

(No Model.)

2 Sheets—Sheet 1.

G. H. PEGRAM.
RIVETING MACHINE.

No. 445,936.

Patented Feb. 3, 1891.

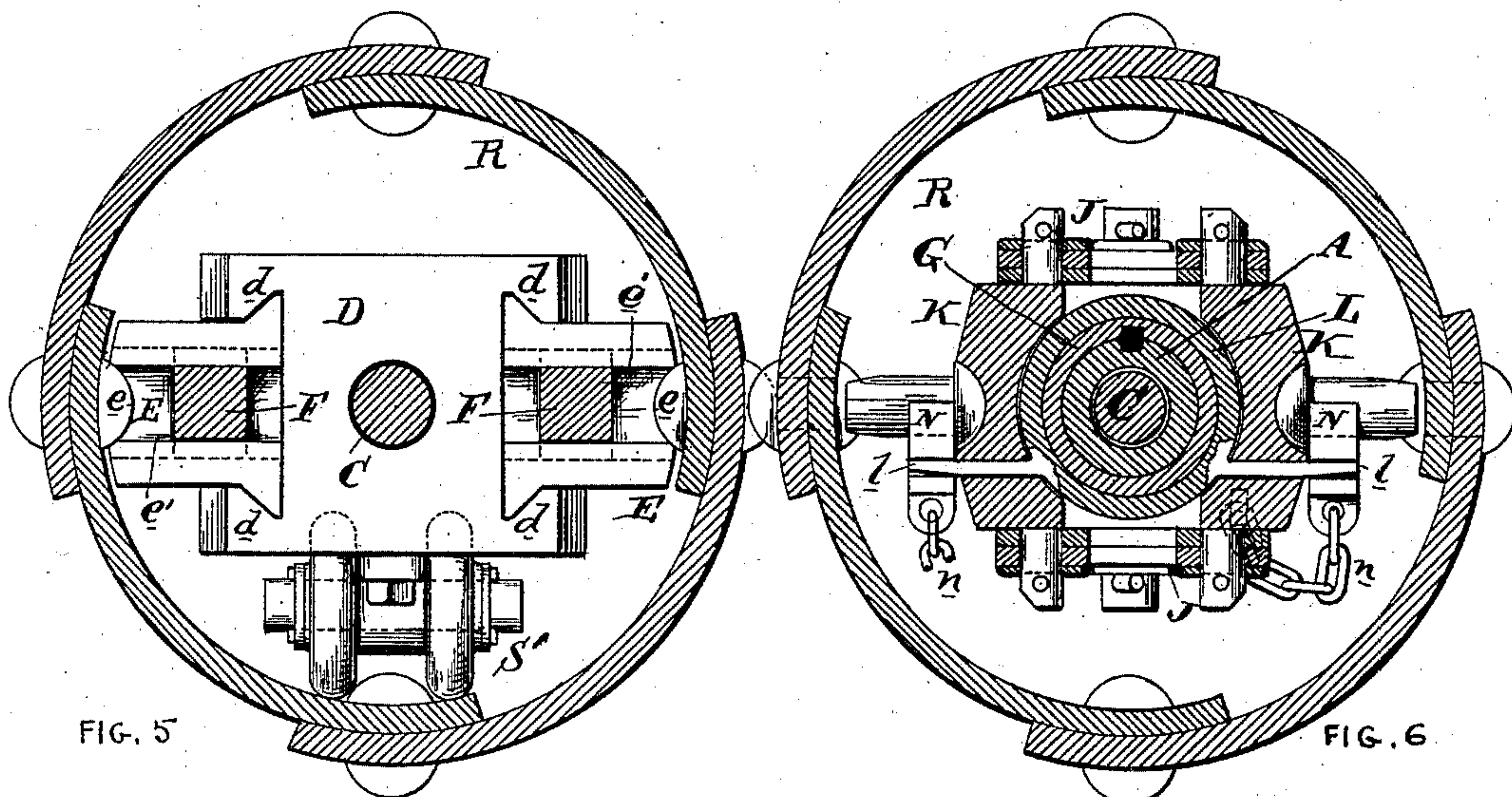


FIG. 5

FIG. 6

FIG. 2

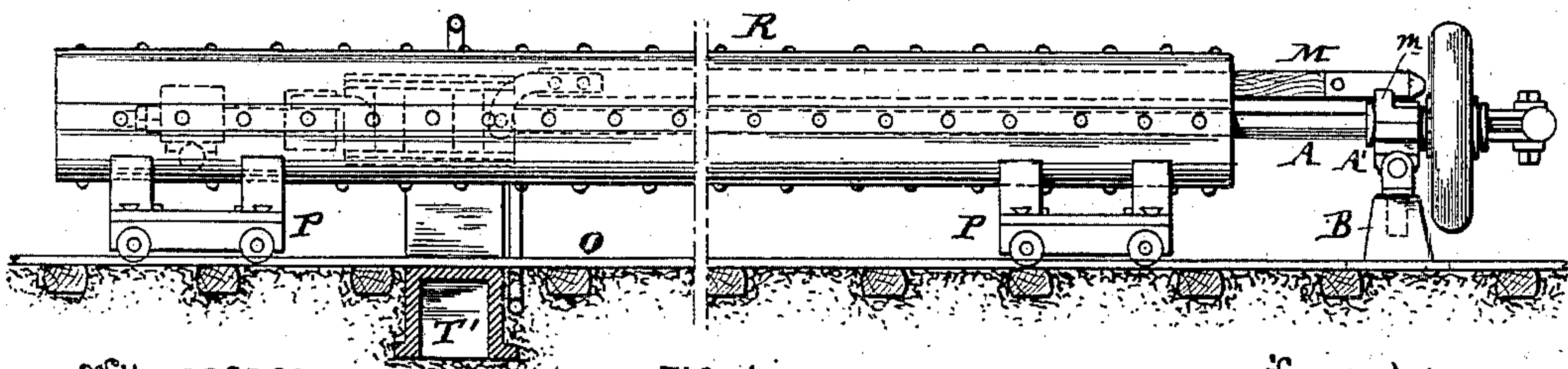
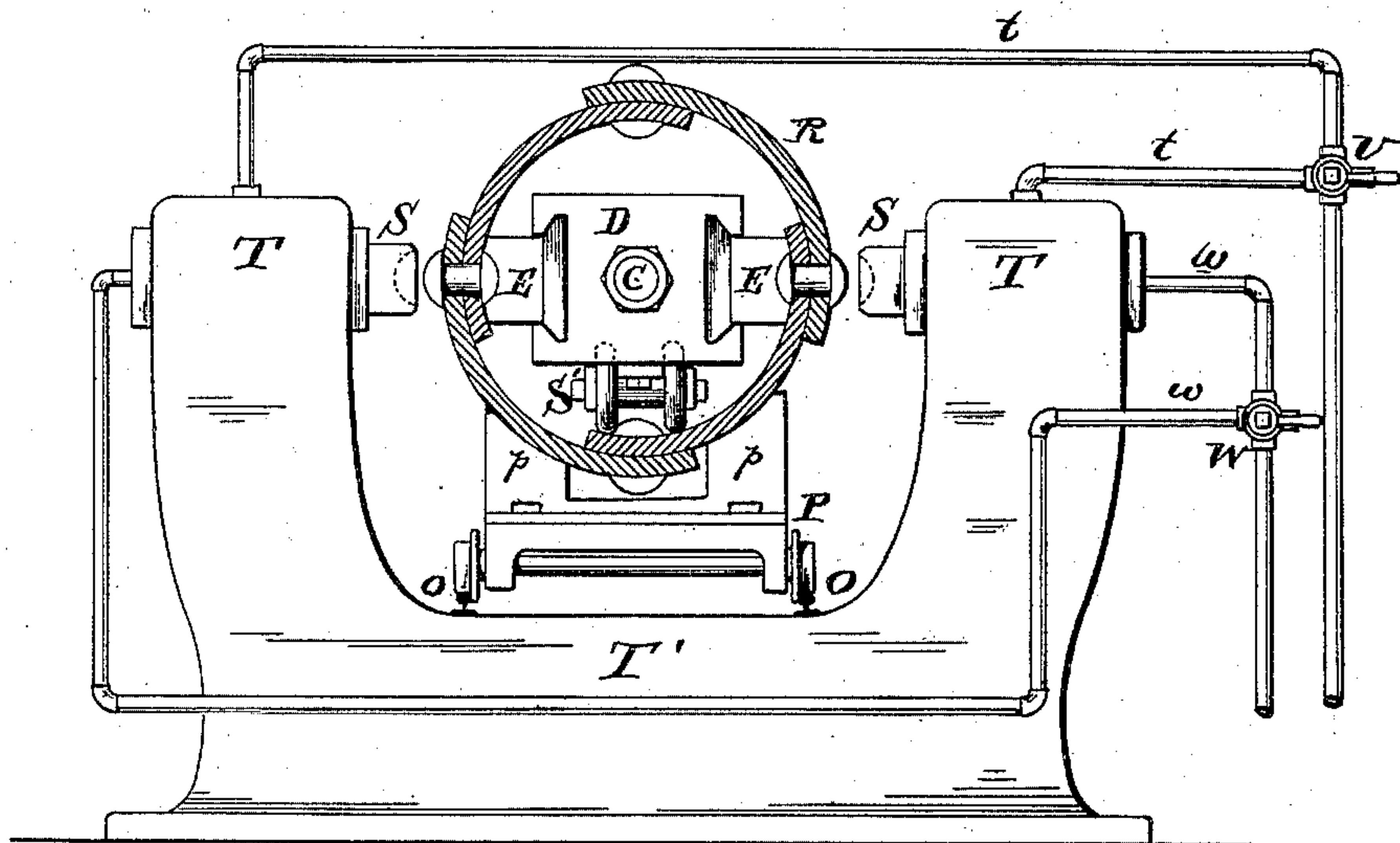


FIG. 1

Witnesses:

Henry D. Dwyer
S. T. Yerkes

Inventor:

Geo. H. Pegram
By his atty
[Signature]

(No Model.)

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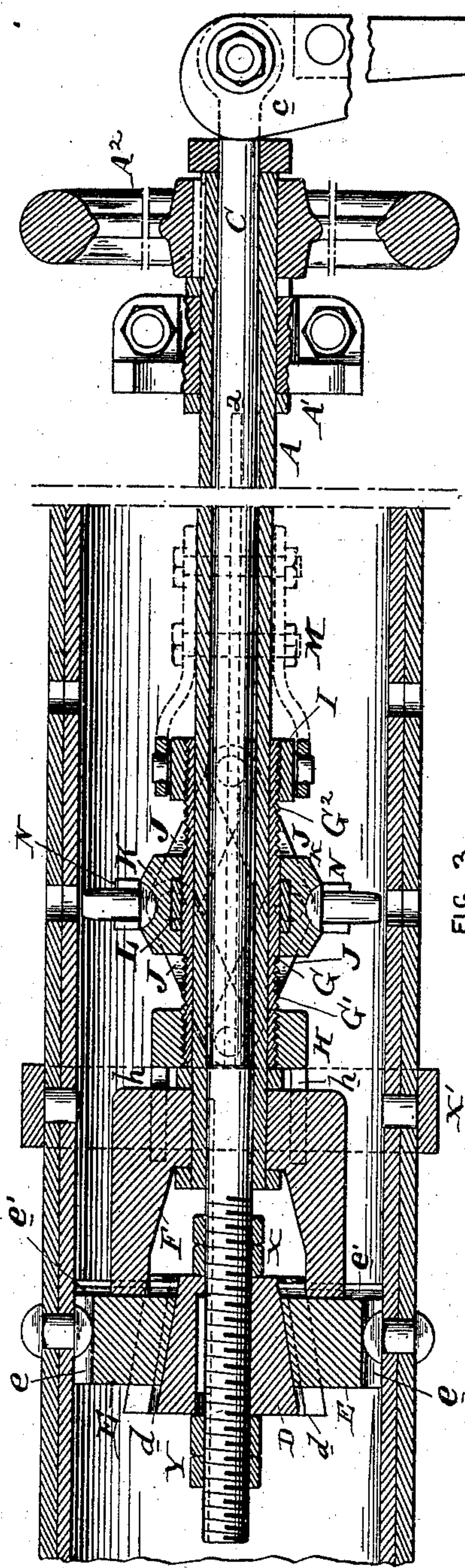


FIG. 3

Witnesses:
Henry D. King
S. T. Yerkes.

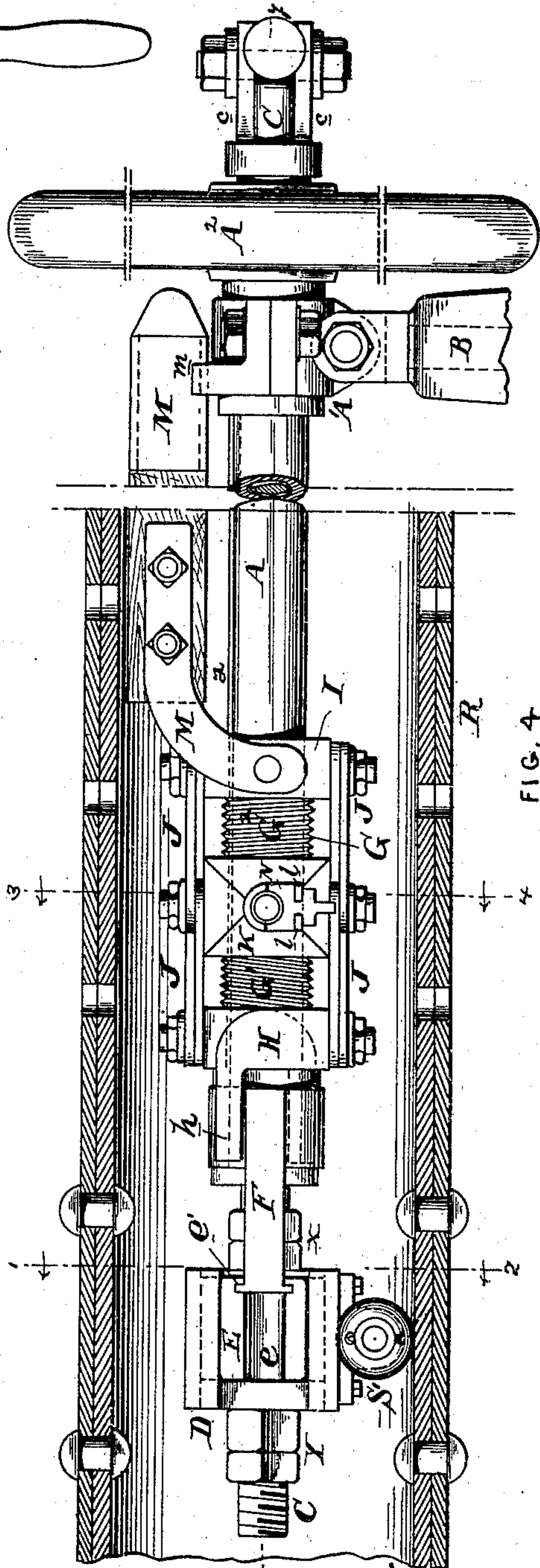


FIG. 4

Inventor:
Geo. H. Pegram
By *Wm. A. ...*

UNITED STATES PATENT OFFICE.

GEORGE H. PEGRAM, OF ST. LOUIS, MISSOURI.

RIVETING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 445,936, dated February 3, 1891.

Application filed October 27, 1890. Serial No. 369,525. (No model.)

To all whom it may concern:

Be it known that I, GEORGE H. PEGRAM, of the city of St. Louis, State of Missouri, have invented an Improvement in Riveting-Machines, of which the following is a specification.

My invention has reference to riveting-machines; and it consists of certain improvements, which are fully set forth in the following specification and shown in the accompanying drawings, which form a part thereof.

The object of my invention is to provide a machine especially adapted for riveting tubes or columns made up of sections and united by longitudinal lines of rivets, which tubes or columns are extensively employed as water-pipes, boiler-flues, and columns in the construction of buildings and bridges.

The machine is designed to facilitate the work of riveting the sections together, and thus cheapen the production of the tubes or columns.

The riveting together of the segments of a tube or column has heretofore been performed by driving rivets through externally-projecting flanges of the segments, in which case power may be employed, or inserting rivets singly from the interior of the tube and driving them by hand, producing comparatively poor and expensive work.

In carrying out my invention I employ two anvil-dies movable to or from each other, supported upon the end of a rod and adapted to be projected into the interior of the tube or column, and combine therewith two riveting-machines arranged upon the outside of the column or tube and provided with riveting-dies arranged in line with the anvil-dies. The operation is such that after the rivet has been placed through the sections of the column or tube from the inside the column is moved forward to bring the rivets in line with the riveting-dies and the anvil-dies are moved against the heads of said rivets. The riveting-dies are then brought to bear upon the ends of the rivets and moved toward the anvil-dies, simultaneously riveting the sections on opposite sides of the column or tube. In this construction the thrust of one of the riveting-machines is counteracted by the thrust of the other riveting-machine, and thus the holder for the anvil-dies has little or no strain

put upon it other than to transmit the pressure between the riveting-machines. In conjunction with a machine of this class I employ a mechanism for automatically inserting the rivets from the inside outward, since in small columns it is impossible for a man to enter and insert the rivets through the holes.

In carrying out this part of my invention I provide a rivet-carriage sliding on the support or rod for the anvil-dies, and having holders on the diametrically-opposite sides, into which holders the rivets are placed while the carriage is outside of the column at one end. The carriage is then slid into the column until stopped by a head limiting its motion, which has been so adjusted that the rivets are brought directly opposite the rivet-holes in the column, into which they are moved laterally by mechanism controlled from the outside, the rivets being simultaneously moved apart and into the rivet-holes and liberated, so that they may be brought into position back of the anvil-dies. The carriage is then withdrawn for the insertion of other rivets. The mechanism for inserting the rivets is movable longitudinally and independently of the anvil-dies, so that the operation of inserting the rivets may be carried on simultaneously with the operation of riveting the column or tube. I also provide a suitable support for the work to be riveted, whereby the same is properly guided over the rivet-inserting mechanism and anvil-dies. The tube or column is allowed a limited lateral motion on the supporting-trucks to avoid strain from any unequal action of the riveting-machines; and it will readily be seen that rivets might be driven by supplanting one of the opposing riveting-machines by a fixed die-holder allowing the work to be moved against it by the other riveter, or a single riveting-machine might span the column, acting simultaneously upon the two rivets to be driven.

There are many details of construction which are fully set out hereinafter, and illustrated in the accompanying drawings, in which—

Figure 1 is a sectional side elevation of a riveting-machine embodying my invention. Fig. 2 is an end view of same, the column to

be riveted being shown in sections. Fig. 3 is a longitudinal sectional plan on line *y y* of Fig. 4. Fig. 4 is a side elevation of the rivet-applying devices and anvil-die, and shows the column being riveted in section. Fig. 5 is a cross-section of Fig. 4 on line 1 2, and Fig. 6 is a cross-section of Fig. 4 on line 3 4.

A is a tube which is journaled at one end in a bearing A' with freedom of rotation and may be rotated by a hand-wheel A². The bearing A' is universally journaled to a rigid support B, fixed at one end of the apparatus.

Arranged through the tube A is a reciprocable rod C, adapted to be reciprocated in the tube A by means of a cam-lever *c*. Secured to the other or free end of the rod C is a wedge-head D, having oblique guide-grooves *d* upon diametrically-opposite sides and adjustable on the rod C by the nuts X and Y. This head may, if desired, be provided with a supporting guide-wheel S', adapted to run upon the under side of the tube, as is clearly shown in Figs. 4 and 5, to support the head in a central line with respect to the tube. For tubes of different diameters the journal-bearing for this wheel or roller S' would be changed, so as to move it farther from the shaft C.

Working in the oblique guides *d* of the head D are the anvil-dies E, having longitudinal grooves *e*, the cross-section of which corresponds to the curvature of the head of the rivet, as is clearly shown in Fig. 5. One of the ends of the anvil-dies E is provided with transverse grooves *e'*, whereby the said anvil-dies may be held to the head F, with provision for radial movement thereon, said radial movement being imparted by the longitudinal reciprocation of the head D with the rod C. The head F is supported and fixed in longitudinal position upon the end of the tube A.

Arranged upon the outside of the tube A and to the rear of the head F is a sleeve G, having one end provided with a left-hand screw-thread G' and the other end provided with a right-hand screw-thread G², and said sleeve is movable longitudinally upon the tube A, but is caused to rotate with it by means of a spline *a*. Arranged upon the left-hand thread G' is a nut H, and upon the right-hand thread G² is a nut I, which nuts H and I are connected by means of a double toggle J, the intermediate joints of which are connected to blocks K, having recesses for receiving the heads of the rivets.

Encircling the sleeve G, beneath the blocks K, is a band L, having oppositely-projecting guides *l*, having their ends made slightly tapered, as shown in Fig. 6. The blocks K slide over the guides *l* when inserting rivets. The rivets are held in the blocks K by means of the holders N, which are notched, as indicated in Figs. 4 and 6, to receive the ends of the guides *l*, upon which they are normally held by friction.

The nut H is provided with projections *h*,

extending over the head F, so that while the nut may reciprocate with respect to the head F it cannot rotate. The nut I is connected to a long bar M, which extends to the rear end of the apparatus adjacent to the hand-wheel A², by which the rivet-carriage is inserted and withdrawn from the tube or column, as shown in Figs. 1 and 4. When the hand-wheel A² is rotated, the nuts H and I are moved toward each other, and this action through the toggles J moves the blocks K away from each other, inserting the rivets into the holes of the sections of the column R. Just before the rivets are wholly pushed into place the blocks K push the holders N off the ends of the guides *l*, allowing said holders to drop by gravity and permit the blocks K being thrust close up to the interior surface of the column to push the rivets entirely home. The holders N are connected to the machine by chains *n*, so that they cannot become lost. If the distance between the holes for the rivets varies in two pieces of work or in the same work, an adjustment may be made through the nuts X and Y or by moving the bar M and all of its connections longitudinally with respect to the head D and the tube A, which through the head F controls the location of the anvil-dies. The various sections making up the column or tube R may be temporarily held in position by a clamp X' of any suitable construction, or temporary bolts may be inserted through the rivet-holes, as is customary.

Arranged parallel to the tube A and rod C is a railway O, upon which are arranged trucks or carriages P, having laterally-adjustable supports *p* for holding the work and guiding it longitudinally with respect to the riveting apparatus. The supports *p* may be varied to correspond to the work to be supported upon the carriages. Any other method of guiding the work over the machine may be employed, if desired.

Arranged transversely to the railway and on a line with the anvil-dies is a yoke-frame T', upon the upper ends of which are arranged the two riveting-machine heads T T, having riveting-dies S S, arranged in a line through the anvil-dies E E and adapted to be moved to or from each other to work in conjunction with said anvil-dies to upset the portions of the rivets which extend through the tube.

V is a valve which controls the flow of the fluid under pressure to or from the riveting-head by pipes *t*, which fluid forces the riveting-dies S S toward each other. By reversing the valve to allow the escape of the fluid and operating the valve W to permit other fluid under pressure to pass by pipes *w w* into the riveting-heads T the riveting-dies may be moved away from each other. The valves may obviously be operated by valve-rods from a station near the support B. This mechanism for operating the riveting may be such as set out in a pending application of mine bearing even date with this, or may be made in any

well-known manner, the particular kind of operating mechanism for riveting dies being immaterial to my invention.

It is quite evident that in place of supporting the work in a manner to move it horizontally the devices may be arranged vertically or obliquely without in the least departing from the principles of my invention.

The necessary variation in the guiding mechanism is such as may be made by any mechanic to suit the work intended to be performed.

While I have described my invention as employing fixed riveters and movable work, the reverse might be resorted to. I do not limit myself to the details of construction here shown, as they may be modified in various ways without departing from the principles of my invention.

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

1. In a riveting apparatus, the combination of two riveting-machines having their riveting-dies pointing toward each other, with two anvil-dies arranged between the riveting-dies and respectively pointing toward the riveting-dies, and a support between the anvil-dies to hold them firmly against the action of the riveting-dies.

2. In a riveting apparatus, the combination of two riveting-machines having their riveting-dies pointing toward each other, with two anvil-dies arranged between the riveting-dies and respectively pointing toward the riveting-dies, a support between the anvil-dies to hold them firmly against the action of the riveting-dies, and an arm or support carrying at one end the anvil-dies and supported at the other end against longitudinal movement.

3. In a riveting apparatus, the combination of two riveting-machines having their riveting-dies pointing toward each other, with two anvil-dies arranged between the riveting-dies and respectively pointing toward the riveting-dies, a support between the anvil-dies to hold them firmly against the action of the riveting-dies, an arm or support carrying at one end the anvil-dies and supported at the other end against longitudinal movement, a railway or guide arranged substantially parallel to the arm or support, and trucks or carriages upon said railway or guide for guiding the work to be riveted.

4. In a riveting apparatus, the combination of two riveting-machines having their riveting-dies pointing toward each other, with two anvil-dies arranged between the riveting-dies and respectively pointing toward the riveting-dies, a support between the anvil-dies to hold them firmly against the action of the riveting-dies, an arm or support carrying at one end the anvil-dies and supported at the other end against longitudinal movement, a railway or guide arranged substantially parallel to the arm or support, trucks or carriages upon said railway or guide for guiding the work to be

riveted, and rollers for guide-wheels carried upon the end of the arm or support adapted to rest upon the work to hold said anvil-dies at the proper elevation.

5. In a riveting apparatus, the combination of two riveting-machines having their dies pointing toward each other, with two anvil-dies arranged between the riveting-dies and respectively pointing toward the riveting-dies, an adjustable support between the anvil-dies to hold them firmly against the action of the riveting-dies, and means to adjust said adjustable support for moving the anvil-dies to or from the riveting-dies.

6. In a riveting apparatus, the combination of two riveting-machines having their riveting-dies directed toward and movable to or from each other, with two anvil-dies arranged in a line between the riveting-dies and movable to or from the respective riveting-dies, a support for said anvil-dies for holding them in position between the riveting-dies while permitting the aforesaid movement, an adjustable head adapted to be moved between the anvil-dies to move them to or from the riveting-dies and support them against the thrust of the said riveting-dies, power mechanism to operate said movable head located at a distance therefrom, and connecting devices between said head and power mechanism.

7. In a riveting apparatus, the combination of two riveting-machines having their riveting-dies directed toward and movable to or from each other, with two anvil-dies arranged in a line between the riveting-dies and movable to or from the respective riveting-dies, and a support for said anvil-dies for holding them in position between the riveting-dies while permitting the aforesaid movement, and adapted to be moved for imparting a lateral movement to the anvil-dies with respect to the riveting-machine.

8. In a riveting apparatus, the combination of two riveting-machines having their riveting-dies directed toward and movable to or from each other, a lateral support extending between the riveting-dies, anvil-dies carried on said support and arranged in a line between the riveting-dies, two rivet-holders arranged in the same plane with the anvil-dies and located laterally with respect thereto and upon the support for said anvil-dies, and power mechanism carried upon the support for causing said rivet-holders to be moved to or from each other for the purpose of automatically inserting rivets into the work prior to passing them between the anvil and riveting dies.

9. In a riveting apparatus, the combination of two riveting-machines having their riveting-dies directed toward and movable to or from each other, a lateral support extending between the riveting-dies, anvil-dies carried on said support and arranged in a line between the riveting-dies, two rivet-holders arranged in the same plane with the anvil-

dies and located laterally with respect thereto and upon the support for said anvil-dies, power mechanism carried upon the support for causing said rivet-holders to be moved to or from each other for the purpose of automatically inserting rivets into the work prior to passing them between the anvil and riveting dies, and an independent device for moving said rivet-holders longitudinally upon the support with reference to said anvil-dies.

10. In a riveting apparatus, the combination of two riveting-machines having their riveting-dies directed toward and movable to or from each other, a lateral support carrying upon its end anvil-dies arranged between the riveting-dies, laterally-movable rivet-holders also carried by said support, clamping devices for holding the rivets to the holders, and power mechanism for simultaneously moving the two rivet-holders away from each other and automatically releasing the rivets from the clamps and holders.

11. In a riveting apparatus, the combination of two riveting-machines having the riveting-dies directed toward each other, a rotary tube A, a head F, carried upon the end of the tube, and upon which is supported the anvil-dies, anvil-dies E, arranged between the riveting-dies, a wedge-shaped head D, acting upon the adjacent sides of the anvil-dies to move them to or from each other, and a longitudinally-movable shaft C for moving said head D.

12. In a riveting apparatus, the combination of two riveting-machines having the riveting-dies directed toward each other, a rotary tube A, a head F, carried upon the end of the tube, and upon which is supported the anvil-dies, anvil-dies E, arranged between the riveting-dies, a wedge-shaped head D, acting upon the adjacent sides of the anvil-dies to move them to or from each other, a longitudinally-movable shaft C for moving said head D, a sleeve G, having right and left hand screw-threads upon its respective ends, nuts H and I, adapted to said screw-threads, toggles J between said nuts, rivet-holders K, connected to said toggles and laterally movable thereby, a connection between the tube A and sleeve G, whereby the latter may be rotated with the former, and means to hold the rivet-holders against rotation.

13. In a riveting apparatus, the combination of two riveting-machines having the riveting-dies directed toward each other, a rotary tube A, a head F, carried upon the end of the tube upon which is supported the anvil-dies, anvil-dies E, arranged between the riveting-dies, a wedge-shaped head D, acting

upon the adjacent sides of the anvil-dies to move them to or from each other, a longitudinally-movable shaft C for moving said head D, a sleeve G, having right and left hand screw-threads upon its respective ends, nuts H and I, adapted to said screw-threads, toggles J between said nuts, rivet-holders K, connected to said toggles and laterally movable thereby, a connection between the tube A and sleeve G, whereby the latter may be rotated with the former, means to hold the rivet-holders against rotation, a sleeve L, having projected arms l, loosely supported upon the sleeve G, and rivet-holding clamps N, loosely connected with the arm l, for holding the rivets temporarily to the heads K.

14. In an apparatus for riveting tubes and columns, the combination of a riveting-machine external to the column and acting upon the opposite sides thereof, with anvil-die blocks inside of the tube or column, arranged to transmit the pressure simultaneously through two rivets in line.

15. In an apparatus for riveting tubes and columns, the combination of a riveter external to the tube or column and acting upon the opposite sides thereof, with die-anvils in the line of pressure of said rivet-machine inside of said tube or column, and mechanism for expanding and locking said die-anvils against interposed rivets.

16. In an apparatus for riveting tubes and columns, the combination of a riveting-machine external to the tube or column and acting upon the opposite sides thereof, and a die-anvil inside of the tube or column for transmitting the pressure between the dies of the riveting-machine and through interposed rivets, with mechanism for projecting rivets into the tube to a distance from the end and inserting two rivets simultaneously in the opposite sides of the tube or column.

17. The combination of a riveting-machine with rivet-holders for holding two rivets arranged in line to be simultaneously upset.

18. In an apparatus, the combination of two rivet-holders and power mechanism for imparting to them an opposite relative movement for inserting two rivets from the interior of a column into the sides thereof simultaneously.

In testimony of which invention I have hereunto set my hand.

GEORGE H. PEGRAM.

Witnesses:

W. A. RILEY,
F. B. AYRES.