, with standard L, having recess k^7, substantially as described.

12. In a wire-stapling machine, the combination of staple-former C, mandrel C^3, staple-driver D, pins c^5 c^4 a^3, cross-head B, and cam, having grooves a a^2, all arranged substantially as and for the purpose shown and specified.

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