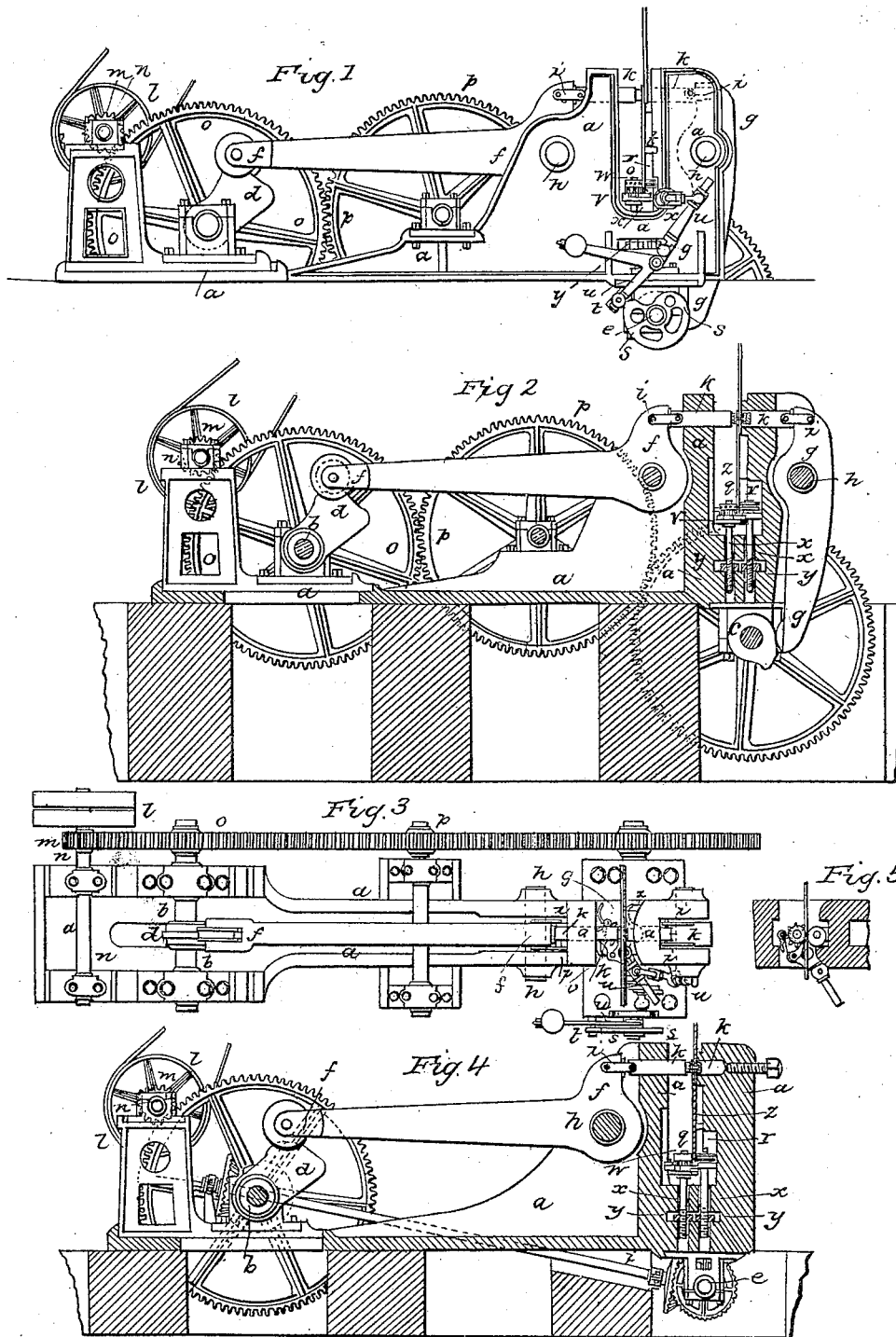


R. SMITH.
Riveting Boiler Plates.

No. 1,312.

Patented Sept. 3, 1839.



WITNESSES
John Davies
Clark Baxter

INVENTOR
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UNITED STATES PATENT OFFICE.

ROBERT SMITH, OF MANCHESTER, ENGLAND.

MODE OF RIVETING METALLIC PLATES FOR BOILERS AND OTHER PURPOSES.

Specification of Letters Patent No. 1,312, dated September 3, 1839.

To all whom it may concern:

Be it known that I, ROBERT SMITH, a subject of the Queen of Great Britain, residing at Manchester, England, have invented or discovered a new and useful Invention of Certain Improvements in the Means of Connecting Metallic Plates for the Construction of Boilers and other Purposes; and I do hereby declare that the following is a full and exact description thereof.

My invention of certain improvements in the means of connecting metallic plates for the construction of boilers and other purposes consist in the employment of certain machinery for connecting the plates by compression that is compressing the ends of the studs or rivets by dies instead of the ordinary manner of riveting by means of the hammer and by manual labor. The apparatus which I have adapted to effect this object is evidently capable of much variation as to form and magnitude and of some modifications in the arrangement and construction of its parts.

I have exhibited in the drawing attached to these presents several views of a machine capable of performing the operation of riveting plates together in a very complete manner and the form and arrangement there set out I have found sufficiently convenient and effective.

Figure 1 represents a side elevation of a machine adapted to the purpose of connecting plates of iron or other metal by compressing the ends of short pieces of cylindrical rods which form the rivets. Fig. 2 is a vertical section taken longitudinally through the middle of the machine and Fig. 3 is a horizontal view of the same taken on the upper side, similar letters of reference being marked upon corresponding parts of the machine in all these figures.

The frame work or main casting of the machine is shown at *a a a* which is to be bolted down to foundation stones or otherwise firmly secured to the ground. A right angled lever *f* of the first order is mounted upon a fulcrum pin or axle *h* inserted into the side frames the shorter arm of which lever acts upon one of the punches or dies *k* and a straight lever *g* also of the first order is mounted upon a similar fulcrum pin or axle *h* likewise inserted into the said frames, its shorter arm acting upon the other punch or die *k*. A rotary shaft *b* turning in plumb

mer blocks attached to the framework carries the cam *d* which acts against the tail or longer arm of the lever *f* for the purpose of projecting the die *k* and another rotary shaft *c* similarly mounted carries the cam *l* which acts against the longer arm of the lever *g* for the purpose of working the other die *k*. The driving power is applied by means of a band and pulley *l* or otherwise to the shaft *n* which shaft carries a pinion *m* that takes into a wheel *o* fixed on the cam shaft *b* and this driving power is communicated through an intermediate wheel *p* to a corresponding wheel *j* fixed on the other cam shaft *c*. The punches or dies *k k* slide in sockets formed in the front part of the frame work as represented in the sectional Fig. 2 and they are respectively connected to the levers *f* and *g* by straps *i i*. Two plates of metal A and B having been previously punched or pierced with corresponding holes are introduced between the dies and held in the proper positions as shown in Figs. 1, 2 and 3. A small pin or riveting stud is then passed through the corresponding holes in the two plates and the positions of the plates adjusted so that the ends of the riveting stud shall stand opposite to the two dies *k k* ready to be compressed by them when the levers *f* and *g* are put in action. Rotary motion being now applied as described to the shafts *b* and *c* and the cams *d* and *e* cause the levers *f* and *g* to act simultaneously in bringing the dies *k, k* toward each other by which means the ends of the metal pin or riveting stud are compressed and spread out upon the plates in form of rivets of a spherical conical or other protuberant shape according to the counter-sunk figure of the dies and the plates thus become closely and firmly attached or riveted together, the operation of perfectly riveting each stud by compression being effected by one rotation of the shafts and cams as described. After one rivet has been thus formed the plates have to be advanced in a lateral direction for the purpose of bringing the next pair of holes with the riveting pin into the same situation between the dies. This is effected by the agency of a pair of conducting rollers *q, r*. These rollers are fixed upon perpendicular shafts *x x* which are inserted into cylindrical holes in the framework and turn loosely therein as shown in Fig. 2. They are placed parallel to each other and the studs or pins around the

periphery of the spur roller *q* pass into a groove formed around the periphery of the roller *r*.

The shafts *a a* are adjustable by means of screw nuts or collars *y y* in order that the rollers *q r* may be brought into coincidence and raised or depressed according to the breadth of the plates intended to be operated upon. On the shaft of the spur roller *q* a ratchet wheel *u* is fixed which is acted upon by a click *v* attached by a swivel joint to a weighted lever *u u*. These parts are represented in the elevation Fig. 1 and also in the detached horizontal view Fig. 3. Upon the end of the shaft *c* an eccentric cam is fixed which acts upon the tail of the lever *u* and when the lesser radius of the cam comes around the lever by its gravity, falls toward a perpendicular position and causes the click to drive the ratchet wheel one tooth which turns the spur roller and causes it to advance the plates one hole thereby bringing the next rivet under the operation of the dies.

I have shown in Fig. 4 a variation of the machinery I have employed for the purpose of connecting metallic plates as above proposed and in this figure it will be seen that I have made one of the dies *k* stationary and am consequently enabled to perform all the necessary evolutions of the machine without the aid of the wheel *p* and the one in which it gears upon the shaft *c* also without the cam *e* lever *g* and pin *h* communicating the rotary motion to the cam *s* by means of bevel wheels and the diagonal shaft *z* and as this arrangement of the machine will be the simpler of the two it may be found to perform the necessary operation with equal success.

It will be found by practical observation that boilers and other vessels the plates of which have been connected by the means I have described are much more firmly united and consequently more capable of resistance than those which have been riveted in the ordinary manner by hand and that the rivets so produced have a much more finished appearance and regularity of form than can be obtained by the ordinary strokes of the hammer while the saving of time consumed in the operation is at ten to one.

Having now described the mode of carrying my invention into practical effect and having at the same time shown and described two modifications of the construction of the machine I would employ for this purpose it only remains for me to add, that I do not intend to confine myself to any precise form or construction of the machine or apparatus employed as it must be evident that it is capable of much mechanical variation by a different arrangement of the parts of which it may be composed nor shall I confine myself to the dimensions of the same; but

I claim as my invention—

The manner of connecting metallic plates for the construction of boilers and other purposes by riveting them together by compression obtained by the aid of machinery constructed upon the principles shown in the accompanying drawing whatever variation in form or dimensions it may receive.

ROBERT SMITH.

Witnesses:

JOHN DAVIES,
SAM. PEARCE.