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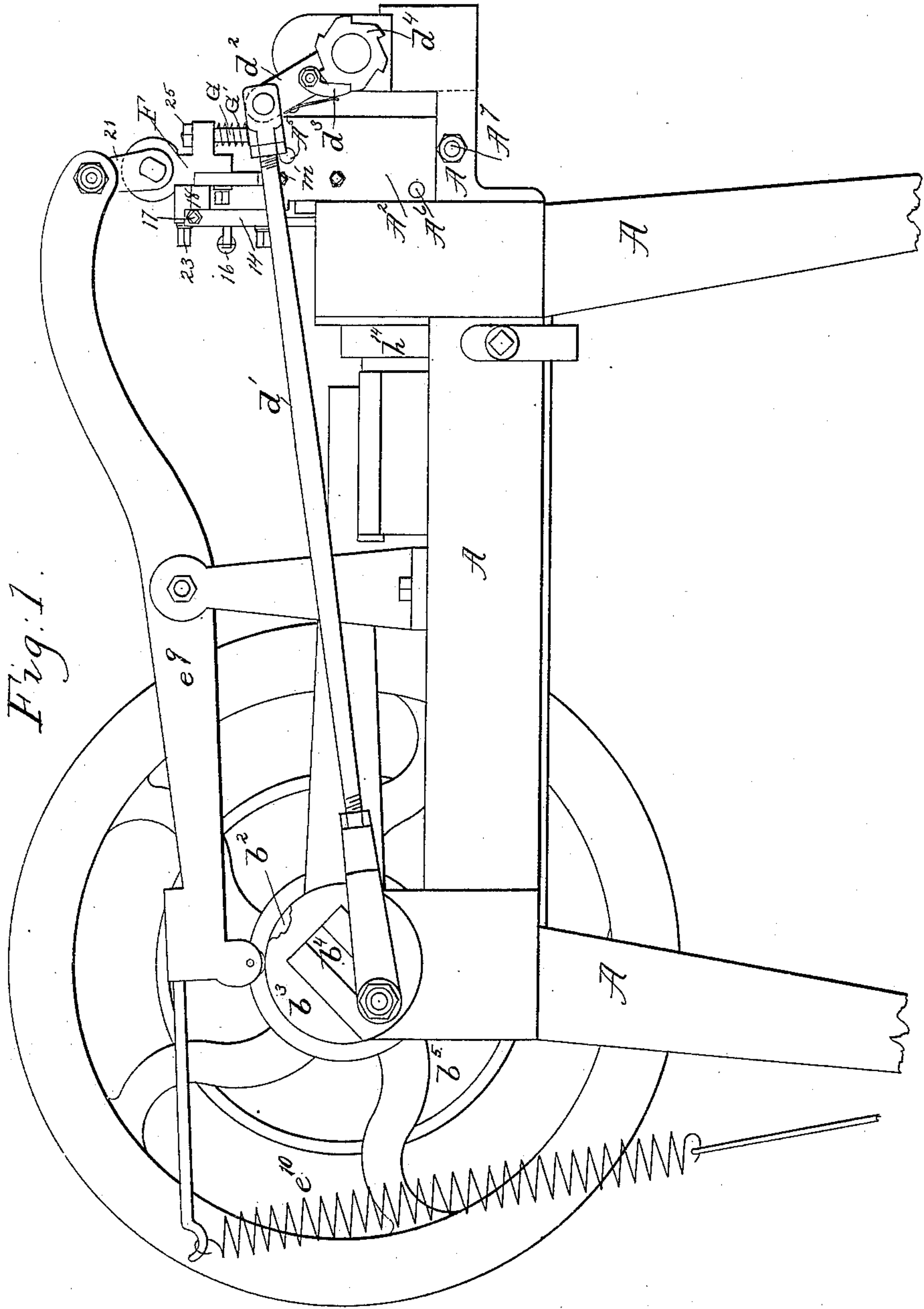
3 Sheets—Sheet 1.

J. E. KIMBALL & W. AVERY.

MACHINE FOR MAKING WIRE NAILS.

No. 333,863.

Patented Jan. 5, 1886.



Witnesses
Thos. L. Conroy
John F. C. Pringle

Inventors
Joseph E. Kimball
William Avery
by Conroy & Pringle attys

(No Model.)

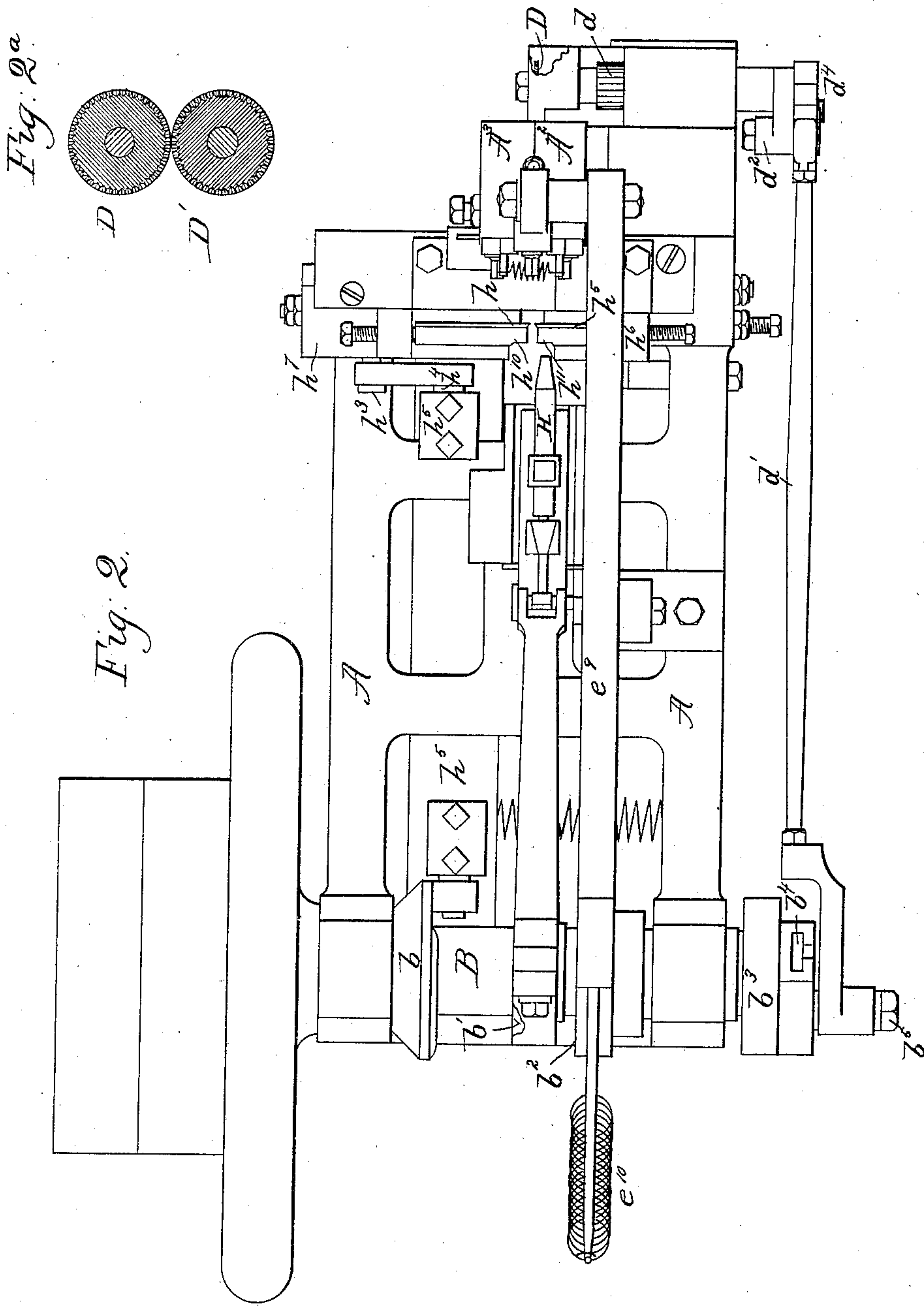
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Frederick L. Conner
John F. C. Pringle

Inventors.
Joseph E. Kimball
William Avery
by *Crosby & Gregory* attys

(No Model.)

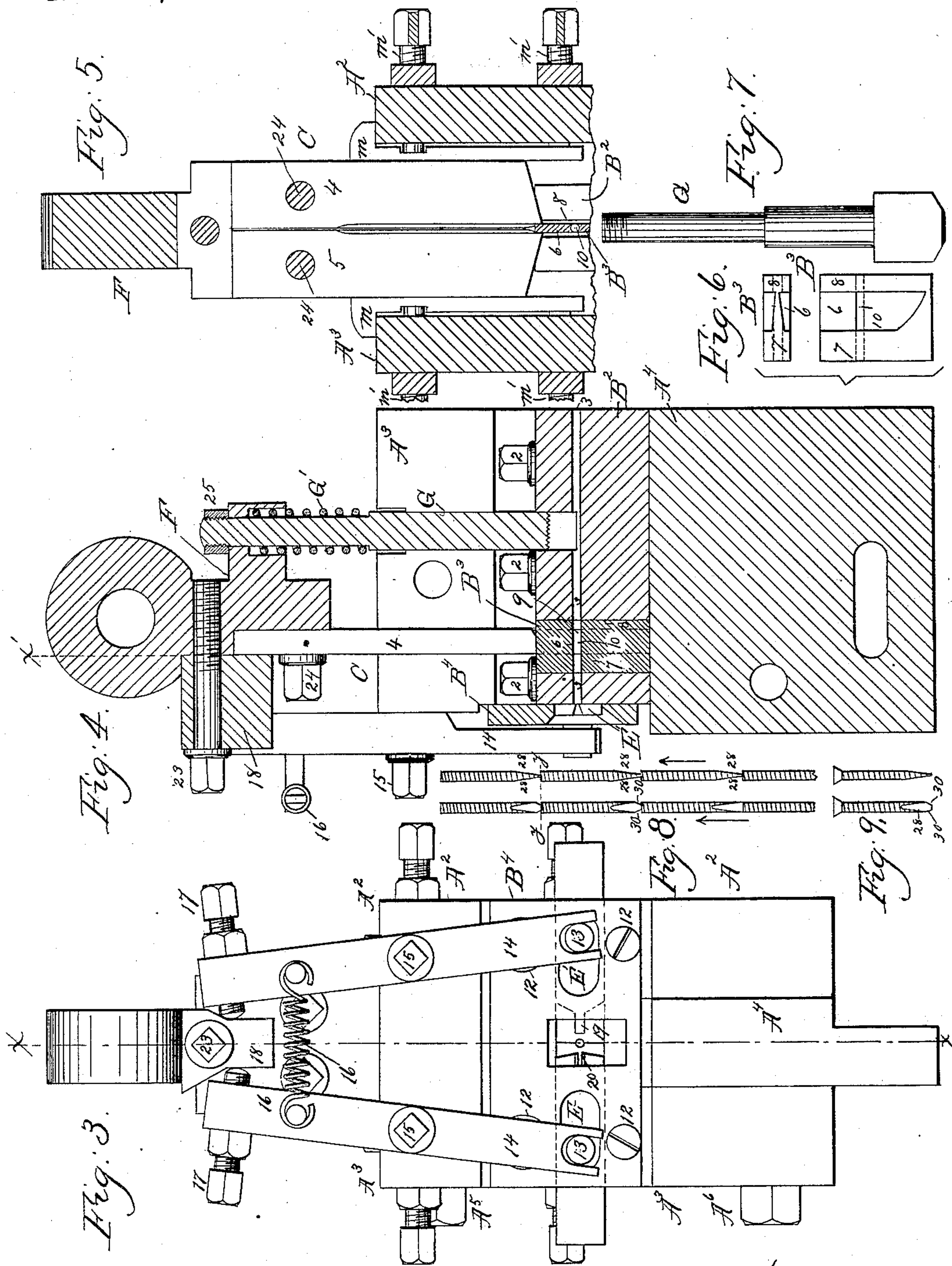
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Witnesses

B. J. Droyes
John F. C. Printz

Inventors.

Joseph E. Kimball
William Avery
by *Crash & McQuay* *Attys.*

UNITED STATES PATENT OFFICE.

JOSEPH E. KIMBALL AND WILLIAM AVERY, OF MILFORD, MASSACHUSETTS.

MACHINE FOR MAKING WIRE NAILS.

SPECIFICATION forming part of Letters Patent No. 333,863, dated January 5, 1886.

Application filed May 18, 1885. Serial No. 165,823. (No model.)

To all whom it may concern:

Be it known that we, JOSEPH E. KIMBALL and WILLIAM AVERY, of Milford, county of Worcester, State of Massachusetts, have invented an Improvement in Nail-Making Machines, of which the following description, in connection with the accompanying drawings, is a specification, like letters on the drawings representing like parts.

The invention herein contained is an improvement upon the machine described in another application made by J. E. Kimball, Serial No. 52,159, filed February 8, 1882. That application shows and describes a machine for producing nails of the class known as "clinch-
ing" nails or screws, the machine being adapted to form such nails or screws with or without heads, the clinching-points being formed by milling-tools while the nail or screw is yet connected with the main body of the wire, instead of when in short pieces corresponding in length with that of the nail or screw to be made.

Our present invention has for its object the production of a machine by which the bevel-surface for the clinching-points may be formed by a punch and die, rather than by means of milling-tools.

We have provided the machine with cutters to remove parts of the said bevel-surfaces, leaving chamfers for the corners of each clinching-point as each nail is detached from the wire, as will be hereinafter described, the nail or screw to be produced by the said machine being described in an application of J. E. Kimball, Serial No. 161,140, for United States Patent.

Our invention consists, mainly, in the combination, with a pair of punches, of a peculiar die or support, which is wedge-shaped at its middle portion and enlarged at the apex of the wedge, and the acting wedge-shaped surface of which is flush with the interior surface of the wire-passage formed by the enlarged portions of the die; also, in the combination, with a punch and die to cut the wire to form a clinching-point, of a pair of cutters moved at right angles to the line of movement of the punch, whereby the point-forming portion, shaped by the punch and die, is beveled or chamfered, substantially as will be described.

Other features of our invention will be hereinafter described, and pointed out in the claims.

Figure 1, in side elevation, represents a machine embodying our present invention; Fig. 2, a top or plan view thereof. Fig. 2^a is an enlarged detail showing the feeding and corrugating rolls in section; Fig. 3, a rear side elevation, on a larger scale, of the head carrying the cutters and punch and die; Fig. 4, a section of Fig. 3 in the dotted line *xx*; Fig. 5, a partial section of Fig. 4 in the dotted line *xx'*, looking toward the right; Fig. 6, details of the die or support which co-operates with the punch. Fig. 7 shows the clamp in elevation. Fig. 8 shows in two views a piece of wire in the process of being formed into nails or clinching-screws, the left-hand view representing the wire as turned one-fourth around from the position shown by the right-hand view; and Fig. 9 represents in two views one of the improved nails or screws to be made on the machine herein to be described, the said nail being provided with a head, the headed nail being supposed to have been detached from the upper end of the wire of Fig. 8.

The frame A, cam-shaft B, cams *b* *b*², eccentric *b'*, slide-block *b*⁴, crank-pin *b*⁵, disk *b*³, feeding and corrugating rolls D D', pinion *d*, link *d'*, lever *d*², pawl *d*³, ratchet *d*⁴, on the shaft of the undermost feed and corrugating roll, the lever *e*⁹, spring *e*¹⁰, cutting-off blades *h* *h*⁵, gripping-dies *h*¹⁰ *h*¹¹, slide *h*⁷, stud *h*³, wrist-pin *h*⁴, connected therewith by a link, the rock-shaft *h*⁵, operated by cam *b*, slide *h*⁶, and header H are all as in the application, Serial No. 52,159, to which reference may be had, wherein like parts are designated by like letters, so need not be herein specifically and exactly described.

The principal novel devices of our invention are contained in a head composed of two side plates, A² A³, and a center piece, A⁴, the two side plates being bolted together by bolts A⁵ A⁶, the latter bolt being extended through the center piece, the center piece in turn being attached by bolt A⁷ to the main frame-work A.

Between the side plates, A² and A³, and at the top of and secured to the center piece, A⁴,

by bolts 2 are the guide-blocks B^2 , containing the opening 3 for the passage of the wire to be formed into clinching nails or screws. These guide-blocks receive the die or support B^3 for the wire while it is being acted upon by the two-part or bladed or bifurcated punch C, its separate parts being marked 4 5. The die or support B^3 , made from steel, is in cross-section, substantially as shown in Fig. 6, the enlarged ends 7 8 forming integral parts of the narrow wedge-shaped connecting-web 6, thus strengthening the said die and preventing the narrow web 6 from breaking, which would be liable to occur if the end 8 were omitted. The ends 7 and 8 enter correspondingly-shaped grooves in the guide-blocks B^2 .

The die B^3 is best made by forming a wire-passage through a steel block, and then milling into each side of that block, as shown in Fig. 6, the block so shaped being subsequently hardened, although, as will be obvious, the die may be formed with its bearing-surface at one end of the steel block.

This feature of our invention being a die or support which sustains one side of the wire against the stress of the double punch, and which is wedge-shaped with the small end of the wedge supported by the enlarged portion 8, the larger end of the wedge does not require any additional support, but for greater convenience in holding the die B^3 firmly between the guide-blocks B^2 we prefer to make the end 7 as shown. It will also be obvious that the guide-blocks B^2 and the die B^3 may all be in one piece, but when made as shown the expense is lessened and a new die, B^3 , may readily be inserted.

An essential feature of our invention is the wire-passage 9, one wall of which forms a rest or surface, 10, by which one side of the wire is supported against the pressure of the punch C, which surface 10 is wedge-shaped and re-enforced at its small end by the enlargement 8, but when made as shown the web 6, opposite the acting surface 10, acts as a guide for the double punch C.

The advantages of this feature of our invention are that the point can be formed in the shape of a wedge whose small end is very thin, and yet this thin edge be not bent, nor cracked or injured in any way, and this is owing to the fact that the thinnest portion of the web 6 is re-enforced by the enlarged portion 8.

We are aware that a wedge-shaped support for a wire when under the action of a double punch is not new with us, that being shown in Letters Patent No. 77,104, dated April 21, 1868, and No. 243,601, dated June 28, 1881; but the wedge-shaped support shown in the said patents has not an enlarged portion to re-enforce the apex of the wedge, and without such re-enforcement of the apex of the wedge it is, we have ascertained by experiment, practically impossible to make wedge-shaped clinching-points on a wire, or to produce wire as shown in Fig. 8. The end of the guide-block B^2 has attached to it by screw 12 the cutter-guide B^4 , which is grooved to receive the two cutters E

E', each having a roller or other stud, 13, to be embraced by a forked lever, 14, pivoted at 15, the said levers being attached together above their pivots 15 by a spring, 16. Each of the said levers has an adjusting device, 17, (shown as a screw,) which is acted upon by a wedge-block, 18, the wedge-block being of such shape as to cause the cutter E' to be moved to place its die part 19 in position against the wire before the forked portion 20 of the cutter E comes in contact with the wire to cut the same while supported by the part 19. The lever e^9 at its front end has a link, 21, which is pivotally joined with an eye at the upper end of a cross-head, F, to which is attached not only the wedge-block 18, but also the two members or parts 4 5 of the punch C, and also the wire-clamp G. The wedge-block is attached to the cross-head by the bolt 23, and the two parts of the punch each by a bolt, 24, the clamp G having its shank extended loosely through a hole in the cross-head, and being held therein by a nut, 25. The clamp G, surrounded by a suitable spring, G' , and preferably serrated at its lower end, as shown in Fig. 4, is forced down upon the wire in the passage 3 just as or before the punch C is caused to strike and cut the wire, the clamp holding the latter against longitudinal displacement, destroying all tendency of the wire to twist or roll.

The two parts 4 5 of the die have their contiguous or inner edges shaped to correspond with the sides of the webs 6, the lower ends of the parts 4 and 5 in their descent straddling the said web and cutting out from the main body of the wire at opposite sides all that part of the surface of the wire which is exposed or left accessible above the surface 10, which is the die-surface proper, that co-operates with the punch when the cutting takes place. The cross-head is reciprocated by the lever e^9 , cam b^3 , and spring e^{10} .

Referring to Fig. 8, the indentations or corrugations in the wire are supposed to have been made by the feeding and corrugating rolls D D', and at proper intervals, according to the length of the nail or screw to be formed, the punch C descends and removes from the wire certain parts, leaving spaces or notches, thus forming beveled faces 28. The wire is fed forward for the proper distance after each operation of the punch C, and the length of the feed movement, regulated according to the length of the nail or screw to be made, is such as to leave the parts or faces 28 of the nail in the line of movement of the cutters E E', so that the part 19 of the cutter E' may be brought against one of the said faces 28, and be supported by it while the cutter E is moved against and made to cut away a portion of the part 28, the cutters E E' acting to chamfer or bevel the clinching-point, forming portions 28, as at 30. After the cutters E E' act as described, the wire is again fed forward until the chamfered portions 30 of the nail are brought in line with the cutting-off blades $h h^5$, the

shank of the nail being placed between the gripping-dies h^{10} h^{11} , when the said cutting-blades and gripping-dies are actuated as in the application, Serial No. 52,159, to cut off the nail in the line y y , or sever the point of one nail from the head end of the nail next behind it toward the rollers D D' .

The nails may be left with their heads of the same diameter as their shanks, as in Fig. 8, or, if desired, they may have enlarged heads, as in Fig. 9, the latter being upset by the header H , common to my said application.

If enlarged heads are desired, the grooves of the feed-rollers D D' will be provided with recesses, as shown in the feed-rollers of the application No. 52,159, to enable portions of the wire to pass at intervals without being corrugated.

The parts 4 and 5 of the cutter slide in gibs m m , made adjustable by the adjusting-screws m' m' .

We do not broadly claim a punch and die to shape the point of a nail.

We claim—

1. The wedge-shaped die B^3 , having its narrow end re-enforced with the end piece, 8, and forming a support for the wire under the action of the punch C , substantially as described.

2. The punch C , combined with the die B^3 , having the narrow web 6 and the end piece, 8, the said die having a passage for the wire to be cut, the wire-passage in the web 6 exposing the wire to be acted upon by the said punch, substantially as described.

3. The feeding and corrugating rolls combined with the punch and the die to remove portions of the periphery of the wire at opposite points to form the beveled sides 28, to serve as the sides of the clinching point of the completed nail, substantially as described.

4. The two-part punch C and the die to support the wire, combined with the clamp to hold the wire while it is being acted upon by the said punch, substantially as described.

5. The two-part punch C and the die to support the wire while being acted upon by the said punch, combined with the guide-block, and the cutters to act upon and cut the wire to form chamfers 30 for the point of the nail, the said cutters moving in lines at right angles to that in which the punch C works, substantially as described.

6. The cutter E' , provided with the projection or rest 19, and the cutter E , provided with the notch opposite the said rest, and the levers to move the said cutters toward each other, combined with the cam 18, and means, substantially as described, to operate it, the said cam being shaped to cause the part 19 of the cutter E' to be brought against and support the wire before the cutter E commences to cut to form the chamfers 30 for the nail-point, as set forth.

7. The feeding rollers or mechanism, the punch C and its co-operating die, the guide-block, and the two cutters E E' , and means, substantially as described, to operate the same, combined with the cutter h , the gripping-slides h^{10} and h^{11} , and with the header H , substantially as described.

In testimony whereof we have signed our names to this specification in the presence of two subscribing witnesses.

JOSEPH E. KIMBALL.
WILLIAM AVERY.

Witnesses:

J. P. PRATT,
H. A. GREELEY.