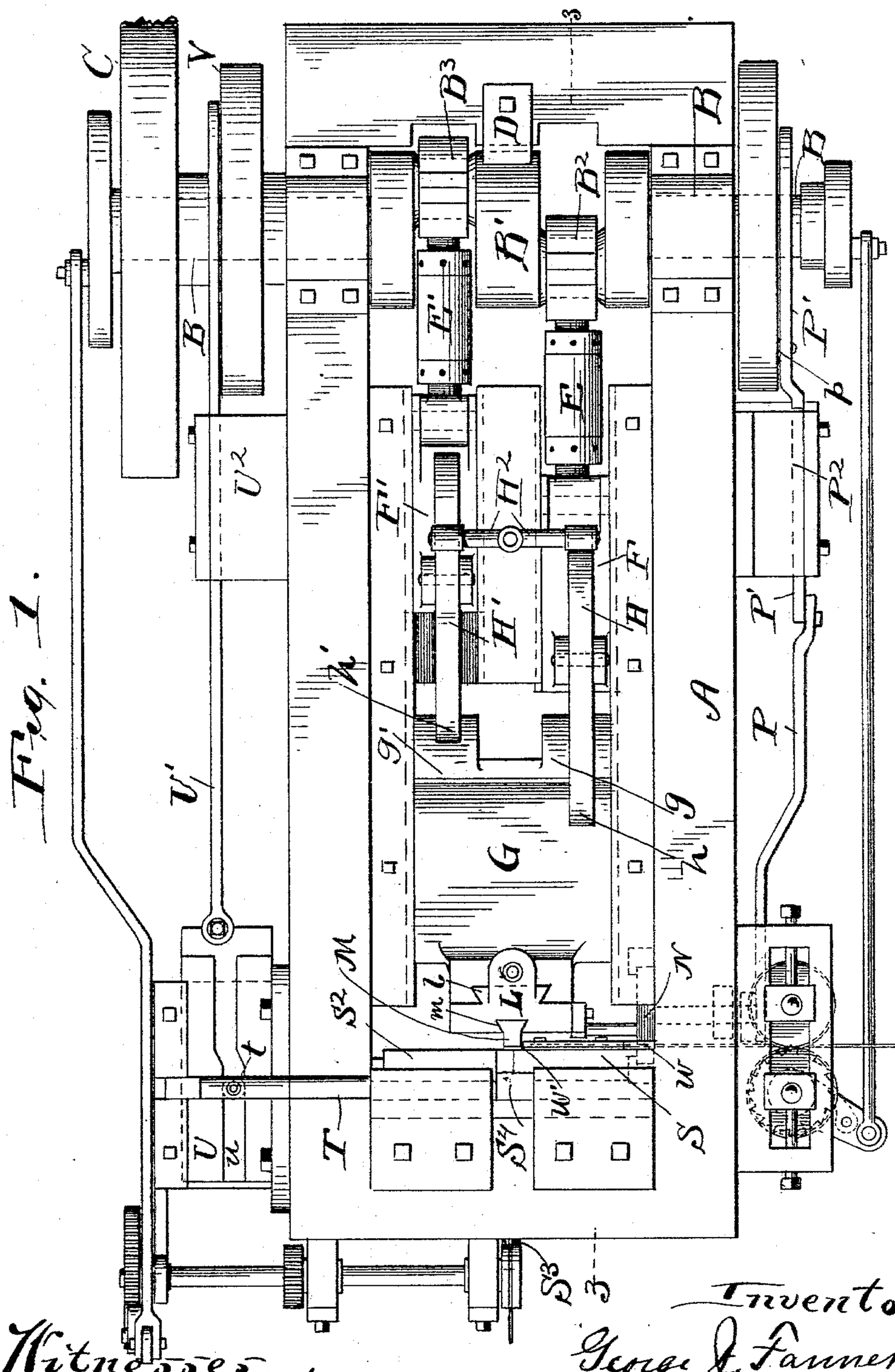
(No Model.) 4 Sheets—Sheet 1.

G. J. FANNER.

CHAPLET BOLT HEADING MACHINE.

No. 562,813. Patented June 30, 1896.



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G. J. FANNER.

CHAPLET BOLT HEADING MACHINE.

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Fig. 2.

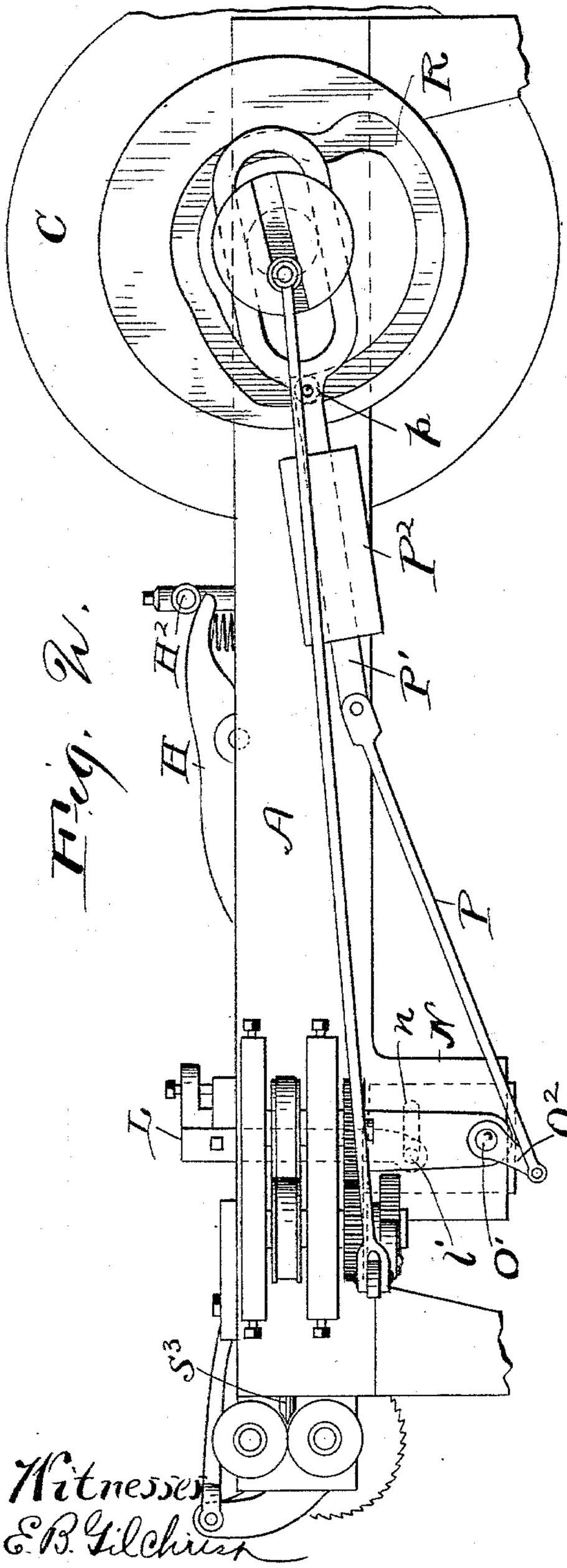
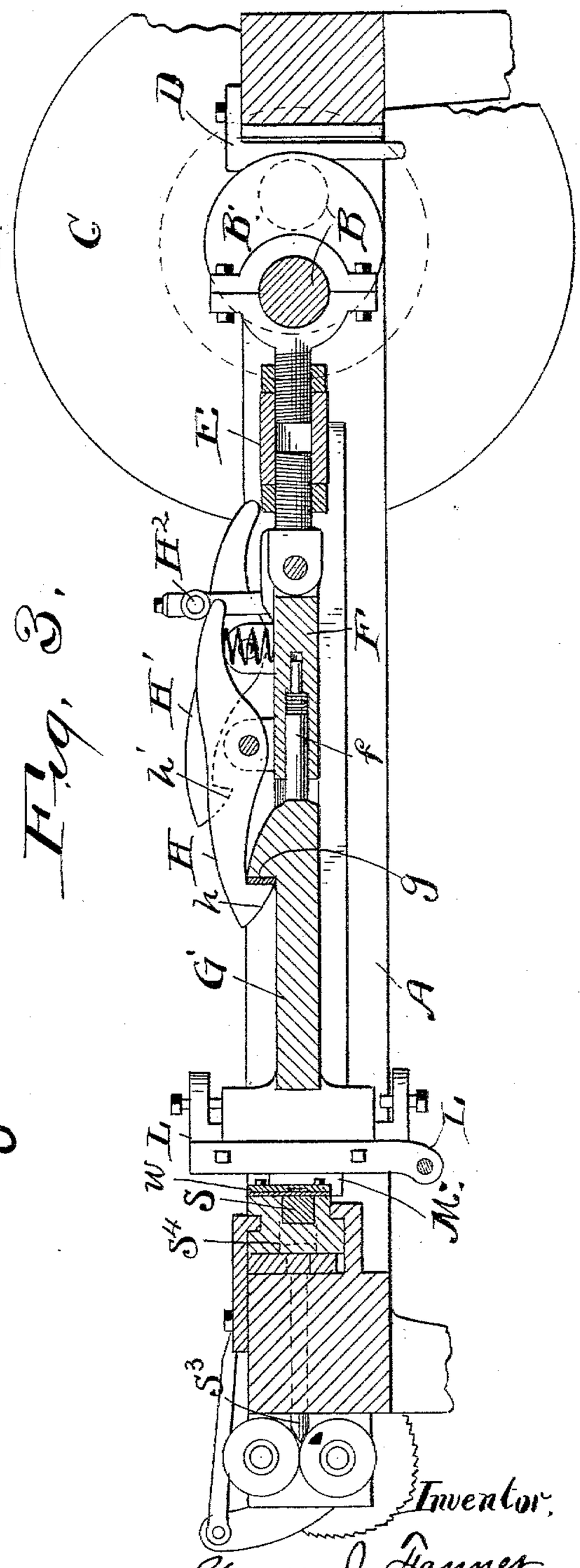


Fig. 3.



Witnesses:
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Ella E. Tilden

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his attorneys.

(No Model.)

4 Sheets—Sheet 3.

G. J. FANNER.

CHAPLET BOLT HEADING MACHINE.

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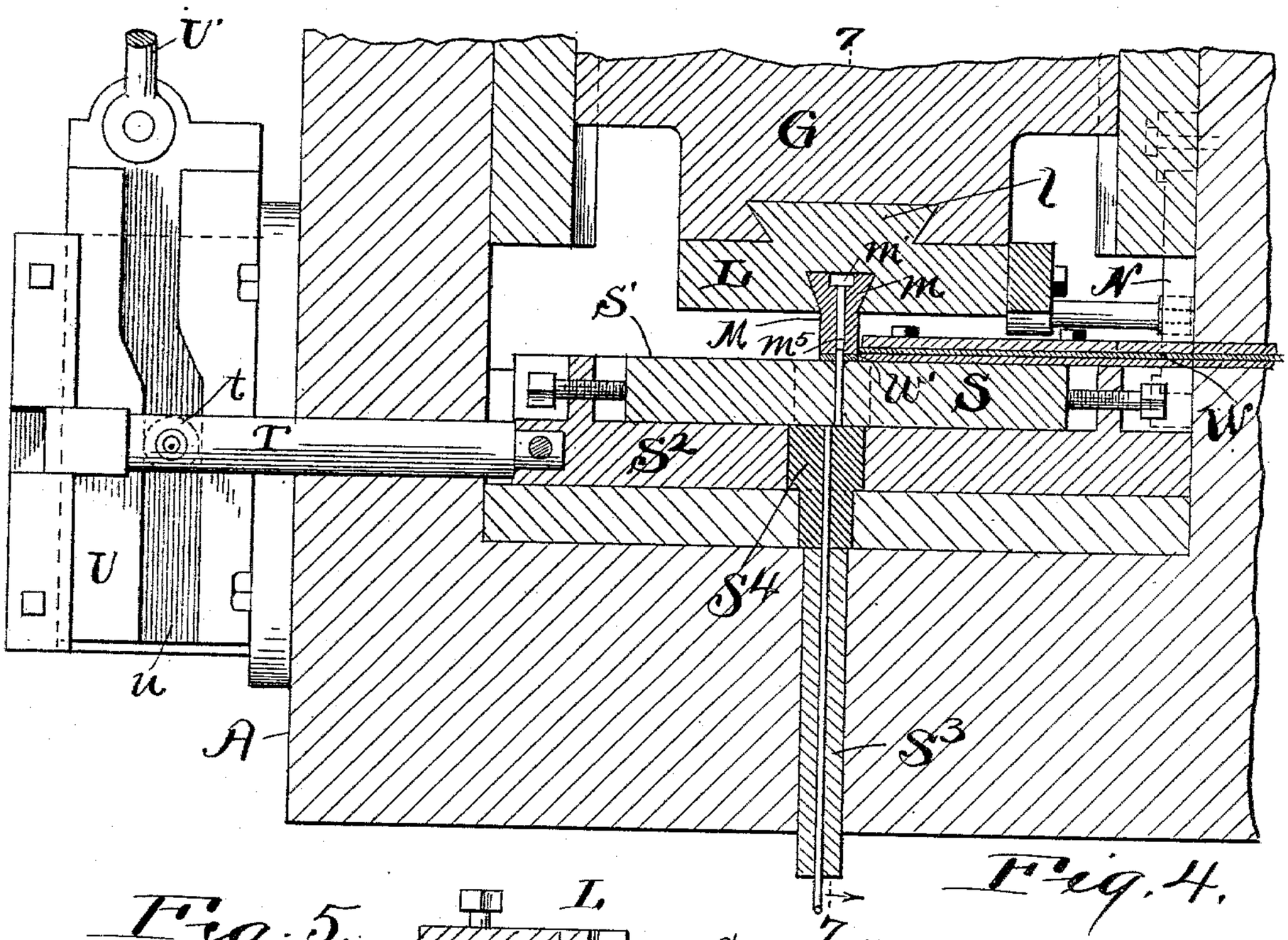

Fig. 4.

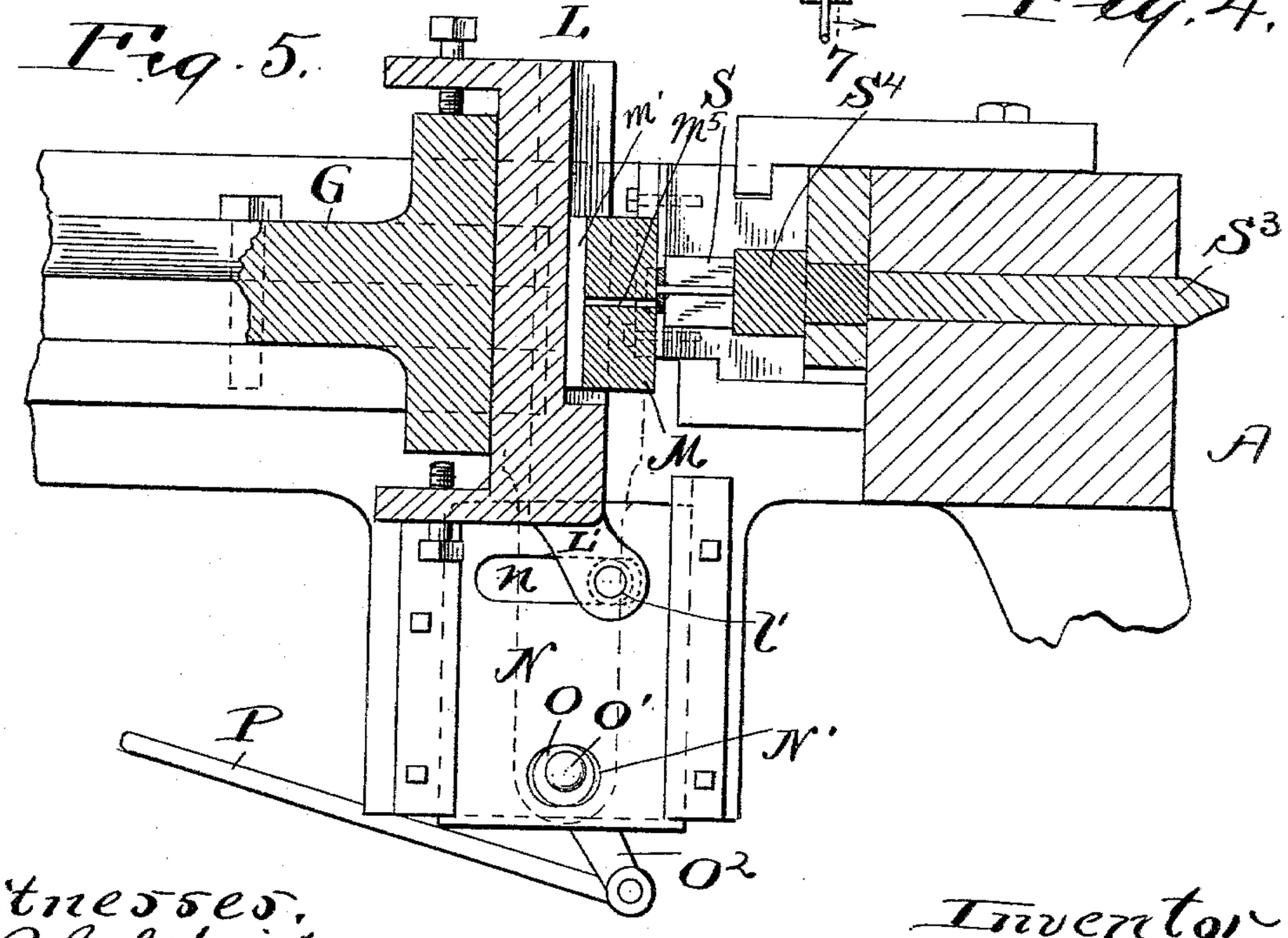

Fig. 5.

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(No Model.) 4 Sheets—Sheet 4.

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CHAPLET BOLT HEADING MACHINE.

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Fig. 9

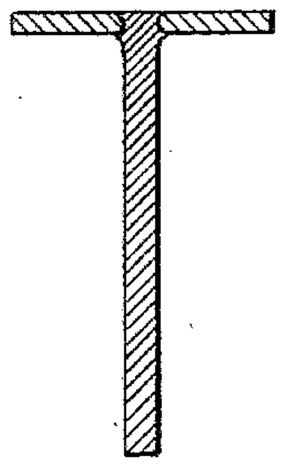


Fig. 6

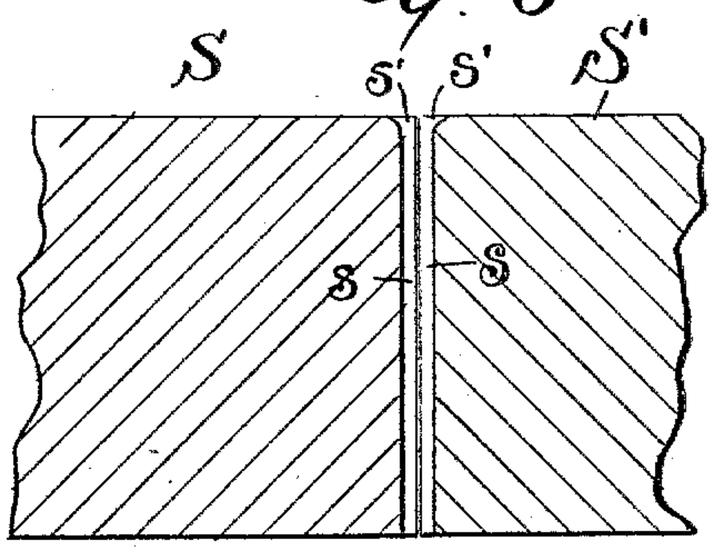


Fig. 7

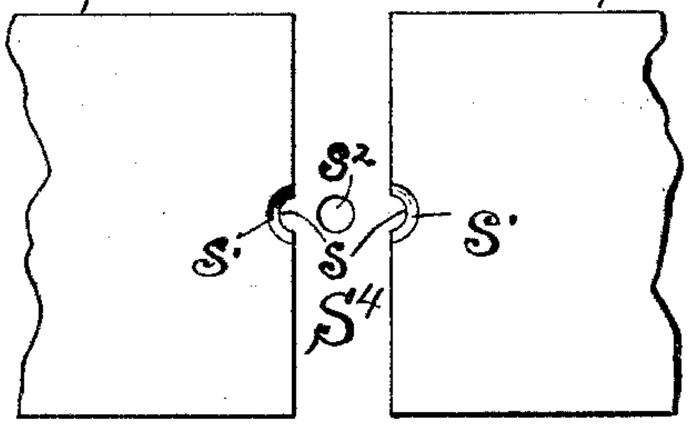
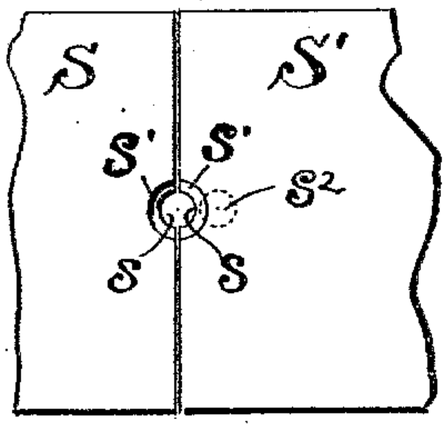


Fig. 8.



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UNITED STATES PATENT OFFICE.

GEORGE J. FANNER, OF CLEVELAND, OHIO, ASSIGNOR TO THE FANNER MANUFACTURING COMPANY, OF SAME PLACE.

CHAPLET-BOLT-HEADING MACHINE.

SPECIFICATION forming part of Letters Patent No. 562,813, dated June 30, 1896.

Application filed January 2, 1896. Serial No. 574,035. (No model.)

To all whom it may concern:

Be it known that I, GEORGE J. FANNER, of Cleveland, Cuyahoga county, State of Ohio, have invented certain new and useful Improvements in Chaplet-Bolt-Heading Machines; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it pertains to make and use the same.

My invention relates to machines for forming heads on chaplet bolts or studs such as are used for holding cores in position in molds; and it consists in the peculiar construction and operation of the machine whereby the bolts or studs are cheaply and quickly formed or headed, as will be hereinafter fully set forth and claimed.

In the drawings, Figure 1 is a plan view of my improved machine while in the act of heading or riveting the head to the shank. Fig. 2 is a view of my machine looking at it from the right-hand side. Fig. 3 is a view in longitudinal vertical section taken through lines 3 3, Fig. 1. Fig. 4 illustrates an enlarged horizontal section showing plan of cutting and punching devices. Fig. 5 is an enlarged section showing more clearly the mode of operating the heading and punching die. Figs. 6, 7, and 8 illustrate more clearly the formation of the groove in the grasping-dies S S′, and also the operation of said dies in connection with the coöperating parts of the machine. Fig. 9 is a view showing a chaplet-bolt as my improved machine forms it.

A represents the bed of my improved machine, in which is mounted a shaft B. At one end of shaft B is secured a heavy wheel or pulley C, which is connected to and receives its motion from a pulley on a main shaft or counter-shaft, through the medium of a belt, and thus shaft B is revolved at a suitable speed. Located approximately at a central point between the ends of the shaft B, and secured thereto in any suitable manner, is a steadying-wheel B′, (concentric with the shaft,) the periphery of which engages an adjustable shoe or block D, the function and object of the wheel B′ and shoe D being to steady the shaft B at its central portion and prevent the shaft from springing or breaking when the machine is in operation.

At the sides of the steadying-wheel B′, I provide two cranks B^2 B^3, which are so located and adjusted on shaft B as to be diametrically opposite each other. Attached to and operated by the cranks B^2 B^3 are two adjustable pitmen E and E′, which are attached at their inner ends, respectively, to guide-heads F and F′. Hence, when the machine is in operation, the guide-heads F and F′ are alternately reciprocated in suitable slides formed in the machine-bed. The guide-heads F and F′ are provided at their free ends with cushion-studs *f*, one being provided in each guide-head, (one only being shown in Fig. 3.) In operation, the cushion-studs *f* engage the rear end of a plunger G and, in connection with the cranks B^2 and B^3 and the pitmen E and E′ and guide-heads F and F′, drive said plunger forward for the purpose of either punching the metal forming the head of the bolt or stud, or for the purpose of upsetting the shank and riveting the head on the same, as will be hereinafter more fully set forth.

H and H′ represent levers pivoted at or about their central portion to the guide-heads F and F′. The forward ends of these levers are provided with downwardly-projecting lips *h* and *h′*, which engage upwardly-projecting ledges or lips *g* and *g′* on the plunger G. The levers H and H′ act at predetermined times to engage the plunger and draw it back through the medium of the guide-heads F or F′ as either of said heads are drawn back by their respective cranks. The levers H H′ are released or disengaged from the plunger by means of a tripping-bar H^2, which is provided with rollers and engages the rear ends of the levers when they are drawn back by their respective cranks.

At the forward end of the plunger G is located and adjusted a vertically-sliding head L, which moves in guides on said plunger G. The head L carries the punching and heading die M, which is secured to the head L in any suitable manner, and moves up and down with it. One manner of forming the head L and die M, and securing them in their respective positions, is shown in Fig. 4, where they

are shown formed with dovetailed rear portions *l m*, respectively, the head L being free to move vertically, but the die M is rigidly held in the head and moves with it. At the rear of the die I provide a groove or way *m'*, (shown in Figs. 4 and 5,) the object of which is to allow the punched portions of the metal plate forming the bolt-heads to fall out.

The mechanism for moving the plunger-head L and its attached die up and down consists of a sliding plate N, provided at its upper end with a slot *n*, in which a roller *l'* operates, the roller *l'* being in turn connected to an arm L', which is formed integral with or connected to the head L. The slot *n* allows the head L to reciprocate horizontally while in the act of punching the bolt-head or riveting the head to the shank without interfering with the vertical movement of the same. At the lower end of plate N is formed an opening N', in which a cam O operates, cam O being on a rock-shaft O', which in turn is provided with an arm O^2. P represents a pitman-rod, one end of which is secured to the arm O^2 of the rock-shaft, the other end being pivoted to a sliding rod P', which is reciprocated by cam R through the medium of a roller *p*, located on that end of the sliding rod which is contiguous to cam R, said roller engaging the groove of cam R. Cam R is secured to and revolves with shaft B. Sliding rod P' is housed in a boxing P^2, located on the side of the bed of the machine, the housing being secured to the bed of the machine in any suitable manner. It will thus be seen from the above description that at every revolution of the shaft B and cam R sliding head L, at the forward end of plunger G, is caused to move or reciprocate up and down, (or vertically,) and hence with the sliding head L the die M also moves vertically for the purpose of presenting either the hole or punching portion or the flat portion of said die opposite the clasping-dies, the purpose of which will be hereinafter fully explained.

S S' represent grasping-dies, one, S, being stationary and adjustably secured to the bed of the machine, and the other, S', being movable. The functions of the dies S and S' are to first cut off the wire which is to form the bolt-shank and then clasp and hold the cut-off portion while the plate forming the head of the bolt is punched, and also hold the shank while it is being upset and riveted to the head. The movable grasping-die S' is operated by means of a bar or rod T. (Shown more clearly in Fig. 4.) The inner end of bar T is connected to a frame S^2, which slides in the bed of the machine on suitable ways and holds and carries with it the die S'. The outer end of bar or rod T is provided with a roller *t*, which engages a cam-slot *u* in sliding block U. The block U is reciprocated through the medium of a rod U', attached to it at one end, the rod U being provided, at its other end, with a suitable roller which engages a face-grooved cam provided in wheel V. Wheel V is mounted on and revolves with shaft B. A suitable housing U^2 is provided at one side of the machine-bed in which rod U' slides and is held in position. It will be seen that as the block U is reciprocated movable die S' is reciprocated at a right angle to the line of motion of the block, through the medium of bar T and frame S^2.

Suitable feeding devices are provided for both the flat iron which forms the head of the bolt or stud, which is fed to the machine from the side of the bed, and also for the round iron which forms the shank of the bolt, and is fed from the front of the machine. I have shown a construction of feeding device, (see Figs. 1 and 2,) both feeding devices being practically the same, (with the exception of the formation of the feeding-wheels,) which may be used to feed the flat or round iron. The feeding device shown consists of two adjustable wheels provided with the proper grooves between them, to accommodate the rod or bar being fed thereto. The feed-wheels are mounted on shafts which are suitably journaled and geared together so as to revolve in unison. One of the shafts is provided with a ratchet-wheel, which is engaged by a pawl mounted on the end of a pitman, the other end of the pitman engaging an adjustable wrist-pin secured in a slot of a crank-wheel which is in turn mounted on shaft B. Thus it will be seen that as the crank-wheel revolves the pitman is given a throw determined by the location of the wrist-pin on the crank-wheel, and the pawl intermittently engages the ratchet-wheel and gives it a partial revolution, which is in turn imparted to the feed-rollers, and the rod or bar fed to the machine accordingly.

As hereinbefore set forth, my machine has for its object the heading of chaplet bolts or studs. These bolts or studs are provided with a sheet or plate metal head, which is first punched at a suitable point and then riveted to one end of the shank, a shoulder being formed at the under side of the head on the shank by upsetting the shank, (see Fig. 7,) which holds the head tightly in position. The grasping-dies S S' therefore are provided each with a groove *s s*, corresponding to about one-half of the diameter of the shank or slightly less, and at the end of the dies S S' which is opposite the sliding head L of the plunger G a countersink *s' s'* is formed which forms a matrix for the upset portion of the shank of the bolt. (See Fig. 6.)

S^3 represents a feeding-tube having its front end directly opposite the wire-feeding wheels, and passing through the front end of the bed of the machine. The rear end of the feeding-tube S^3 abuts against a die S^4, which has an orifice s^2 corresponding to and in line with the feeding-tube S^3. The inner end of the orifice s^2 is located a short distance from the groove *s* in the stationary grasping-die S. It will thus be seen that as the wire which forms the

shank of the bolt is fed through the orifice s^2 to a predetermined length (which is governed by the feeding-wheels and their connected parts) the movable die S′, closing up to the stationary die S, will cut off the wire and clasp it between them and hold the shank until the head is punched, the shank upset, and the head riveted to the shank.

The device for cutting off the metal for the head of the bolt is constructed and operated as follows: Opposite the passage between the feeding-rollers I provide a tube *w*, which is provided with an orifice corresponding to the width and gage of the iron or metal to be fed, and which orifice registers with the passage between the feeding-rolls. The inner end of the orifice *w* is so located that a ledge *w′* is formed between it and the stationary die S. The ledge *w′* is so placed that as the heading-die M is driven forward, its inner edge acts in conjunction with ledge *w′* as a shear and cuts off the metal which is to form the head of the bolt.

The operation of my device is as follows: The machine, as regards its feeding devices, both for the wire forming the shank of the bolt and for the metal forming the head of the bolt, are "set" or regulated to feed the desired length of metal in each case as required. The dies are also set, and the metal forming the shank is fed through the feeding-wheels and thence through the feeding-tube at the front of the machine, to the grasping-dies, a predetermined length of wire protruding, according to the length of shank desired. The movable die is then, by the action of the machine, caused to travel toward the stationary die S, and while thus traveling shears or severs the shank and carries it toward the stationary die S and grasps it between them, holding it tightly and leaving, as usual, a small portion of the shank projecting from the dies, as aforesaid, acts first as a punch to form the hole in the head, and afterward to supply stock sufficient for the upsetting of the shank and the riveting portion, as will be hereinafter fully set forth. Directly after the grasping-dies S S′ have severed and grasped the shank, as before described, the plunger G advances, the heading-die L being in its lowest position, and the protruding shank grasped between the grasping-dies S S′. Now, as the plunger advances toward the dies S S′, the inner edge of the heading-die M, in conjunction with the ledge *w′* on the inner edge of tube *w*, acts to sever the metal which is to form the head of the bolt, and after the metal is severed it is carried forward toward the grasping-dies S S′, and the protruding end of the shank is forced through it, thus making the protruding end of the shank, in connection with the hole m^5 in the heading-die, act as a punching-machine. The heading-die L is now retracted by means of one of the levers H or H′ engaging, at its forward end, one of lips *g g′* on plunger G, which action frees the end of the shank from the hole m^5 in the heading-die L and allows the said die to be dropped by means of the action of the rock-shaft O′ and its coacting parts and connection. After the heading-die L is dropped it presents opposite to the protruding shank, which is still grasped between the dies S and S′, a flat or imperforate portion, which, upon the heading-die being again driven forward, both upsets the shank, thus forming the shoulder and at the same time rivets the shank to the head, thus forming the bolt.

It will be seen that in operation the plunger G, which carries the punching and heading die L, is driven forward twice during each revolution of the crank-shaft B, and is retracted alternately by levers H and H′, which are operated by means of suitable springs, and the tripping-bar H^2, which engages the free arm of the levers at each back stroke of the guide-heads F and F′, these levers H and H′ being so regulated in their operation as to engage and release plunger G at suitable times.

What I claim is—

1. In a chaplet-bolt-heading machine, the combination with grasping-dies, one of which acts first to cut off the shank and then grasp it, of a die operated by means of a plunger which acts first to cut off the strip from which the head is formed, and then to force the strip against the shank to punch said strip and finally to head the strip to the shank.

2. In a chaplet-bolt header, the combination with grasping-dies, one of which acts to first cut off the shank from a rod into proper lengths and then grasp it and hold it until the head is punched by and riveted to the shank, the punching and riveting being accomplished without altering the position of the shank or grasping-dies, substantially as shown and described.

3. In a machine for heading chaplet-bolts, the combination with grasping-dies, one of which is movable and acts to cut off the rod before grasping it against the stationary die, of a ram carrying a vertically-movable plunger-die, and means for shifting said die to present to the shank held between the grasping-dies, first, a hole whereby the shank acts to punch the metal which is to form the head of the bolt, and then present a portion adapted to rivet the shank to the head, substantially as and for the purpose shown and described.

4. In a machine for securing heads to rods, shanks or the like, the combination with a plunger, to which is secured the heading or riveting die, of two reciprocating guide-heads secured to and operated by oppositely-located cranks, which are revolved in unison, whereby said plunger and heading or riveting die is forced to reciprocate twice to each revolution of the shaft of the machine, substantially as and for the purpose set forth.

5. In a heading-machine of the kind described, the combination with a main shaft

provided with two cranks, oppositely disposed on said shaft, of connecting-pitmen and sliding heads, said sliding heads operating to alternately drive the heading-plunger forward and retract it, substantially as and for the purpose shown and described.

In testimony whereof I sign this specification, in the presence of two witnesses, this 2d day of December, 1895.

GEORGE J. FANNER.

Witnesses:
W. E. DONNELLY,
ELLA E. TILDEN.