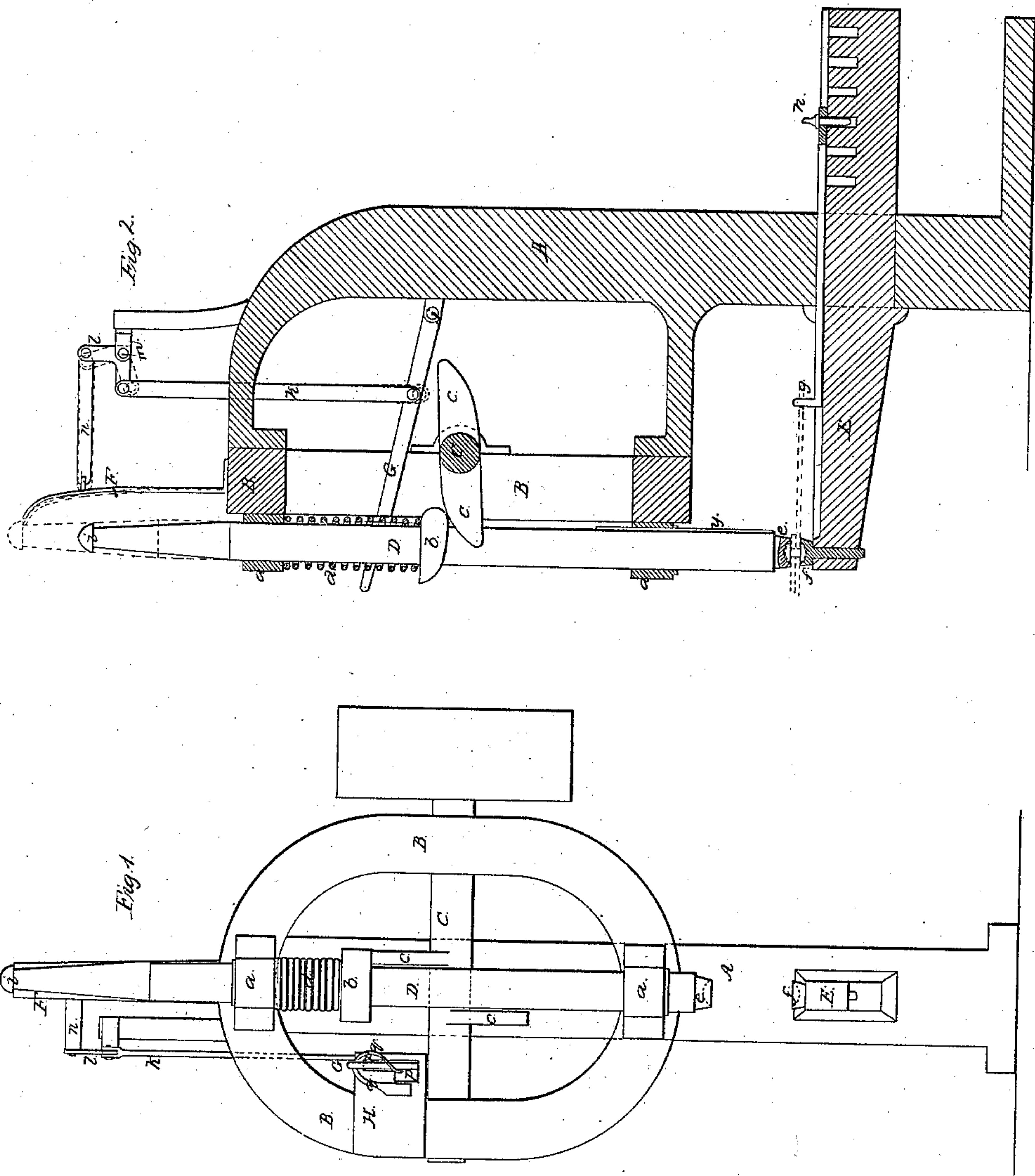


Howell & Birdsall, Riveting Machine,

No. 42,375.

Patented Apr. 19, 1864.



Witnesses.

D. Robertson
Thos. H. Dwyer

Inventors.

James Howell
Dennis Birdsall

UNITED STATES PATENT OFFICE.

JAMES HOWELL AND DAVID BIRDSALL, OF JERSEY CITY, NEW JERSEY.

IMPROVEMENT IN RIVETING-MACHINES.

Specification forming part of Letters Patent No. 42,375, dated April 19, 1864.

To all whom it may concern:

Be it known that we, JAMES HOWELL and DAVID BIRDSALL, both of Jersey City, in the county of Hudson State of New Jersey, have invented a new and Improved Machine for Riveting and Heading the Rivets of Steam-Boilers and other Articles; and we do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a front view of the machine. Fig. 2 is a vertical section of the same at right angles to Fig. 1.

Similar letters of reference indicate corresponding parts in both figures.

In this machine the riveting is performed by a direct-acting or rectilinearly-moving hammer, which is raised or drawn back by one or more cams or wipers on a rotating shaft, and driven down or forward upon the rivet by means of a spring, the work being placed over and supported by a stationary arm attached to the framing or standard of the machine.

One object of our invention is to dispense with the necessity of forging the rivets with heads, and to form the heads by the riveting operation, using rivets composed of pieces cut from bar or rod iron; and to this end it consists in the employment, in combination with the hammer and the stationary arm, of two cup-shaped dies, one in the hammer and the other in the arm, to form a head on each side of the joint by the action of the hammer.

The stationary arm of the machine is also fitted with a movable gage to insure the bringing of the centers of the rivets exactly under or opposite to the centers of the hammer and dies.

We also provide certain means by which, after the hammer has been raised or drawn back by the action of the cams or wipers, it is held up or back out of the way of the stationary arm and lower die, to enable the work to be introduced to or moved in the machine.

To enable others skilled in the art to make and use our invention, we will proceed to describe its construction and operation.

A is a standard, which constitutes the main framing of the machine, intended to be bolted to a suitable bed-plate or foundation.

B is a frame, bolted to the front of the standard A, and containing or having attached to it

the bearings for the horizontal rotary main shaft C, and the vertical guides *a a* for the hammer D, which consists of a straight rod of suitable length and thickness, having forged or otherwise secured upon it a collar, *b*, upon which the cams or wipers *c c* on the main shaft act to raise it preparatory to the production of the blow by the spring *d*, which is coiled around it between the said collar and the upper guide, *a*; and which brings down the hammer after the escape of the points of the cams or wipers from the collar *b* in the revolution of the shaft. The cams or wipers are arranged in pairs to act simultaneously on both sides of the hammer. The hammer is made with a feather, *y*, to prevent it from turning in its guides.

E is the stationary arm, over which the work is placed, made of a separate piece from the standard A and secured firmly thereto or cast in the same piece with the said standard. This arm is arranged so that a vertical plane passing longitudinally through its center will also pass through the center of the hammer.

e and *f* are the two cup-shaped dies for upsetting the two ends of the rivets and forming the heads, one secured in the lower end of the hammer D, and the other in the stationary arm E, with their centers exactly opposite each other. These are intended to be movable to substitute others of different size or form.

g is the movable gage, over which the holes near one edge of the plates to be riveted are placed, to enable the rivet-holes in the other edge of the plate to be brought exactly opposite to or concentric with the cup-shaped dies to insure the ends of the rivets being upset equally all around the holes. This gage is made with a turned-up end, to enter the rivet-holes, and fitted to a groove in the arm E, and in order that its turned-up front end, over which the plates are hooked, may be drawn back close, or nearly so, to the standard A, the stem of the said gage is inserted through the said standard, and the gage is secured in place by a set-screw or pin, *h*, behind the standard.

On the top of the frame B of the machine, behind the hammer, there is placed a stop-catch, F, which serves the purpose of retaining the hammer in the highest position to which it is lifted by the cams *c c*, and thereby keeping it out of operation and securing it out of the way while the work is being adjusted on the stationary arm, either preparatory to

the commencement of the riveting operation or to its repetition on a new rivet, also obviating the necessity of stopping the main shaft during the shifting or adjustment of the work. This catch is represented as composed of a stout piece of spring-steel, which stands up to such a height that a shoulder, *i*, on the upper part of the hammer will just come above its upper end when the hammer is raised to its full height by the cams or wipers *c c*. In the normal condition of the said catch its point is just far enough back to allow the hammer to clear it, as shown in Fig. 2 in black outline, and does not interfere with movements of the hammer produced by the cams or wipers and the spring *d*; but when it is desired to suspend the operation of the hammer, a slight forward movement of the said catch is sufficient to make it catch under the shoulder *i* of the hammer when the latter has been lifted, and so hold it up, as shown in red outline in Fig. 2. The movement of the catch *F* to make it thus catch and hold up the hammer is effected by means of a lever, *G*, the handle of which is within reach of an attendant standing in front of the machine. The said lever works on a fulcrum-pin, *j*, secured to the standard *A*, and is connected by a rod, *k*, with one arm of an elbow-lever, *l*, which works on a fixed fulcrum, *m*, and the other arm of which is connected by a rod, *n*, with the catch *F*. The front portion of the lever *G* works in an L-shaped slot, *p*, in a plate, *H*, secured to the front of the frame *B*, and a spring, *g*, is applied to press on one side of it in such manner as to force it toward that side of the slot on which is the offset. By pressing down the front end of the lever by hand to the bottom of the slot *p* the catch *F* is thrown forward into contact with the hammer, so that the next time the hammer rises it is caught up and secured in such manner that in their continued rotation with the main shaft the cams simply touch and pass by the shoulder *b* without producing any operation of the hammer. On letting go of the lever

the spring *g* presses it into the offset of the slot *p*, and so prevents it from rising, and locks the catch *F*. When the hammer is to be set in operation, the lever is drawn out of the offset of the slot, and the elasticity of the catch *F* throws it back from the hammer and raises up the lever *G*.

When the gage has been adjusted, and the work placed in the machine, and up to the gage, as shown in red outline in Fig. 2, the rivet composed of a straight piece of rod or bar iron of proper size to fit the holes, having been heated to a welding heat, is placed in those holes which have been brought under the hammer, and the machine is set in operation by simply drawing the lever *G* out of the offset portion of the slot *p*, and moving it upward to withdraw the stop-catch *F* from the hammer. The hammer, then rising and falling rapidly, quickly forms a head on the rivet both on the upper and on the under side of the plates, and the heads thus formed are made concentric with the holes and of a good shape by means of the cup-shaped dies *e f* in the hammer and stationary arm. When the riveting and heading of one rivet is finished, the lever *G* is pulled down and the catch *F* again brought into operation to catch up the hammer and suspend its operation, and after the work has been moved to bring new holes into position a new rivet is put in and the operation repeated, as before described.

Having now described our invention, we will proceed to state what we claim and desire to secure by Letters Patent.

The combination of the trip-hammer *D*, spring *d*, dies *e f*, gage *g h*, and the stop-catch device *F*, when constructed and operated substantially as described.

JAMES HOWELL.
DAVID BIRDSALL.

Witnesses:

D. ROBERTSON,
THOS. S. J. DOUGLAS.