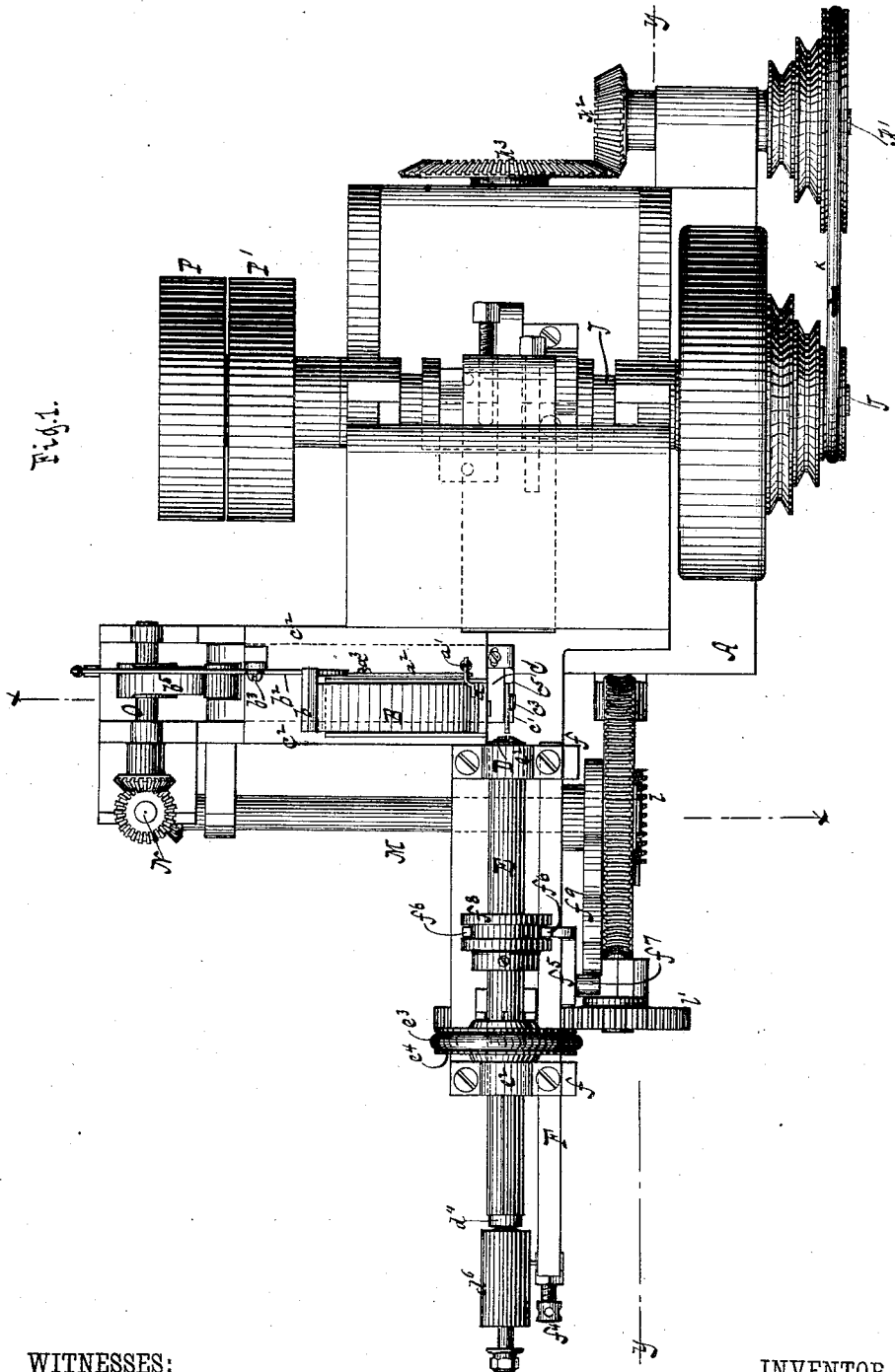


(No Model.)

3 Sheets—Sheet 1.

I. T. SMITH.
MACHINE FOR SWAGING NEEDLE BLANKS.
No. 280,682. Patented July 3, 1883.



WITNESSES:

Otto Stupel and
William Miller

INVENTOR

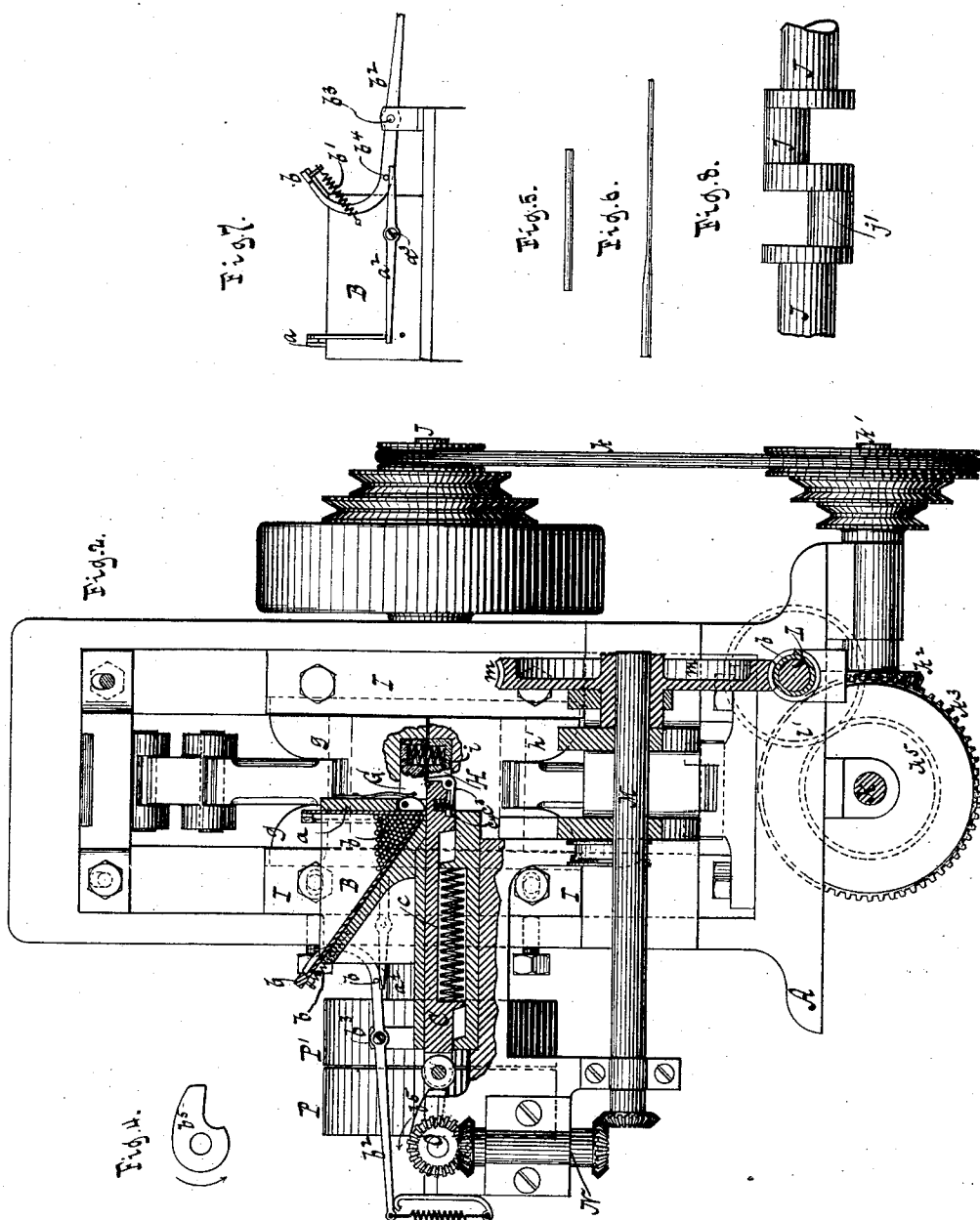
Ira T. Smith.

BY *Van Santvoord & Haupp*
his ATTORNEYS

(No Model.)

3 Sheets—Sheet 2.

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WITNESSES:

Otto Hupeland
William Miller

INVENTOR

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BY *Vandewater & Hauff*
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(No Model.)

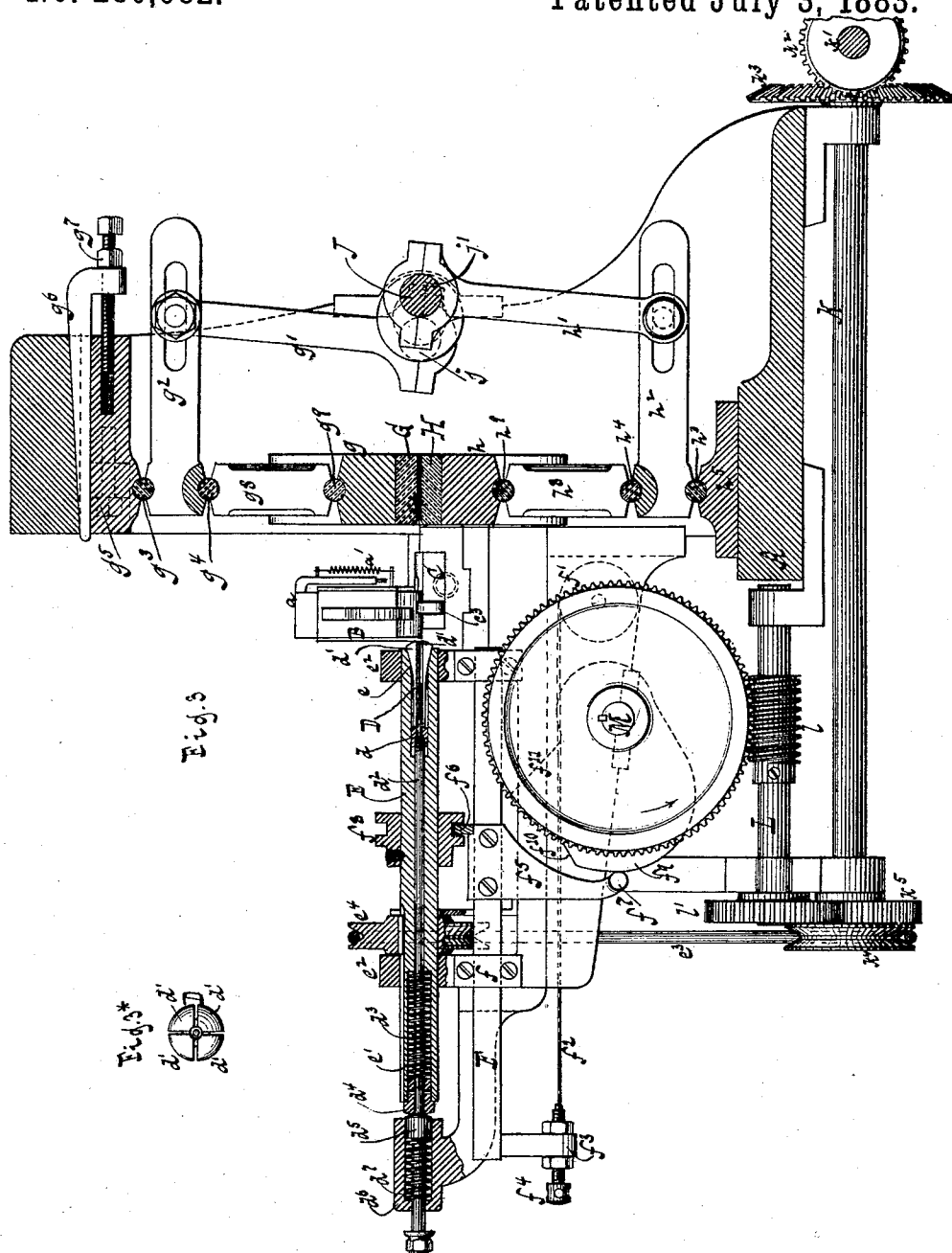
3 Sheets—Sheet 3.

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WITNESSES:

Otto Hufeland
 William Miller

INVENTOR

Ira T Smith.

BY Van Santvoord & Hauff

ATTORNEYS

UNITED STATES PATENT OFFICE.

IRA T. SMITH, OF MOUNT CARMEL, CONNECTICUT.

MACHINE FOR SWAGING NEEDLE-BLANKS.

SPECIFICATION forming part of Letters Patent No. 280,682, dated July 3, 1883.

Application filed October 12, 1882. (No model.)

To all whom it may concern:

Be it known that I, IRA T. SMITH, a citizen of the United States, residing at Mount Carmel, in the county of New Haven and State of Connecticut, have invented new and useful Improvements in Machines for Swaging Needle-Blanks, of which the following is a specification.

The object of this invention is to give the approximate form to sewing-machine and other needles by subjecting the wire from which they are made to a rapid succession of compressions between two dies while the wire or blank is being rapidly revolved by a chuck or holder; and I accomplish this by the mechanism substantially as hereinafter described, and illustrated in the accompanying drawings, in which—

Figure 1 represents a plan or top view. Fig. 2 is a transverse vertical section in the plane xx , Fig. 1. Fig. 3 is a longitudinal vertical section in the plane yy , Fig. 1. The remaining figures are details which will be referred to as the description progresses.

Similar letters indicate corresponding parts.

In the drawings, the letter A designates a frame which supports the working parts of my machine. The blanks, which are cut to the required length, (see Fig. 5,) are placed into a hopper, B, whence they are successively delivered to the swaging mechanism in the following manner: On the interior of the vertical side of the hopper, Figs. 2 and 7, is situated a slide, a , and on the inner surface of the inclined side of said hopper is situated a slide, b . The slide a is depressed by a spring, a' , Figs. 3 and 7, and it is raised against the action of this spring by a lever, a'' , which has its fulcrum on a pivot, a''' . The slide b is depressed by the action of a spring, b' , and it is raised against the action of this spring by a lever, b'' , which has its fulcrum on a pivot, b''' . From the lever b'' projects a pin, b^4 , which actuates the lever a'' , and the lever b'' is actuated by a cam, b^5 , which revolves in the direction of the arrow marked near it in Fig. 2. When this cam strikes the lever b'' , the slide a is raised against the action of its spring, while the slide b , which previously was sustained by the upper end of the lever b'' , is left free to follow the action of its spring, so that it pushes one of the blanks beneath the slide a , and if

the cam b^5 releases the lever b'' the slide b is drawn back and the slide a is depressed by its spring upon the blank beneath it. A yielding toe, b^6 , opposite the end of the slide prevents injury to the mechanism if the blank should become jammed.

Beneath the hopper B is situated a slide, C, which is exposed to the action of a spring, c , and of the cam b^5 , said cam serving to press the slide inward against the action of the spring. The blank beneath the slide a rests upon the slide C, and if this last-named slide is released by the cam b^5 and permitted to follow the action of its spring c the recess c' near its inner end, Fig. 2, is brought beneath the mouth of the hopper B, and the blank beneath the slide a is depressed into this recess. The slide C moves in guideways c'' , Fig. 1, and on its inner end is secured a bell-crank lever, c^3 , which is exposed to the action of a spring, c^4 , and the vertical arm of which forms the outer wall of the recess c' . When a blank has been deposited in this recess, its inner end abuts against a shoulder, c^5 , Fig. 1, formed on the inner end of the slide C, while its outer end projects a short distance beyond the edge of the slide, so that it can be grasped by the clamp D. A section of this clamp is shown in Fig. 3 and an end view in Fig. 3*. It is composed of a tube, d , which is split throughout a portion of its length, so as to form four (more or less) jaws, d' , which open by their inherent elasticity, so as to admit the end of the blank, and the backs or outer surfaces of which are tapering, so that they are caused to close when drawn back into the socket e . The clamp D is secured to a rod, d'' , which is guided in a spindle, E, at the inner end of which is formed the socket e for the clamp D, while at its outer end is formed a socket, e' , for the reception of a spring, d^3 , and of a head, d^4 , secured to the outer end of the rod d'' , so that when the rod d'' is permitted to follow the action of the spring d^3 the jaws d' will close; but if the rod d'' is retained in the position shown in Fig. 3 the jaws d' remain open. The spindle E has its bearings in boxes e^2 , Figs. 1 and 3, which are firmly secured to the frame A, and a revolving motion is imparted to it by a belt, e^3 , and pulley e^4 , which is mounted on the spindle by means of a feather-key, so that said spindle can move in the direction of its length while

it is being revolved. When the spindle is forced back to the position shown in Fig. 3, the head d' of the rod d'' is forced up against a pin, d^b , which slides in a stationary bracket, d^c , and is forced inward by a spring, d^d , and as long as the head d' is exposed to the action of the pin d^b the jaws d' of the clamp D remain open. The movement of the spindle E in the direction of its axis is produced by a slide, F, which moves in guides f f' , and is drawn inward by the action of a coiled spring inclosed in a barrel, f' , from which extends a cord, f^2 , to an arm, f^3 , extending from the slide. A set-screw, f^4 , serves to regulate the position of the spindle F for the needle-blanks of different length.

In the slide F is secured an arm, f^5 , which is provided with a flange, f^6 , and with a stud, f^7 . The flange f^6 engages with a grooved collar, f^8 , which is firmly mounted on the spindle E, while the stud f^7 bears upon the surface of the cam f^9 , being held in contact with said surface by the action of the coiled spring in the barrel f' . In Figs. 1 and 3 the cam f^9 is shown in such a position that its highest part acts upon the stud f^7 . In this position the jaws of the clamp D are open. As the cam f^9 revolves in the direction of the arrow marked on it in Fig. 3, the stud f^7 travels down the incline f^{10} of the cam, and the spindle E is permitted to move inward a short distance sufficient to pass the clamp over that portion of the blank which projects beyond the edge of the slide C, Fig. 1, the clamp being retained in its open position by the action of the spring d' and pin d^b until the stud f^7 travels down the incline f^{11} of the cam f^9 . During that time the spindle E moves inward a sufficient distance to relieve the rod d'' from the action of the pin d^b , and the clamp D is caused to close and to grasp the blank firmly by the action of the spring d^b . As the spindle E continues to move inward, the inner end of the blank is introduced between the dies G and H, which are secured in slides g h , respectively, Figs. 2 and 3, which move in guideways I, formed in the frame A.

The dies G H are held apart by springs i , Fig. 2, and they receive a very rapid and powerful motion toward and from each other by the following means: J is a shaft with two cranks j j' , Figs. 3 and 8, one of which, j , connects by a connecting-rod, g' , with a lever, g^2 , that is provided with two knuckles, g^3 g^4 , one of which, g^3 , engages with a cavity formed in a bridge, g^5 , which is attached to the frame A, Fig. 2, so that it can be adjusted up and down by means of a wedge, g^6 , and set-screw g^7 . The knuckle g^4 rests in a cavity formed at the upper end of a toggle-lever, g^8 , the lower end of which is also provided with a cavity, which engages with a knuckle, g^9 , fastened to the slide g , Fig. 3, which carries the die G. In the same manner the crank j' connects, by a rod, h' , lever h^2 , knuckles h^3 h^4 , bridge h^5 , toggle-lever h^8 , and knuckle h^9 , with the slide h , which carries the die H. The outer ends of

the connecting-rods g' h' are adjustable on the levers g^2 h^2 . As the crank-shaft J revolves, an oscillating motion is imparted to the levers g^2 h^2 , and the toggle-levers g^8 h^8 are caused to rock on the knuckles g^3 h^3 from one side of their central position to the other. Whenever the toggle-levers move toward their central position, the dies G H are moved toward each other with great force, and when said toggle-levers move out of their central positions the dies are permitted to open slightly, so that the blank which is forced in between the dies by the forward movement of the spindle E will be gradually advanced between the dies, and as the blank, while it revolves with the spindle E, is exposed to a powerful pressure whenever the dies are forced toward each other, it (the blank) is gradually drawn out from the form shown in Fig. 5 to that shown in Fig. 6, Fig. 5 being a side view of the blank as it enters the swaging-machine, and Fig. 6 is a similar view of the same as it leaves the machine, both these figures being on a scale about three times as large as that on which the remaining figures are drawn, or on a full-size scale for ordinary sewing-machine needles. The throw of the dies can be regulated by adjusting the outer ends of the connecting-rods g' h' in the levers g^2 h^2 .

The crank-shaft J receives a very rapid revolving motion (about fifteen hundred revolutions per minute) by a belt running on a fast pulley, P, and a loose pulley, P', and from this shaft motion is transmitted to a shaft, K, (best seen in Fig. 3,) by a belt, k , and a counter-shaft, k' , which is geared together with the shaft K by bevel-wheels k^2 k^3 .

On the shaft K is mounted a pulley, k^4 , from which motion is transmitted to the spindle E by the belt e^3 and pulley e^4 , Fig. 3. From this shaft K motion is also transmitted to a shaft, L, by cog-wheels k^5 l^5 , and on the shaft L is mounted a worm, l , which gears into a worm-wheel, m , mounted on the shaft M. This shaft makes about ten revolutions per minute, and on it is mounted the cam f^9 , which imparts motion to slide F, and through it to the spindle E. The shaft M is geared together with a vertical shaft, N, from which motion is transmitted to the horizontal shaft O, which carries the cam b^5 , that serves to actuate the slide C beneath the hopper B, and also the levers b^2 a^2 , which act upon the slide b a in the hopper.

What I claim as new, and desire to secure by Letters Patent, is—

1. The combination, substantially as hereinbefore set forth, of the hopper B, the slides a b in the interior of said hopper, mechanism, substantially as herein described, for actuating said slides, the slide C, which moves beneath the hopper, and is provided with a recess to receive the successive blanks, the clamp D, mechanism for revolving and for advancing this clamp, and the dies G H.

2. The combination, substantially as hereinbefore described, of the hopper B, the slides a b in the interior of the hopper, the levers a^2 b^2 ,

for actuating said slides, the slide C beneath the hopper, and the cam b^5 , for actuating the slide C and the levers a b .

3. The combination, substantially as herein-
5 before described, of the spindle E, mechanism for imparting a revolving motion to this spindle, the slide F and cam f^9 , the clamp D, secured to a rod, d^2 , in the interior of the spindle, the spring d^3 , head d^4 , pin d^5 , and spring
10 d^7 , for regulating the time when the clamp advances and closes upon the blank.

4. The combination, substantially as herein-
before described, of the dies G H, secured to
slides g h , the double-crank shaft J, the con-
15 necting-rods g' h' , levers g^2 h^2 , knuckles g^3 g^4 h^3 h^4 , toggle-levers g^5 h^5 , and knuckles g^6 h^6 .

5. The combination, substantially as herein-
before described, of the dies G H, secured to the
slides g h , the double-crank shaft J, the con-
20 necting-rods g' h' , levers g^2 h^2 , knuckles g^3 g^4 h^3 h^4 , toggle-levers g^5 h^5 , knuckles g^6 h^6 , bridge g^6 ,
and adjustable wedge g^6 .

6. The combination, substantially as herein-
before described, of the hopper B, the clamp
D, a slide moving vertically in said hopper to
25 deliver the blanks separately, and a slide recip-
rocating beneath the delivery-opening, and
having a recess adapted to receive the blanks
as delivered, the dies G H, mechanism, sub-
stantially as herein described, for advancing
30 the clamp, together with the blank, toward the
dies, and mechanism, substantially such as
herein described, for causing the dies to act
upon the blanks as the same are advanced be-
tween them.

35 In testimony whereof I have hereunto set my
hand and seal in the presence of two subscrib-
ing witnesses.

IRA T. SMITH. [I. s.]

Witnesses:

F. D. SMITH,
ALLEN D. OSBORN.