

(No Model.)

2 Sheets—Sheet 1.

I. T. SMITH.

MACHINE FOR SWAGING NEEDLE BLANKS.

No. 492,589.

Patented Feb. 28, 1893.

Fig 1

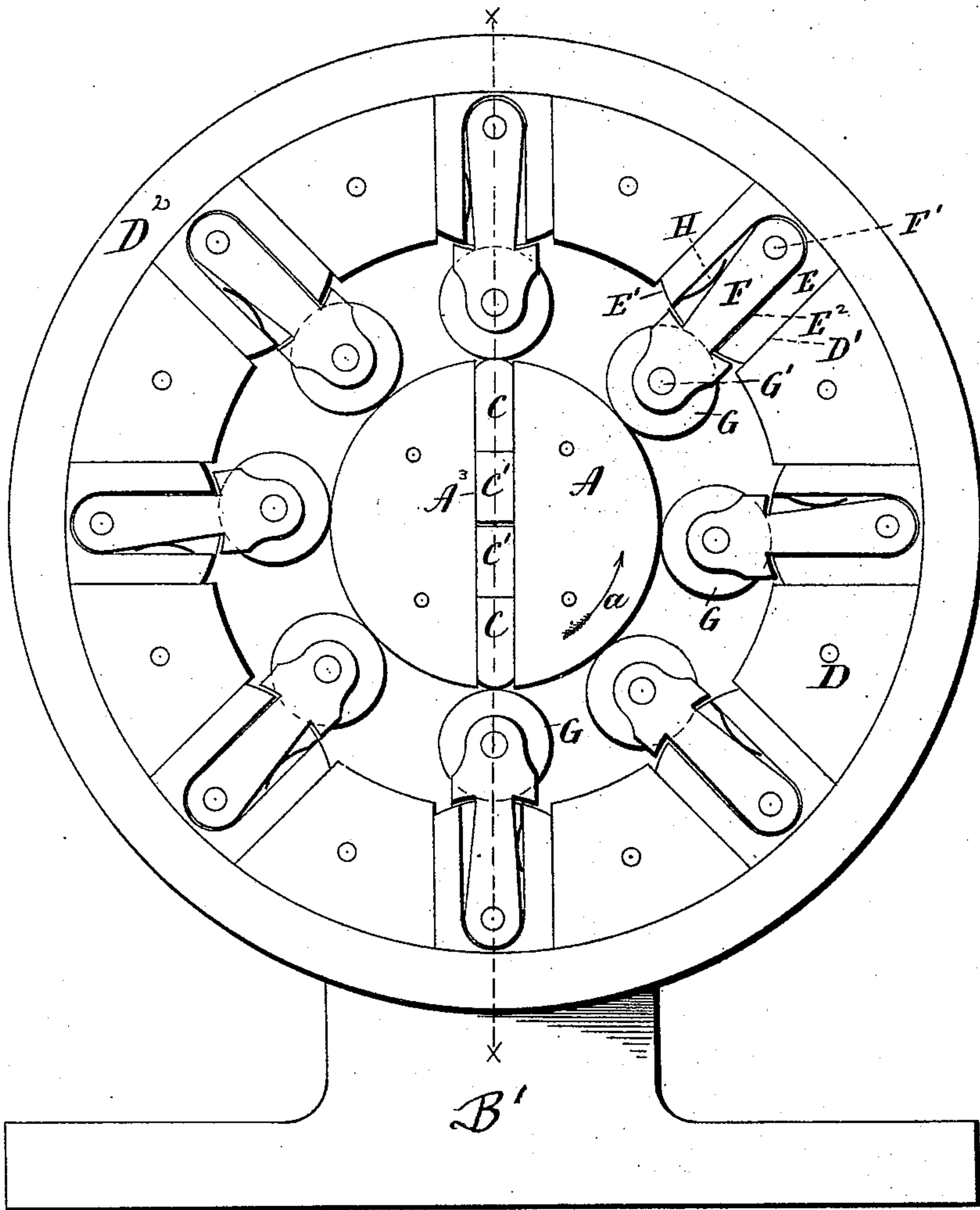
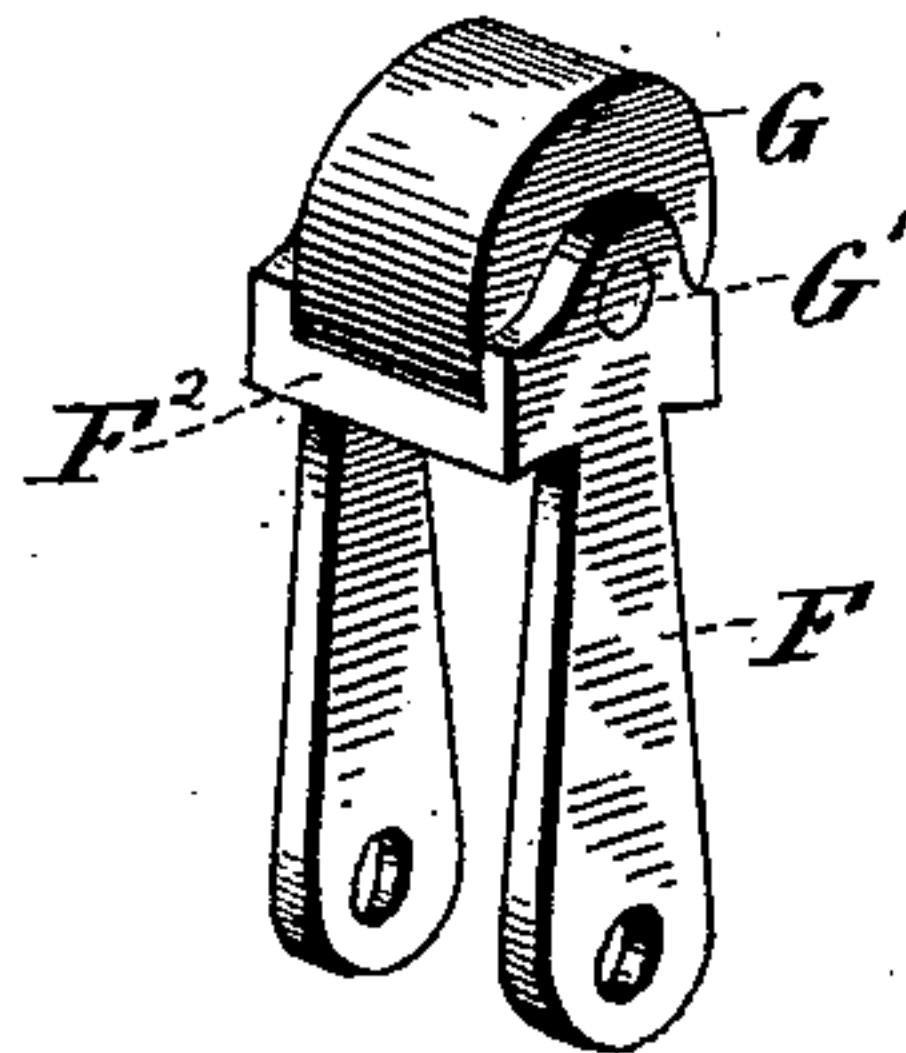


Fig 3



Witnesses
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(No Model.)

2 Sheets—Sheet 2.

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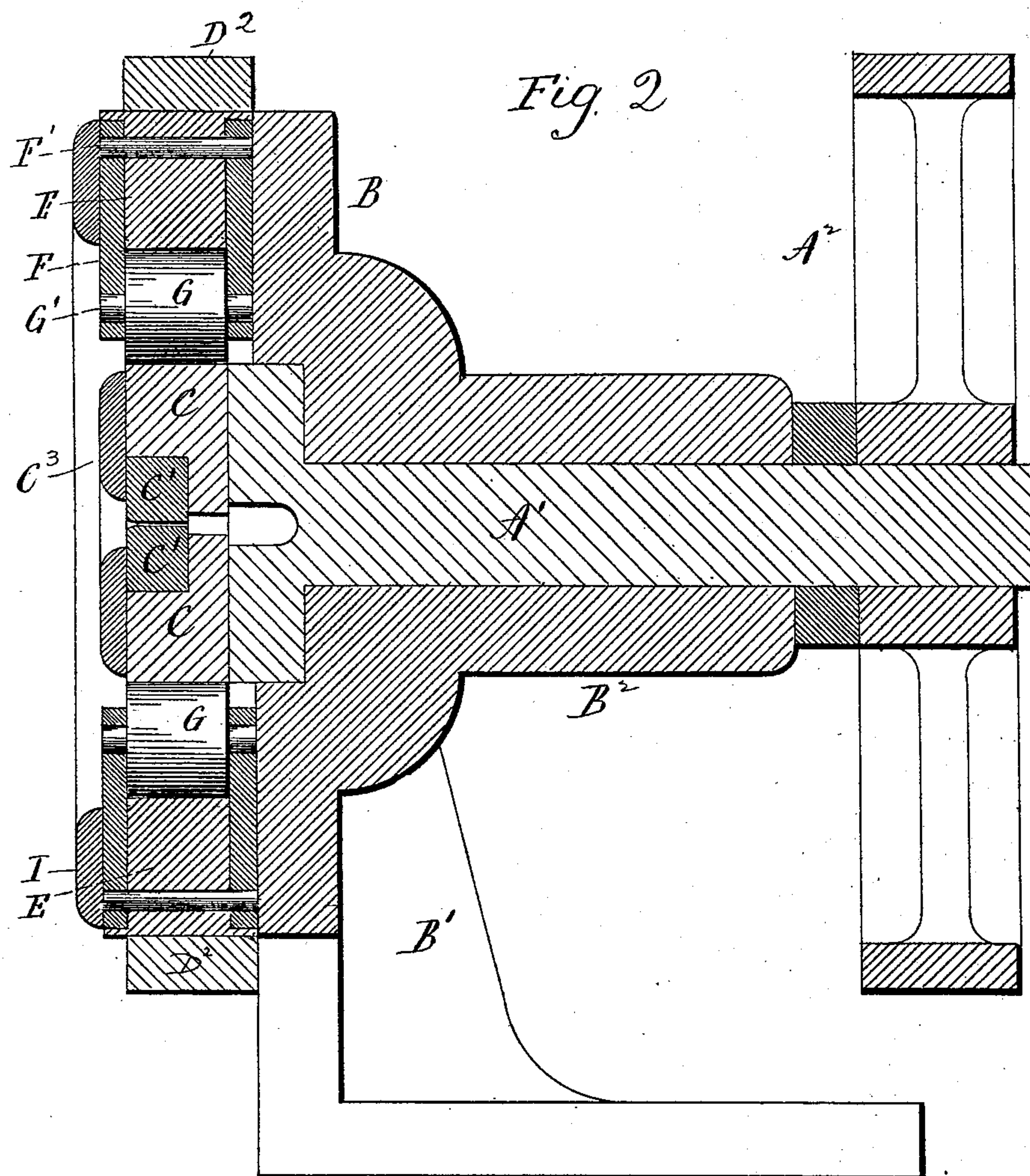
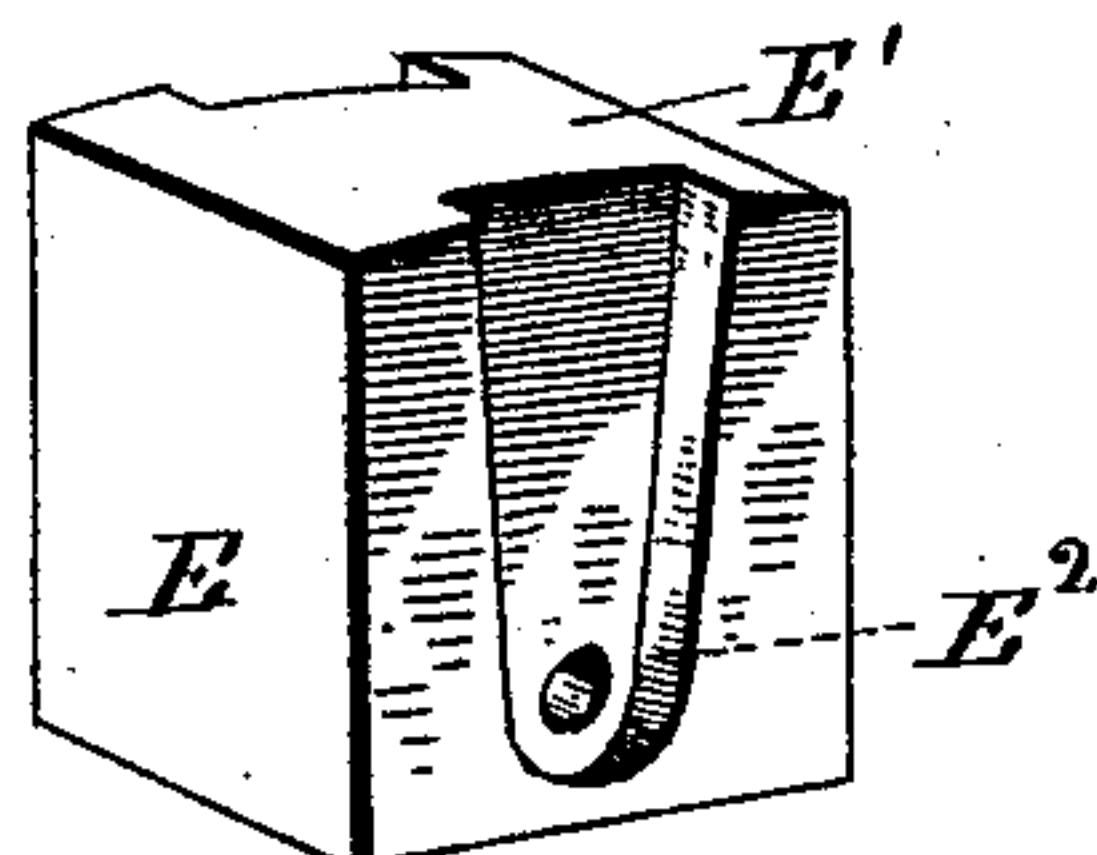


Fig. 4



Witnesses
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UNITED STATES PATENT OFFICE.

IRA T. SMITH, OF MOUNT CARMEL, CONNECTICUT.

MACHINE FOR SWAGING NEEDLE-BLANKS.

SPECIFICATION forming part of Letters Patent No. 492,589, dated February 28, 1893.

Application filed August 1, 1892. Serial No. 441,835. (No model.)

To all whom it may concern:

Be it known that I, IRA T. SMITH, of Mount Carmel, in the county of New Haven and State of Connecticut, have invented a new Improvement in Machines for Swaging Needle-Blanks; and I do hereby declare the following, when taken in connection with accompanying drawings and the letters of reference marked thereon, to be a full, clear, and exact description of the same, and which said drawings constitute part of this specification, and represent, in—

Figure 1, a view in front elevation of a swaging mechanism constructed in accordance with my invention, with the retaining rings removed. Fig. 2, a view thereof in vertical central section on the line $x-x$ of Fig. 1, showing the rollers in side elevation. Fig. 3 is a detached perspective view of one of the rollers and the pivotal carrier thereof. Fig. 4 is a similar view of one of the anvils.

My invention relates to improved mechanism for swaging needle-blanks and for kindred operations, the object being to provide, for the operation of the swaging-dies, simple and durable apparatus adapted to be run at a very high rate of speed with the minimum of noise and wear, and to make the quick sharp blow which is necessary to the best results in swaging.

With these ends in view, my invention consists in the combination with a circular die-head having a slot extending diametrically across its face, of two movable die-blocks located in the said slot, and respectively extending to the periphery of the said head, two dies respectively mounted in the inner ends of the said blocks, an anvil-head arranged concentric with the said die-head, a circular series of inwardly projecting anvils having rounded faces, opposite in curvature from the curvature of the die head, mounted in the anvil-head, pivotal carriers for the respective anvils, rollers mounted in the respective carriers, so as to travel upon the curved faces of the anvils, and springs engaging with the respective carriers to normally hold the rollers out of line with the centers of the curved faces of the anvils, one of the said heads being rotatable.

My invention further consists in certain de-

tails of construction and combination of parts as will be hereinafter described and pointed out in the claims.

As herein shown I have provided for the rotation of the die-head A, instead of the anvil-head B, but this arrangement may be reversed if desired. Under the construction shown the anvil-head is constructed with a foot B', by means of which it is rigidly secured in place, and with a hub B², which forms a bearing for the shaft A' of the die-head, the said shaft being provided at its outer end with a pulley A², from which it is driven. The face of the die-head is constructed with a slot A³, extending diametrically across it, and receiving two corresponding die-blocks C C, the outer ends of which are rounded, and project a very little beyond the peripheral face of the head when a needle, or other object to be swaged is located between the dies C' C', which they respectively carry, and which are mounted in their inner ends. A spring, not shown, is provided for pushing the die-blocks outwardly so as to separate the dies to permit them to receive the thing to be swaged between them. A retaining ring or annular cap, C³, shown in Fig. 2, is secured to the face of the die-head for holding the die-blocks in place in the slot A³ thereof.

The anvil-head has its outer face formed with a circular series of forwardly projecting sector-shaped blocks D, arranged equidistant from each other, and concentric with the die-head A. The spaces D' between the said blocks, receive a circular series of anvils E, rectangular in cross-section, adapted to fit snugly into the said spaces, having their inner ends curved as at E' proportionally to the movement to be imparted to the dies, and their outer ends curved to the curvature of a heavy band D², against which they abut, and by which they are held in place as against endwise outward movement, and which is applied to the curved outer edges of the said blocks D. The curvature of the inner ends of the anvils is, it will be observed, opposite to the curvature of the die-head, and this is the source of the quick sharp swaging blow characteristic of my improved machine. The said band D², takes the heavy thrusts of the anvils when the mechanism is in operation.

The opposite face of each anvil is provided with a corresponding groove, E^2 , respectively receiving the parallel corresponding arms F , F , of a carrier pivotally attached to the anvil by a pin F' , passing through the outer end thereof and through the outer ends of the said arms, the inner ends of which are enlarged, and united by cross-pieces F^2 , F^2 , which stiffens the carriers. A roller G , is mounted on a pin G' , between the said inner ends of the arms, so as to rest upon the curved face of the anvil, which takes the entire thrust of the roller to the exclusion of the pin, the same merely holding the roller in place. Each anvil is provided with a spring H , of any suitable construction, arranged to engage with its carrier to hold the same, and hence the roller mounted therein, out of line with the center of the curved face of the anvil. It will be observed that the arms F , taper from their outer toward their inner ends, whereby they are permitted to have a limited swinging movement in the grooves of the anvils, the opposite walls of the said grooves limiting this movement, and hence the movement of the rollers. A retaining ring or annular cap I , is provided as shown in Fig. 2 of the drawings, for holding the anvils in place, the said cap being secured to the block D , of the anvil-head. The curved faces of the anvils are arranged so that the roller in riding up from its normal position to the center of the curved face of the anvil, will move inward for a distance exactly corresponding to the inward movement to be given to the die-blocks and hence the dies.

It will be understood from the foregoing that when the die-head is rotated in the direction of the arrow a , with the outer ends of its die-blocks projecting a little beyond its periphery, they will engage with the rollers and cause the same to ride up from their normal to their central positions, whereby the blocks will be forced inward. Then just as soon as the rollers have reached their central positions, or have been carried a little beyond the same, the die-blocks will be released, and the rollers allowed to fly back to their normal positions under the action of their springs. In this way the die-blocks being rapidly rotated with the die-head will receive in quick succession the inward thrusts thus derived from the rollers which take their bearing not in their carriers, but on the curved inner ends of the anvils, the contact of the die-blocks with the rollers being only momentary owing to the described curvature of the working faces of the anvils. Under this construction of swaging mechanism the same may be run at a very high rate of speed, and with the minimum of noise and wear. I secure, moreover, a quick sharp blow which is necessary to the best results in swaging, for when the die-blocks have a long engagement with the movable parts which they strike, the effect of the dies is rather to squeeze than to strike the object being swaged, which, under

those circumstances, is often split. Again, when there is a long engagement between the die-blocks and the part which they strike, the object being swaged is apt to be twisted or turned. If needles are being swaged, they are liable to be turned in the chuck which holds them, and their shanks are scratched and mutilated. It will thus be seen that a quick sharp blow and the briefest possible contact between the die-blocks and the parts which they strike, is in the highest degree desirable. As I have elsewhere stated, the anvil-head may be rotated instead of the die-head, but I prefer the arrangement shown, because the die-head is much the lighter of the two. When the die-head is rotated as provided for herein, the chuck carrying the blocks is not rotated.

I would have it understood that in carrying out my invention I do not limit myself to the exact construction herein shown and described, but hold myself at liberty to make such changes and alterations therein as fairly fall within the spirit and scope of my invention.

I am aware that it is old to employ, in machines of the class to which my invention relates, toggle-like devices for giving the blow to the die-blocks. I am also aware that it is old to use, in such machines, rollers to give the blow. I do not, therefore, claim toggle-like devices or rollers broadly, but only my particular construction.

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

1. In a swaging mechanism, the combination with a circular die-head having a slot extending diametrically across its face, of two movable die-blocks located in the said slot, and respectively extending to the periphery of the said head, two dies respectively mounted in the inner ends of the said blocks, an anvil-head arranged concentric with the said die-head, a circular series of inwardly projecting anvils having rounded inner faces, opposite in curvature from the curvature of the die head, mounted in the anvil-head, pivotal carriers for the respective anvils, rollers mounted in the respective carriers so as to travel upon the curved faces of the anvils, and springs engaging with the respective carriers to normally hold the rollers out of line with the centers of the curved inner faces of the anvils, one of the said heads being rotatable, substantially as described, and whereby the dies are given a sharp quick blow, owing to the described curvature of the working faces of the anvils.

2. In a swaging mechanism, the combination with a circular die-head having a slot extending diametrically across its face, of two movable die-blocks located in the said slot, and respectively extending to the periphery of the head, two dies respectively mounted in the inner ends of the said blocks, an anvil-head arranged concentric with the die-head,

a circular series of inwardly projecting anvils mounted in the said head and having their inner ends rounded opposite to the curvature of the die head, and their opposite faces longitudinally grooved, pivotal carriers for the respective anvils, having two arms fitting into the grooves thereof, rollers mounted in the inner ends of the arms of the respective carriers, so as to bear upon the curved faces of the anvils to which the carriers are pivoted by the outer ends of their arms, and springs engaging with the respective carriers to normally hold the rollers out of line with the cen-

ters of the curved inner faces of the anvils, one of the said heads being rotatable, substantially as set forth, and whereby the dies are given a sharp quick blow, owing to the described curvature of the working faces of the anvils. 15

In testimony whereof I have signed this specification in the presence of two subscribing witnesses. 20

IRA T. SMITH.

Witnesses:

GEO. A. ANGLE,
FRED C. EARLE.