(No Model.) 3 Sheets—Sheet 1.

E. PREUSSE.

MACHINE FOR STITCHING BOOKS WITH WIRE STAPLES.

No. 298,117. Patented May 6, 1884.

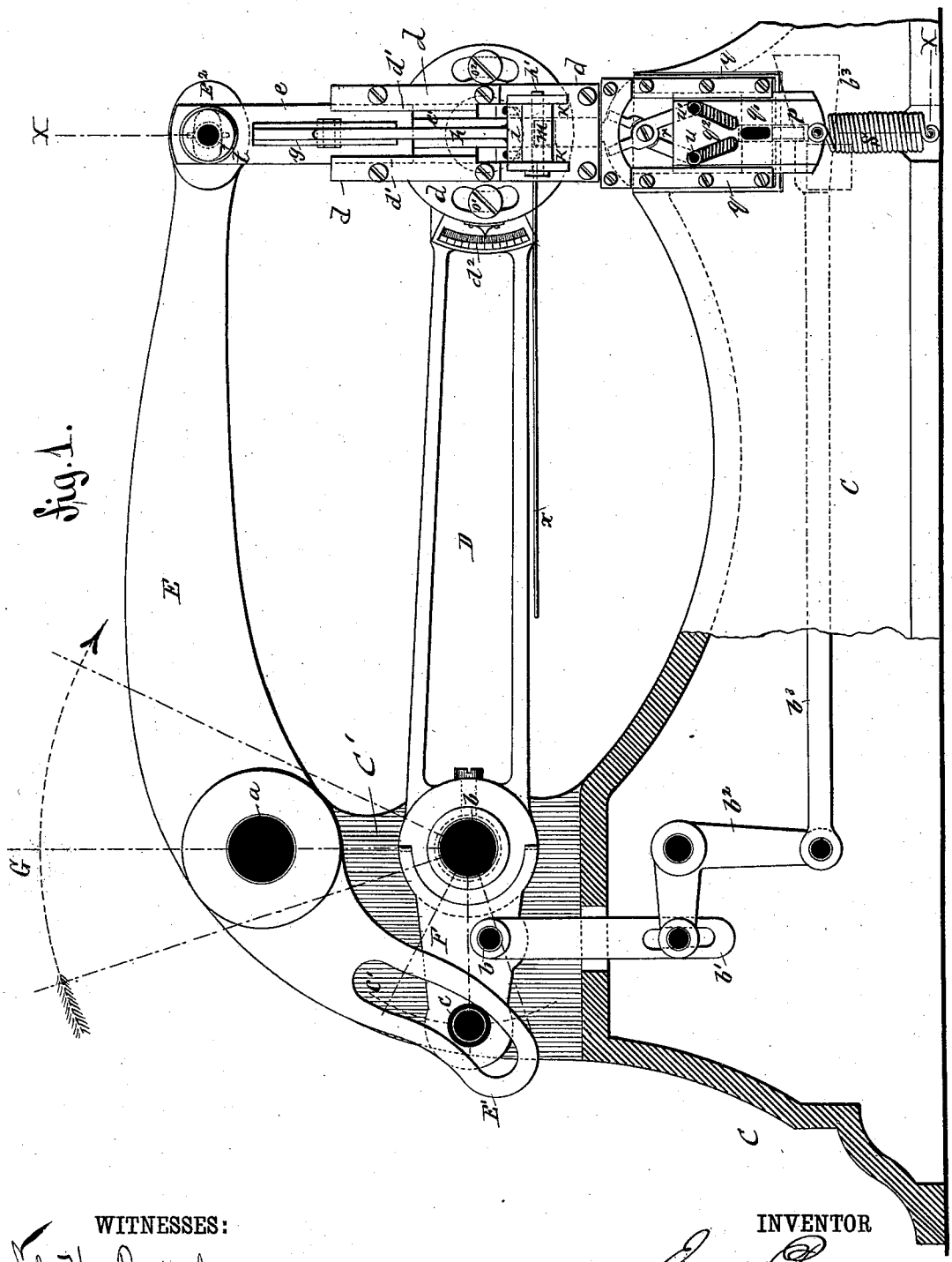

Fig. 1.

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(No Model.) 3 Sheets—Sheet 2.

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Fig. 2.

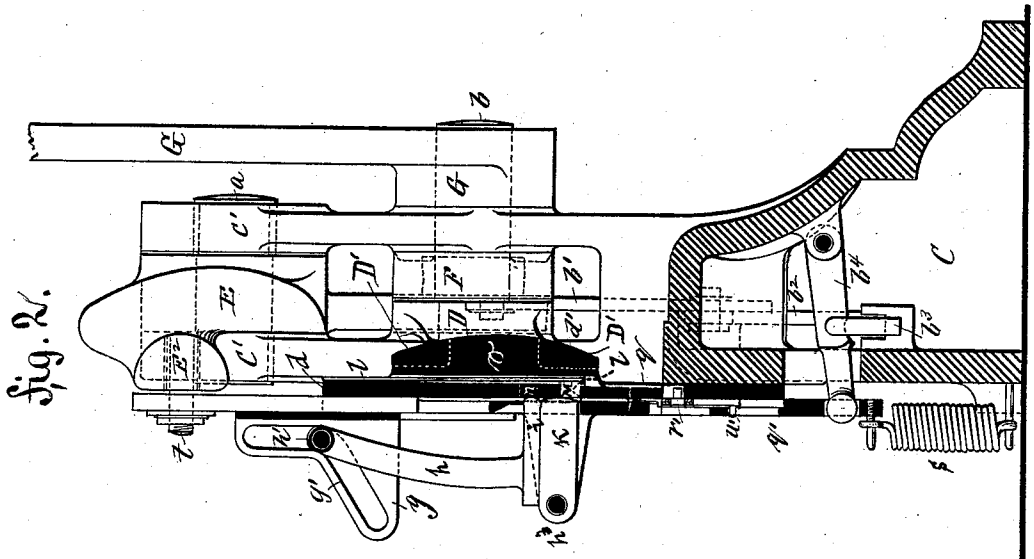

Fig. 5.

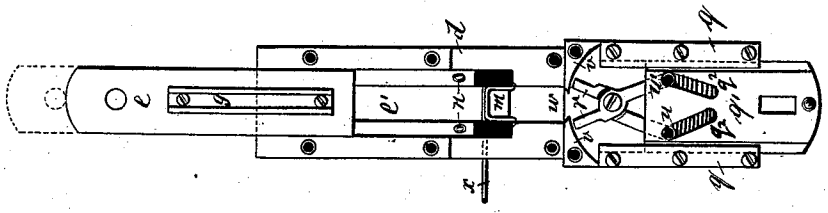

Fig. 4.

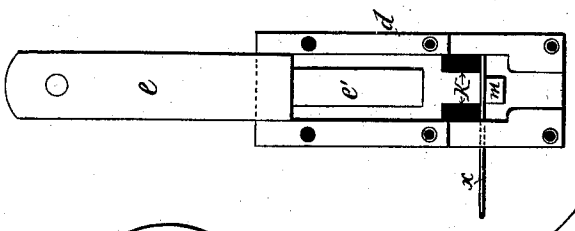

Fig. 3.

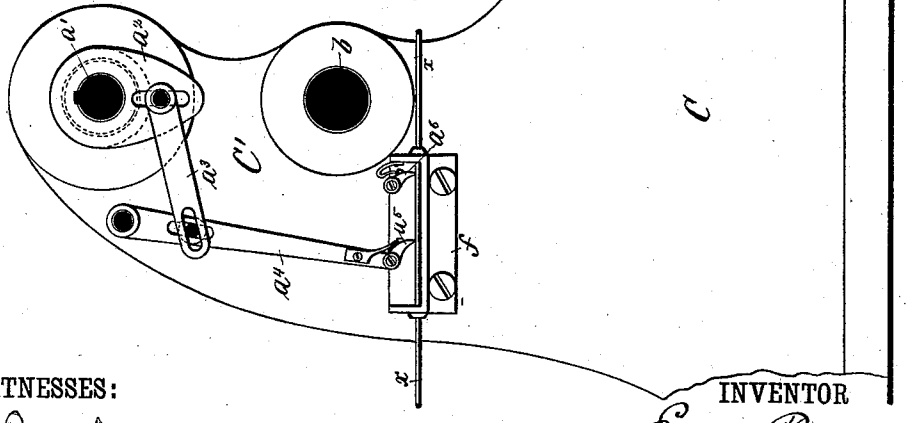

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Fig 6

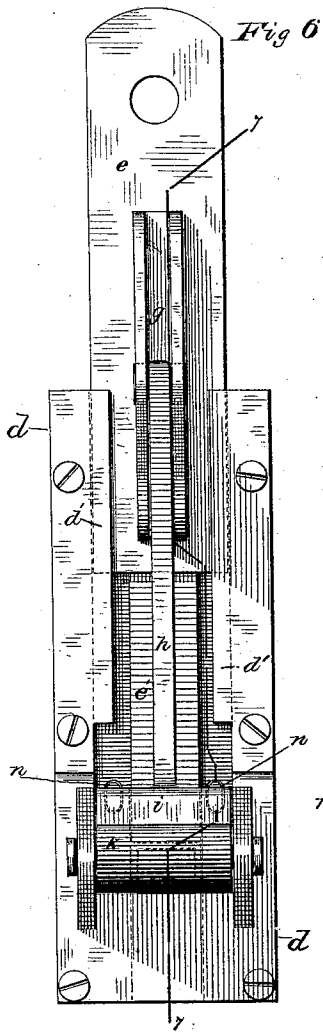


Fig 9.

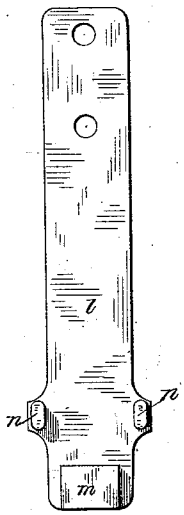


Fig 7.

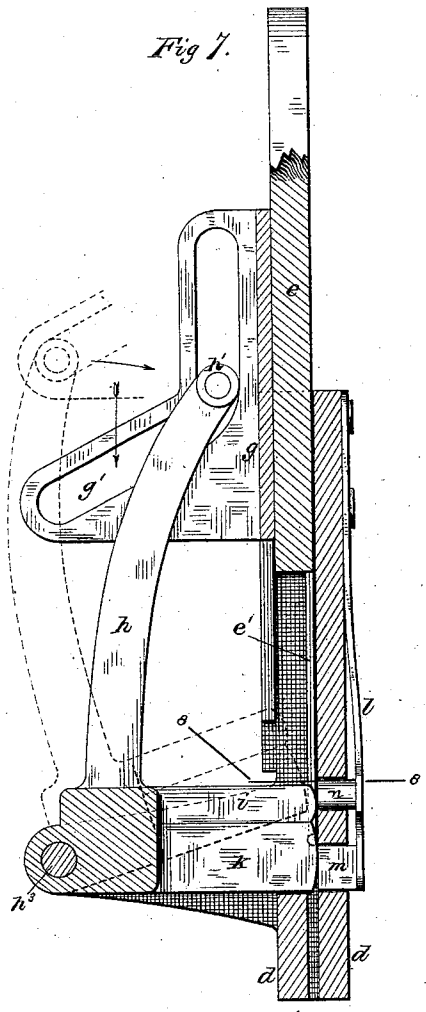
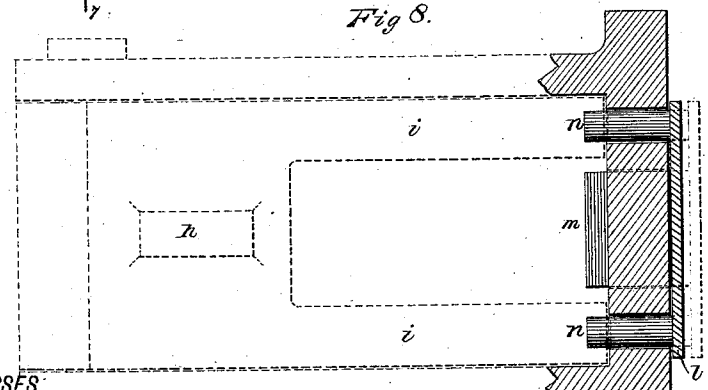


Fig 8.



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UNITED STATES PATENT OFFICE.

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MACHINE FOR STITCHING BOOKS WITH WIRE STAPLES.

SPECIFICATION forming part of Letters Patent No. 298,117, dated May 6, 1884.

Application filed April 26, 1883. (No model.)

To all whom it may concern:

Be it known that I, ERNST PREUSSE, a subject of the King of Saxony, German Empire, residing at the city of Plagwitz-Leipsic, in the Kingdom of Saxony, German Empire, have invented certain new and useful Improvements in Machines for Stitching Books with Wire Staples, of which the following is a specification.

This invention has reference to an improved machine for stitching books, pamphlets, &c., by means of metallic wire staples that are driven through the paper, and then closed up on the same.

The invention consists in the peculiar construction of adjustable wire-feed mechanism.

The invention consists, further, in a novel combination of parts constituting the driving mechanism.

The invention consists, further, in a novel staple-forming mechanism.

In the accompanying drawings, Figure 1 represents a side elevation, partly in vertical section, of my improved machine for stitching books with wire staples. Fig. 2 is a vertical transverse section of the same on line *x x*, Fig. 1. Fig. 3 shows a detail side view of the mechanism for intermittently feeding the wire for the staples. Figs. 4 and 5 are detail side views of the mechanism for cutting off the wire, shaping the staples, and forcing them through the paper. Fig. 6 is a side view of the forming and driving mechanism. Fig. 7 is a vertical section of the same on line 7 7 of Fig. 6. Fig. 8 is an enlarged transverse section of the same on line 8 8 of Fig. 7. Fig. 9 is an enlarged face view of the spring with its former and pins.

Similar letters of reference indicate corresponding parts.

Referring to the drawings, C represents the base of my improved machine for stitching books by means of wire staples, which base is preferably made of cast metal of suitable strength, and provided at one end with two upright standards, C′, in bearings of which the actuating-shaft *b*, that imparts motion to the different actuating mechanisms, is supported.

To the shaft *b* is secured, at its end outside of the standards C′, the hand-lever G, by which the machine is operated.

In the space between the upright standards C′ C′ are arranged the pivoted arm D, through which the shaft *b* passes, and the crank-arm F, that is keyed to the shaft *b*. The arm D carries at its opposite end a casing, *d*, which supports the mechanisms for shaping the wire staples, and serves as a guide for the head for driving them through the books to be stitched.

Below the mechanism by which the shaping and driving of the wire staple is produced is arranged at the front end of the base C the mechanism by which the ends of the staples, after the same have been driven through the paper, are bent up and pressed against the under side of the book to be stitched. The crank-arm F is connected by a pin or roller, *c*, with the slotted rear arm, E′, of a lever, E, that is fulcrumed to the upper part of the uprights C′ C′. The slot *c′* of the rear arm, E′, is made of such a shape that the required motion of the lever E is imparted by the action of the crank-arm F on the outwardly-curved lower part of slot *c′*, while the crank-arm F exerts no influence upon the lever E when its pin *c* passes through the upper part of the slot *c′*, that is concentric to the shaft *b*.

To the opposite end, E^2, of the lever E is applied by a pivot-pin, *t*, a slide-piece, *e*, that is guided in ways *d′ d′* of the frame *d*, and provided with a push-piece, *e′*, at its lower end, that serves to drive the wire staple through the paper. The crank-arm F operates also, by a pivot-link, *b′*, fulcrumed bell-crank lever b^2, connecting-rod b^3, having a wedge-shaped outer end, and a transverse lever, b^4, a vertical slide-piece, *q′*, that is guided in ways *q*, attached to the base C, so as to actuate a tong, *r*, which latter forms the mechanism by which the ends of the wire staples are bent and pressed upon the under side of the paper. As the lower end of the pivot-link *b′* is slotted, the crank-arm F actuates the mechanism for closing the wire staples when nearly at the end of its upward stroke after the mechanisms for shaping and driving the staples have completed their motions. The slide-piece *q′* is returned into its lower position by the action of a strong spiral spring, *s*, when the upward pressure on the slide-plate *q′* by the lever b^4 and rod b^3 is relaxed, at which moment the

hand-lever G has been returned to its normal position of rest. The lever is returned either by hand or by means of a strong spring, so as to be ready for the next stroke.

The feeding of the wire which is used for forming the staples is accomplished from the shaft *a* of the lever E by means of a crank or eccentric, a^2, that is keyed to the outer end, a', of shaft *a*, connecting-link a^3, and lever a^4, which latter is pivoted at its upper end to the outside of the front standard, C', and provided at its lower end with a spring-pawl, a^5, that engages the wire *x*. A check-pawl, a^6, is pivoted in front of pawl a^5 to the guide-bracket *f*, through holes of which the wire is passed. By the motion of the lever a^4 the pawl a^5 presses the wire against the guide-bracket *f* and moves it forward for such a distance as is required for the length of one staple-blank. The check-pawl a^6 then takes hold of the wire and retains it while the lever a^4 is moved backward, so as to re-engage the wire and feed it forward for the length required for the next staple-blank by the next motion of the hand-lever G, and so on. The crank a^2 is slotted, also the link a^3 and lever a^4, their connection being made by clamp-screws, whereby the stroke of the lever a^4 and the exact length of wire required for the blanks of different sizes are obtained. As soon as the wire *x* is moved forward for the distance required, the lever E is lowered by the action of the hand-lever G and crank-arm F, and thereby the slide-piece *e* moved in downward direction in the ways of the casing *d*.

The slide-piece *e* is provided with a fixed and laterally-extending bracket-piece, *g*, the angular slot *g'* of which engages an anti-friction roller, *h'*, at the upper end of a lever, *h*, which is rigidly connected at its lower end to the cutting and shaping pieces *k k*, that are pivoted at h^3 to a laterally-projecting bracket of the casing *d*. The wire *x* passes through a side opening of the frame *d* below the cutting and shaping pieces *k k* and over a shaping-block, *m*, which latter is arranged intermediately between the cutting and shaping pieces *k k*, so that when the latter are lowered by the action of the slotted bracket-piece *g* on the lever-arm *h* a piece of wire of a size required for the staple is cut off, and then formed into U-shape staple on the block *m*, as shown clearly in Figs. 4 and 5. The block *m*, around which the wire staple is shaped, is applied to the lower part of a strong band-spring, *l*, which is attached at its upper end to the rear part of the casing *d*. This band-spring *l* also carries above the shaping-block *m* projecting pins *n n*, that pass through holes of the casing *d*. The block *m* projects through an opening of the casing *d* far enough to permit the shaping of the wire blank on the same by the action of the cutting and shaping pieces *k k*, while the pins *n n* project to such an extent as to cause the pressing back of the block *m* after the staple has been formed by the action of an oscillating plate, *i*, on the pins *n n*. The plate *i* forms a part of the lever *h*, and oscillates with the same on the pivot-pin *h'*, so that when the lever *h* has arrived at its foremost position the pins *n n*, as well as the block *m* and their spring *l*, are pressed back and clear the path for the staple *z* and push-piece *c'*, so as to cause the driving of the staple through the paper by means of the push-piece *c'*. The tong *r* of the staple-closing device engages the ends of the staple that project at the under side of the paper, and bends them by the closing action caused by the slide-piece *q'* and the pins *u u'*, which move in converging slots q^2. The upper ends of the tong *r* move along arc-shaped guards *v v*, and act upon the projecting ends of the staples *z* only when they clear said guards, so as to complete the bending up and tight pressing of the ends of the wire staple against the under side of the paper.

The arm D may be turned slightly on the shaft *b*, as indicated in dotted lines, Fig. 1, to raise or lower the outer end thereof, according as a thick or thin book is to be stitched.

The casing *d* is axially adjustable on the outer end of the arm D, so as to secure the proper position of the guideways *d'* relative to the guideways *q* of the staple-closing tong *r* in the different positions in which the arm D is adjusted to suit the varying thicknesses of the books to be stitched, said casing or disk *d* being provided with a boss, *o*, which turns in a socket in a circular enlargement, D', at the outer end of the arm D. Set-screws o' o^2 pass through arc-shaped slots of the circular casing *d* and secure the same to the enlargement D', said slots permitting the axial adjustment referred to.

The end d^2 of the arm D is provided with a graduated scale, along which moves an index-hand of the casing *d*, by which the exact adjustment of the casing and its mechanisms toward the bending mechanism in the lower part of the base-frame C is accurately secured, as required by the different thicknesses of paper to be stitched and the size of staples used for stitching the paper.

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

1. The combination, in a staple-forming mechanism for book-stapling machines, of a shaping block or mandrel, over which the wire is fed, hinged cutting and shaping jaws adapted to swing down on either side of said block, and means, substantially as described, for withdrawing said block from between the jaws after the staple is formed, substantially as described.

2. In a machine for stitching books with wire staples, the combination of the hand-lever G, shaft *b*, fixed arm D, having casing *d d'* at the outer end, crank-arm F, fulcrumed lever E, and slide-piece *e*, having push-piece *c'*, with means for cutting off and shaping the wire staple, and means whereby the staple ends are bent and closed after the same have been forced through the paper, substantially as set forth.

3. In a machine of the class described, the

combination of casing *d*, vertical slide-piece *e*, push-piece *e'*, slotted bracket *g*, lever *h*, cutting and shaping pieces *k k*, plate *i*, pins *n n*, and shaping-block *m*, the latter two being applied to a strong band-spring, *l*, so as to release the bent staple for being forced into the paper, substantially as set forth.

4. The combination, with the main shaft, of an intermittent feeding mechanism consisting of a slotted crank-arm on said shaft, an oscillating lever, a slotted link connecting said crank-arm and lever, means, substantially as described, for adjusting said slotted link on the crank-arm and lever for regulating the feed. a spring-pawl at the lower end of said lever for grasping the wire to feed it forward, a guide for the wire, and a spring pawl for holding the wire during the backward movement of the lever, substantially as described.

5. The combination, in a staple-forming mechanism for book-stapling machines, of a frame, a spring attached thereto provided with a shaping-block and projecting pins, pivoted shaping-jaws adapted to bend the wire over said block, and curved faces movable with said jaws, adapted for contact with said pins for pushing back said spring to withdraw the block from between said jaws when a staple is formed, substantially as described.

6. The combination of a bed, a staple-clinching mechanism, substantially as described, a lever, E, a staple-driver, as *e*, pivoted to said lever, a pivoted arm, D, adjustable with reference to the bed to suit the thickness of the book, a frame, *d*, axially adjustable on said arm, and provided with ways in which the driver slides, and suitable actuating mechanism, substantially as described, said pivoted arm being provided with a graduated scale, and said adjustable frame being provided with a pointer, whereby the proper adjustment is indicated for the given thickness of a book to be stitched, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

ERNST PREUSSE.

Witnesses:
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B. ROI.