No. 656,228. Patented Aug. 21, 1900.

J. J. TYNAN & H. C. MOSTILLER.

RIVETING APPARATUS.

(Application filed Nov. 6, 1899.)

(No Model.)

FIG. 1.

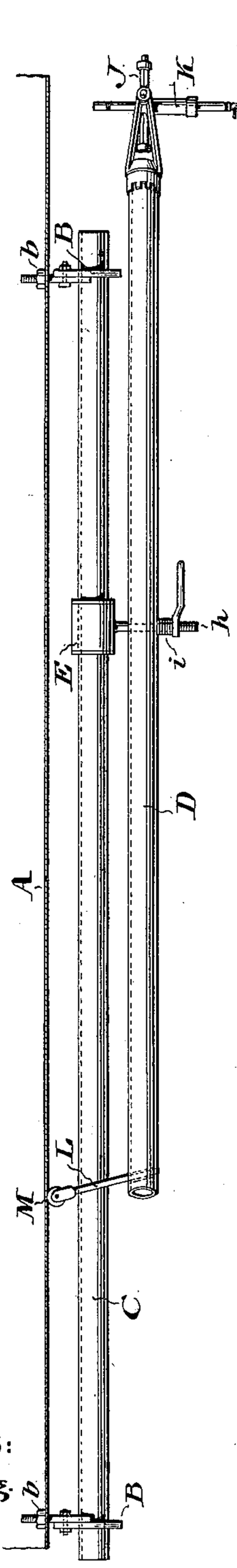


FIG. 2.

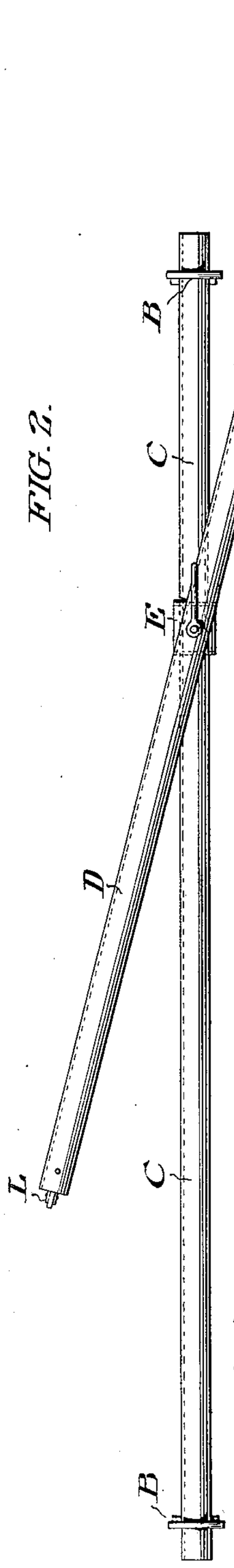


FIG. 4.

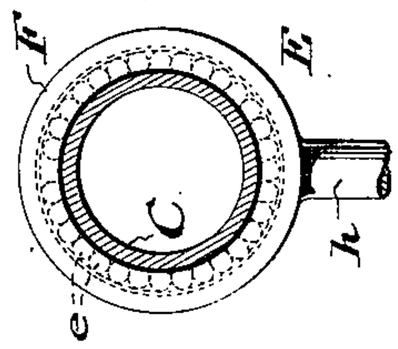
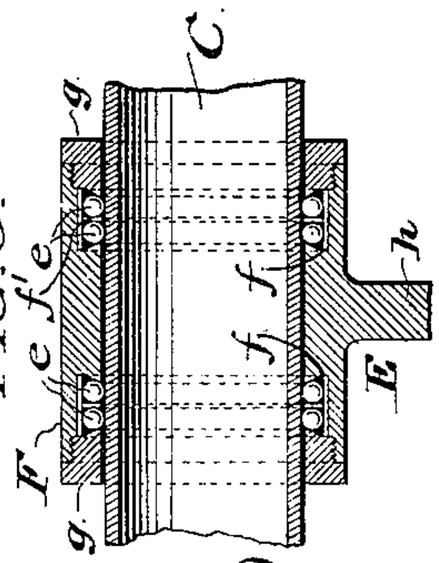


FIG. 3.



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UNITED STATES PATENT OFFICE.

JOSEPH J. TYNAN AND HENRY C. MOSTILLER, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNORS, BY MESNE ASSIGNMENTS, TO THE PNEUMATIC TOOL IMPROVEMENT COMPANY, OF SAME PLACE AND CAMDEN, NEW JERSEY.

RIVETING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 656,228, dated August 21, 1900.

Application filed November 6, 1899. Serial No. 735,898. (No model.)

To all whom it may concern:

Be it known that we, JOSEPH J. TYNAN and HENRY C. MOSTILLER, citizens of the United States, residing in the city and county of Philadelphia, in the State of Pennsylvania, have invented certain new and useful Improvements in Devices for Supporting Riveting and other Apparatus, of which the following is a specification.

In the insertion of rivets of large size in the hulls of vessels, bridges, tanks, and similar structures, where a great number of large rivets are employed, distributed over an extensive surface area, it is desirable that the heavy riveting machine employed to upset the heads of the rivets should be mounted upon carrying mechanism which will support it and enable it to be moved as expeditiously and easily as possible from point to point to operate upon the successive rivets, and such a carrying mechanism it is the object of our invention to provide.

The large rivets applied to structures of the character referred to are usually inserted into the previously punched rivet holes from the upper or inner sides, so that the free ends of the rivets project outside and below. Consequently the riveting machine which upsets the projecting ends of the rivets must frequently be supported on the under side of the vessel or structure, and the plunger or hammer be driven upwardly against the depending free ends of the rivets. The apparatus invented by us and shown in the drawings is illustrated as supported by and below a structure upon the rivets of which it is supposed to operate.

In the accompanying drawings we show, and herein we describe, a good form of a convenient embodiment of our invention, the particular subject-matter claimed as novel being hereinafter definitely specified.

In the drawings,

Figure 1 is a view in side elevation of an apparatus conveniently embodying our invention.

Figure 2 is an under plan view of the same.

Figure 3 is a vertical, longitudinal, sectional, elevation through the upper portion of the traveling hanger.

Figure 4 is a view in end elevation of the traveling hanger, the supporting rail being shown in section and the balls of the ball bearing being illustrated in dotted lines.

Similar letters of reference indicate corresponding parts.

In the accompanying drawings,

A indicates the skin or hull of a vessel, or any permanent part of a structure upon the rivets of which the riveting machine may operate.

B B are a pair of supporting brackets of any preferred character, the upper portions of which happen to project through the wall or structure A, and to be secured in position therein by nuts *b* applied thereto, while the lower ends of said brackets respectively encircle or clasp the respective extremities of a supporting rail C.

The brackets B may be each conveniently formed in two parts pivotally connected intermediate of their length, with the result that the supporting rail is, with the lower portions of the brackets, capable of slight lateral swinging motion with respect to the upper portions.

The supporting rail C is preferably of circular section, and may be conveniently formed of a length of metal pipe.

D is a carrying arm which may in practice be made of any desired length, as, for instance, fifteen or twenty feet, and which is at a point in the vicinity of its center pivotally, *i. e.* hingedly, connected with, so as to have movement of rotation with respect to, a traveling hanger E mounted upon and free for longitudinal movement with respect to the supporting rail. The carrying arm may, similarly to the supporting rail, be formed from a length of metal pipe.

The upper portion of the traveling hanger E consists of a sleeve F which in the embodiment of our invention illustrated, encircles the supporting rail, the bore of which sleeve is of diameter slightly in excess of the external diameter of the supporting rail, and is provided with a series of balls through which the sleeve rests and bears upon said rail.

Conveniently two or more circumferential series of balls *e e* are employed at each end

of the sleeve, mounted in ball races formed in the respective ends of the sleeve, as shown particularly in Figure 3.

Conveniently the ball races are constituted by and between shoulders at the inner ends of enlargements or countersinks formed at the respective extremeties of the bore,—and the inner ends af annular nuts *g* mounted in threaded engagement in said enlargements or countersinks.

The opposing faces of the shoulders on the one hand, and the inner ends of the annular nuts *g* on the other, are oppositely inclined as shown in Figure 3, with the result that the ball races formed have overhanging lips which serve to maintain the balls in position when the sleeve is not in place upon the supporting rail.

The ball races are preferably provided each with a basal bearing face of steel, conveniently formed as a steel ring *f* of suitable dimensions, inserted in position in the enlargements or countersinks.

The two series of balls in each ball race are separated from each other by an annular dividing plate *f'* formed of hardened steel.

The sleeve as stated rests upon the rail through the interposed balls, and, manifestly, in its travel along said rail, rolls upon said balls, with the result that its movement requires the minimum of exertion.

Similarly, as will be understood, the hanger is capable of a swinging movement in a plane perpendicular to the axis of the supporting rail.

The lower end of the hanger constitutes a shank *h* which in the particular embodiment illustrated, is pivotally or hingedly connected to the carrying arm by projecting through a vertical opening formed in the central portion of said arm, beneath which arm said shank is provided with a series of nuts and washers *i* threaded upon it which serve to hold the arm up against the shoulder at the upper end of the shank.

The outer end of the arm is provided with a swinging yoke J of well-known character, in which the riveting or other machine K is employed is carried.

The inner end of the arm is provided with a strut L the free end of which is provided with a wheel ball or caster M in contact with the adjacent surface of the structure A.

The carrying arm supporting the riveting machine is by reason of being supported at a point near its center, and by virtue of the contact of the strut with the structure A, normally maintained in a position in substantial parallelism with the surface operated upon.

The contact of the strut with the surface A, in the operation of the riveting machine, tends to counterbalance the downward thrust or "recoil" so to speak, incident to the impact of the air or steam driven riveting hammer against a rivet.

As will be understood, the riveting machine K may, by reason of the carrying arm being pivotally supported by the hanger as described, and of the hanger being capable of movement from end to end of the supporting rail, be shifted to any selected point within a large area of the surface A, and may operate, of course, upon all the rivets in succession within said area without further adjustment of the parts or other movements save the pivotal movement of the arm upon the hanger and the traveling movement of the hanger upon the rail.

It is only after all the rivets within the large area referred to have been operated upon that it is necessary to remove the brackets B from the structure A and carry the entire apparatus bodily to a different area of operation.

As will be understood, the operator in charge of the riveting machine, moves it to any desired point within the range of operation of the supporting mechanism, without leaving his position by the machine, as he effects both the swinging movement of the carrying arm, and the longitudinal movement of the arm and hanger together along the supporting rail, by the application of slight manual force to the yoke or outer end of the arm.

The strut L requires no attention; it simply follows the movement of the carrying arm.

Having thus described our invention, we claim—

1. In an apparatus for movably supporting a riveting or other apparatus, in combination, a supporting rail, means for supporting said rail, a traveling hanger formed or provided with a sleeve which encircles said rail and is adapted to have both longitudinal and circumferential movement with respect to it, anti-friction devices disposed between said sleeve and said rail, and a carrying arm secured to said hanger by a swivel connection so as to be capable of revolving movement on an axis perpendicular to the axis of the rail, substantially as set forth.

2. In an apparatus for movably supporting a riveting or other machine, in combination, a supporting rail of cylindrical exterior, means for supporting said rail, a carrying arm, a traveling hanger connected to said arm in such manner that the latter has movement of rotation, and as to its upper end formed or provided with a sleeve which encircles the rail, and ball bearings mounted in suitable races formed in the inner face of said sleeve, substantially as set forth.

3. In an apparatus for supporting a riveting machine or kindred device, in combination, a supporting rail, a sleeve encircling said rail and embodying countersinks in its respective extremities, balls mounted in said countersinks, annular nuts mounted in said countersinks the opposing faces of the bottoms of the countersinks and the inner ends of the annular nuts being oppositely inclined, a car-

rying arm, and a depending device connected to the sleeve and pivotally connected to said carrying arm, substantially as set forth.

4. In a riveting machine supporting apparatus, in combination, a supporting rail, a sleeve encircling said rail, two recesses in the inner face of said sleeve, two series of balls mounted in each recess, a steel ring placed at the base of each recess, and an annular dividing plate disposed between the balls of the two adjacent series, and a carrying arm hingedly connected to said sleeve.

5. In a riveting machine supporting apparatus, in combination, a supporting rail, a sleeve encircling said rail, two recesses in the inner face of said sleeve, two series of balls mounted in each recess, a steel ring placed at the base of each recess, and an annular dividing plate of hardened steel disposed between the balls of the two adjacent series, a carrying arm hingedly connected to said sleeve, a riveting apparatus or similar device mounted on said arm, and a strut provided with a wheel or caster mounted on said arm.

6. In a device for supporting riveting and other apparatus, in combination, a supporting rail, means for supporting said rail, a traveling hanger formed or provided with a sleeve which encircles said rail and is adapted to have both longitudinal and circumferential movement with respect to it, and a carrying arm which is connected at a point intermediate of its length to said hanger, substantially as set forth.

In testimony that we claim the foregoing as our invention we have hereunto signed our names this 24th day of October, A. D. 1899.

JOS. J. TYNAN.
HENRY C. MOSTILLER.

In presence of—
F. NORMAN DIXON,
THOS. K. LANCASTER.