(No Model.) 2 Sheets—Sheet 1.

W. SELLERS.

RIVETING MACHINE.

No. 454,572. Patented June 23. 1891.

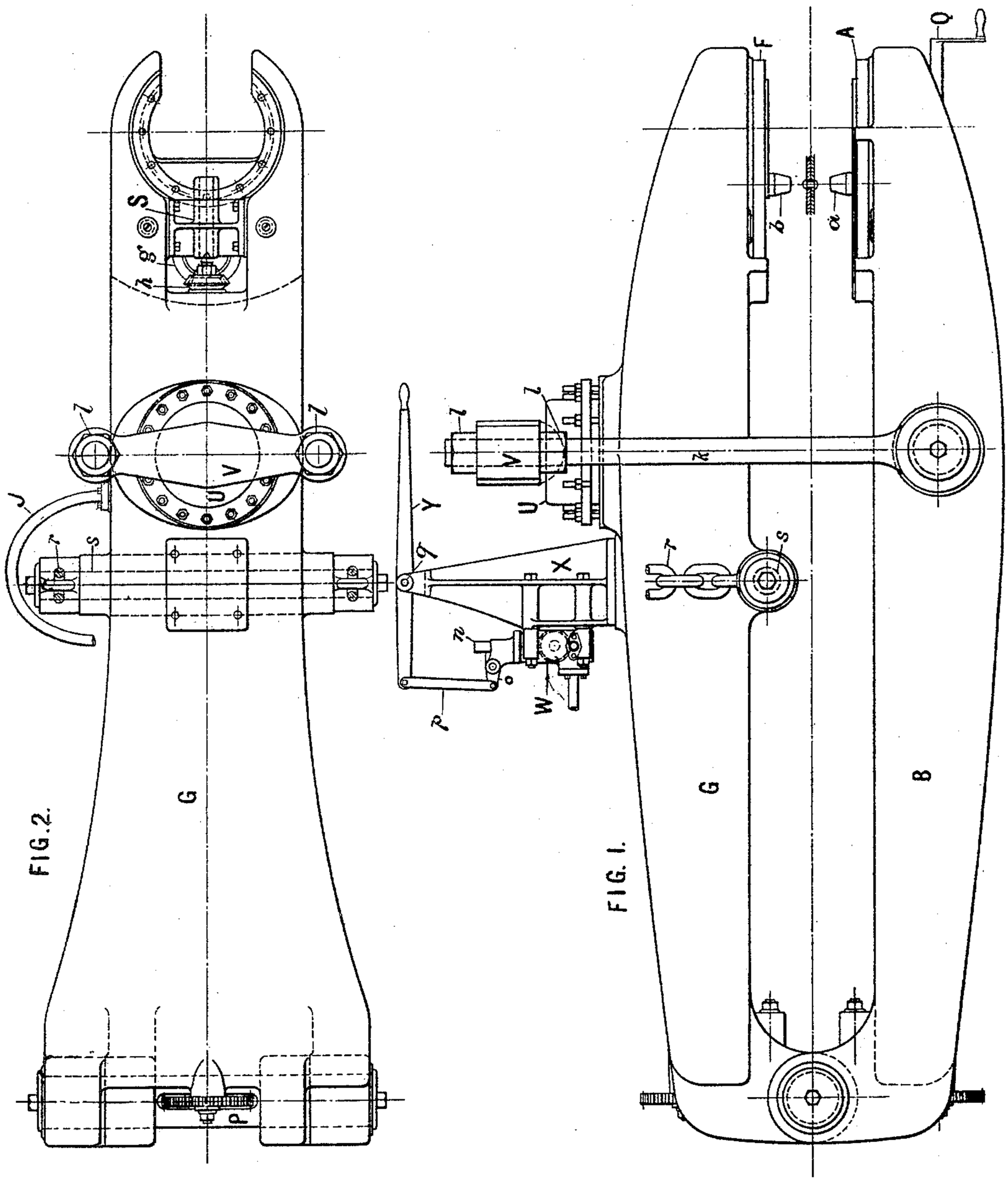

FIG. 2.

FIG. I.

WITNESSES:

John L. Phillips

E. A. Harper.

INVENTOR

Wm. Sellers

(No Model.)

2 Sheets—Sheet 2.

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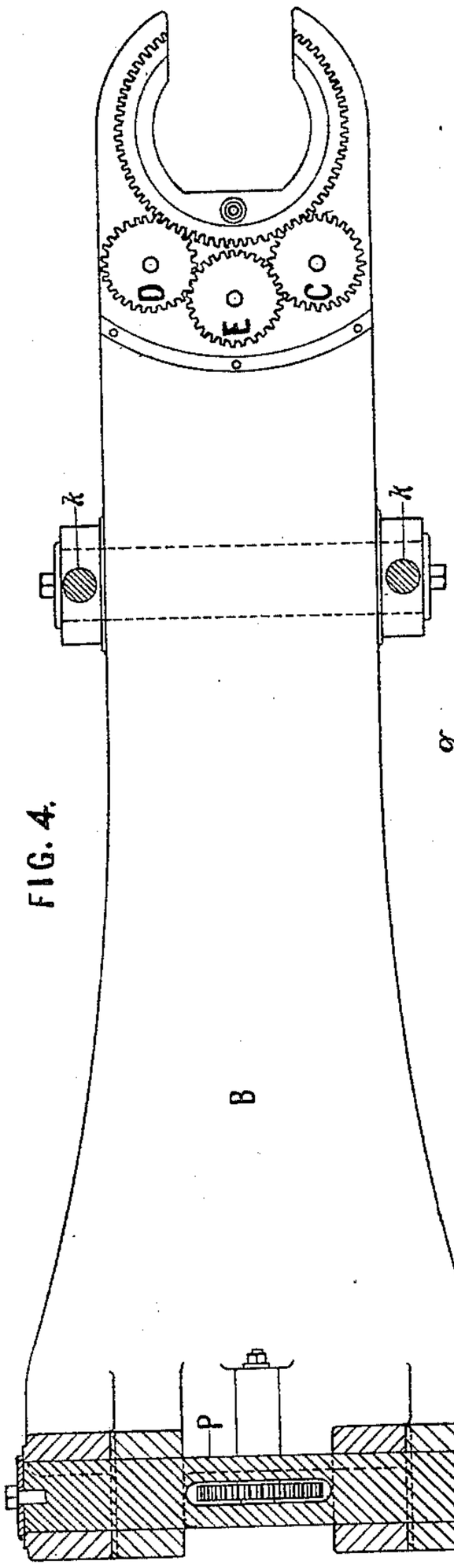

FIG. 4.

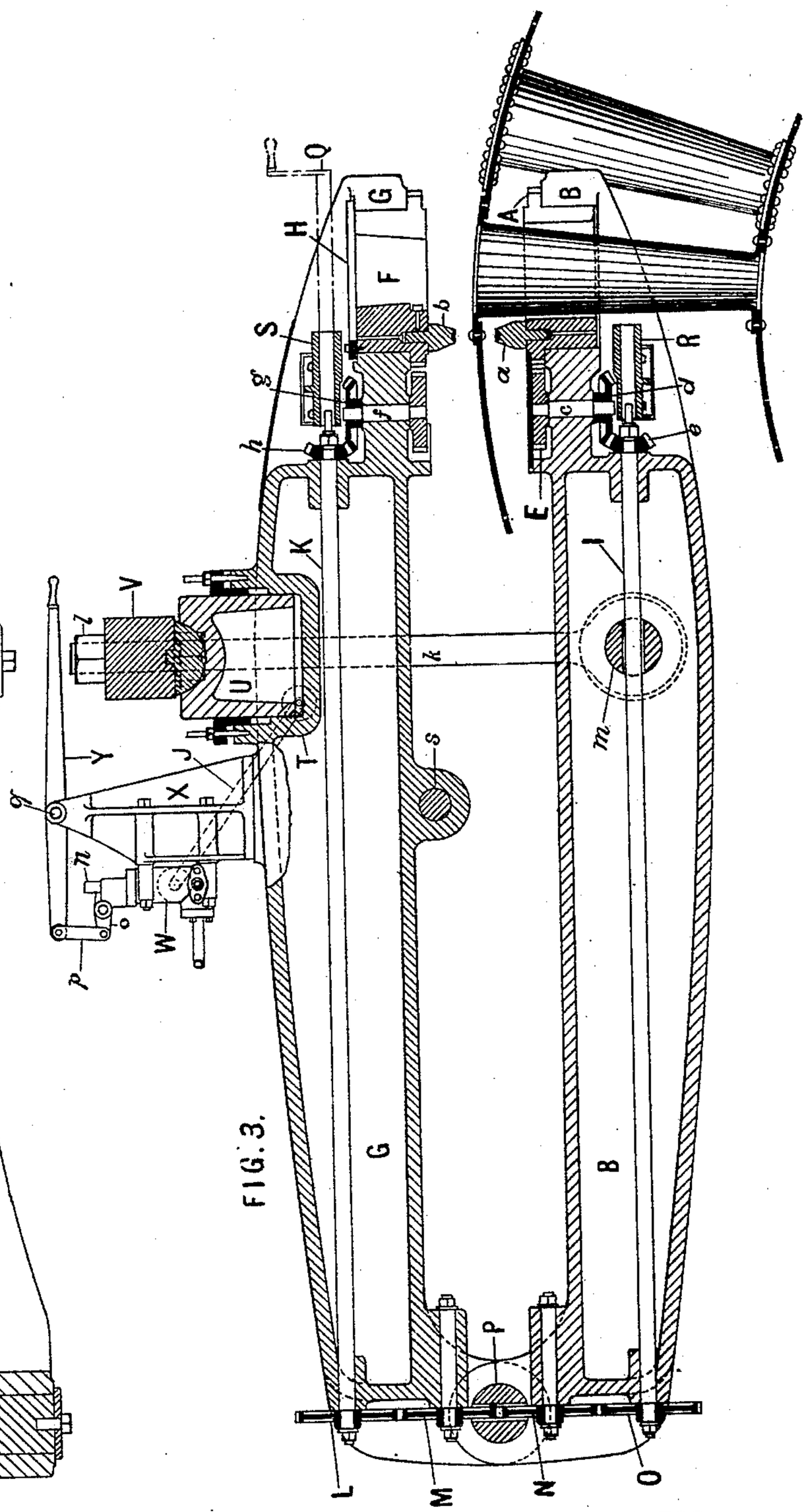

FIG. 3.

WITNESSES:

John L. Phillips

E. F. Harper.

INVENTOR

Wm Sellers

UNITED STATES PATENT OFFICE.

WILLIAM SELLERS, OF PHILADELPHIA, PENNSYLVANIA.

RIVETING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 454,572, dated June 23, 1891.

Application filed December 5, 1890. Serial No. 373,700. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM SELLERS, of the city and county of Philadelphia, in the State of Pennsylvania, have invented an Improvement in Riveting-Machines, of which improvement the following is a full and exact description.

My improvement is adapted to riveting the flange of a pipe or tube to a corresponding surface on another pipe or tube or to the plating of any vessel, more particularly if a series of tubes in close proximity must be riveted to a vessel common to all, and as this latter condition is found in the Galloway boiler the drawings represent the machine as operating upon such tubes, which heretofore have always been riveted in place by hand.

To enable this machine to operate upon the tubes of a Galloway boiler, the order of procedure for constructing the flue of which these tubes form a part must be changed, and this change forms the subject-matter of another application; but as this change is only for the purpose of enabling the machine to do its work and does not affect the machine itself no further notice of it is necessary in this application.

The nature of my invention consists in providing a riveting-die and a holder mounted, respectively, upon circular tables rotatable about the axis of a tube, one or both of which are provided with an opening in the periphery through which the tube can pass when its axis is parallel to the axis of rotation.

It further consists in rotating the circular table through which the tube must pass by means of two gear-wheels so far removed from each other on the periphery of the table that the opening through it for the tube cannot cut off the connection with both gear-wheels at the same time.

It further consists in providing two levers of the third order with a rotatable table upon one end of each and a fulcrum common to both at the other end and so gearing these tables together that their rotatory movements must be concurrent.

It further consists in mounting the circular tables upon two levers of the third order, having a fulcrum common to both of such length that in whatever position the riveting-die and the holder may be the line of strain in driving the rivet must always fall within this fulcrum.

The more fully to explain my invention reference will now be made to the drawings, which form part of this specifiation, in which—

Figure 1 represents a side elevation of my improved riveting-machine. Fig. 2 is a plan of the same with the valve-case and stand removed. Fig. 3 is a sectional view of Fig. 1, and Fig. 4 is a plan of the lower lever in Figs. 1 and 3 in all of the drawings.

Similar letters refer to similar parts.

The riveting-die and the holder are alike; but for convenience of description I will call the lower die *a* "the riveting-die," which makes the upper one *b* the holder. In their operation *b* rests upon the rivet-head and *a* moves toward *b* to close the rivet. The riveting-die *a* is supported in the circular table A, the upper flange of which rests upon the end of a lever of the third order B, and a hub under this flange is fitted to a hole in the lever, so that it will turn freely therein. An opening through this table and hub is provided large enough to admit the tube to be operated upon freely. An opening from this hole through to its periphery is made wide enough for the tube to pass through, and an opening of corresponding width is made in the end of the lever B, so that by raising the tube or lowering the lever the tube, when in the position shown in Fig. 3, can pass freely into the center of the circular table A. The shape of the hole in the circular table and of its opening to the periphery of the table, as also of the opening in the end of the lever B, are shown in Fig. 4. It will be observed that the opening in the end of the lever B is not so large as the hub under the circular table A, so that this table is held securely in its position by the hub, while it is free to rotate about its axis. The distance from the center of the riveting-die *a* to the center of the circular table A corresponds with the radius of the circle of rivets which is to be driven in the upper or large end of the tube. (Shown in Fig. 3.) When the flange on the small end of this tube is to be riveted, the circular table A is removed and another similar one is put in its place, in which the distance of the riveting-die *a* from the center of the table corresponds

with the radius of the circle of rivets in the smaller flange. The periphery of the circular table A is provided with teeth, into which the teeth of the pinions C and D mesh, and these two pinions are geared together by the pinion E. The distance between the pinions C and D is such that when the opening in the periphery of A is turned to the pinions one or the other pinion must always be in gear with the circular table, so that this table can always be turned by rotating the pinion E. The circular table F in the upper lever G and the lever itself, which is also of the third order, are arranged in the same manner as the table A and lever B. The table F is turned about its axis by gearing similar to that on lever B and in like manner; but as the flange of the circular table F is on the under side of the lever G provision is made for holding up this table by a circular ring H, which is bolted to the hub on the upper side of the table F. Provision is made for rotating the pinion E and table A by means of the vertical shaft *c*, bevel-wheels *d* and *e*, and the shaft I, and similar provision is made for the table F by means of the vertical shaft *f* and bevel-wheels *g* and *h* and the shaft K.

The shafts I and K are geared together by the train of wheels L M N O, which pass through the fulcrum-pin P, that unites the levers B and G by a hinged joint, and so geared the rotation of the two circular tables must be concurrent and the relative position of the riveting-die *a* and the holder *b* in their circular path must always be the same. The fulcrum-pin P and the hinged joint are made so long that in whatever position the riveting-die and the holder may be in their circular path the line of strain in driving a rivet will always fall within this fulcrum-pin, so as thereby to avoid the distortion of the hinged joint. Provision for turning the shafts I and K is made by the socket-wrench Q, which fits upon either shaft, and is held in position by the bearing R, which is bolted to the lower lever B, and by the bearing S, which is bolted to the upper lever G. The wrench Q is transferable from one shaft to the other to suit the character of work—as, for example, in riveting the top flange on the large end of the tube, the wrench must be placed on the shaft I, which is above the flue, as shown in Fig. 3, but in riveting the bottom flange on the small end of the tube the shaft I would be within the tube and the wrench could be operated only in connection with the shaft K, which would then be underneath the flue. Provision for operating the levers B and G is afforded by the hydraulic cylinder T, plunger U, and cross-head V, connected with the upper lever G, and the eyebolts *k k*, which are secured to the cross-head V by the adjustable nuts *l l l l* and to the lower lever B by the pin *m*, which passes through this lever and the eyes on the bolts *k k*. High-pressure water is admitted to and discharged from the cylinder T through the bent pipe J, which connects this cylinder with the valve-case W. This valve-case is mounted upon the stand X, which is bolted upon the top of the upper lever G. The stem *n* of the valve in the case W is connected through the lever *o* and link *p* to the hand-lever Y, which latter has its fulcrum *q* in the top of the stand X. The whole apparatus is suspended at any convenient height by chains *r r*, secured to the pin *s s*, which passes through the under side of the upper lever G as nearly as possible in the center of gravity of the whole mass.

Having now described the object and nature of my improvement and illustrated the same by reference to drawings of a workable machine, what I claim as new, and desire to secure by Letters Patent, is—

1. A riveting-machine provided with a riveting-die and a holder mounted, respectively, upon circular tables rotatable about the axis of a tube, one or both of which are provided with an opening in the periphery through which the tube can pass, substantially as described.

2. In a riveting-machine, a circular table provided with an opening through its periphery, substantially as described, in combination with two gear-wheels which mesh with teeth on the periphery of the table and so far removed from each other around this periphery that the opening through it cannot cut off the connection with both gear-wheels at the same time.

3. In a riveting-machine, two levers of the third order, each provided with a rotatable table upon one end and a fulcrum common to both at the other end, where these tables are so geared that their rotatory movements are concurrent.

4. In a riveting-machine, a riveting-die and a holder mounted on rotatable tables upon the ends of two levers of the third order, having a fulcrum common to both of such length that the line of strain in driving a rivet must always fall within this fulcrum, substantially as described.

WM. SELLERS.

Witnesses:
JOHN D. PHILLIPS,
E. R. HARPER.