No. 673,444.

Patented May 7, 1901.

J. H. MULL.

RIVETING APPARATUS.

(Application filed Mar. 27, 1900.)

(No Model.)

2 Sheets—Sheet 1.

FIG. 1.

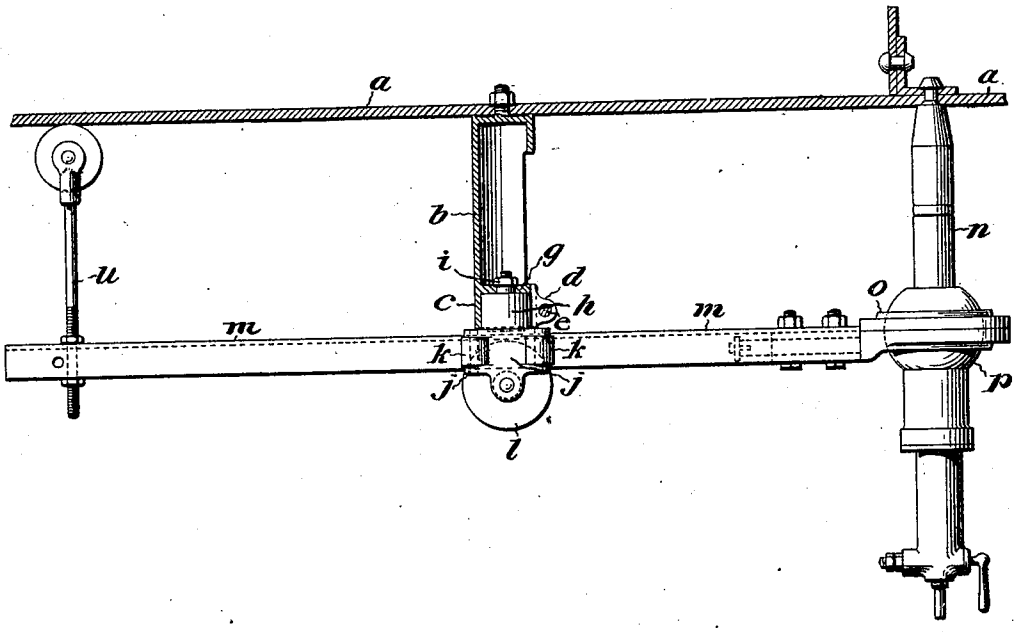
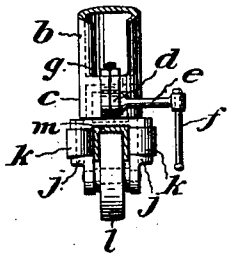


FIG. 2.



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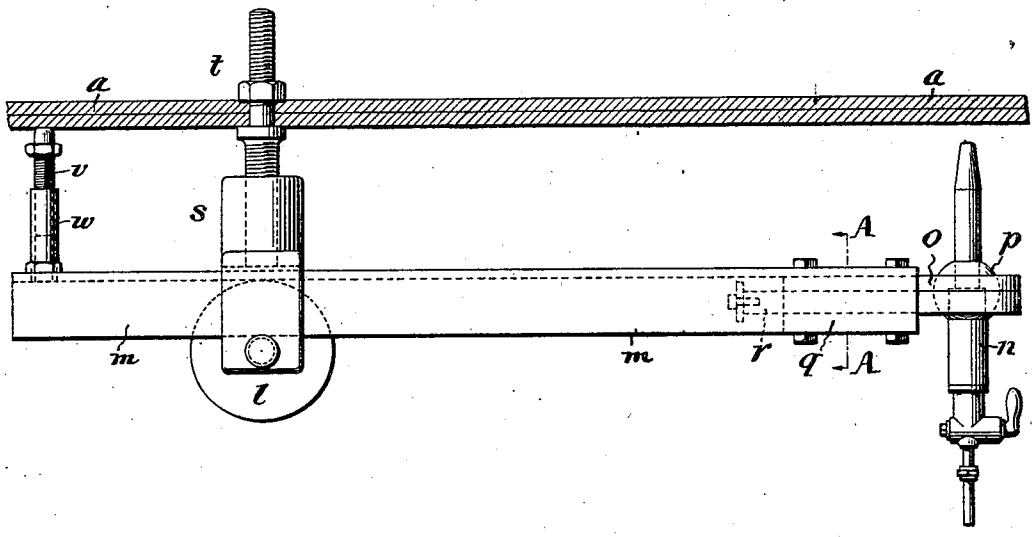
J. H. MULL.

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(No Model.) 2 Sheets—Sheet 2.

FIG. 3.



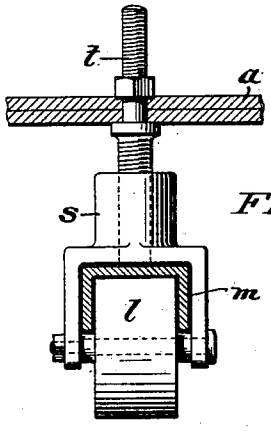
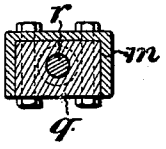


FIG. 4.

FIG. 5.



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UNITED STATES PATENT OFFICE.

JAMES HENRY MULL, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR TO THE PNEUMATIC TOOL IMPROVEMENT COMPANY, OF SAME PLACE AND CAMDEN, NEW JERSEY.

RIVETING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 673,444, dated May 7, 1901.

Application filed March 27, 1900. Serial No. 10,332. (No model.)

To all whom it may concern:

Be it known that I, JAMES HENRY MULL, a citizen 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 Riveting Apparatus, of which the following is a specification.

My improvements relate to apparatus for movably supporting riveting machines in position upon the hulls of vessels, upon the sides of tanks, upon bridges, and other places in which rivets are employed.

Power actuated riveting machines are of such weight and subjected to such vibration that it is impossible to manually support them in position for work, and supporting frames or devices are necessary.

It is a desideratum that an apparatus for supporting a riveting machine should be arranged to allow the machine to be easily shifted from one rivet to another until all the rivets in a large area have been operated upon without further manipulation of the supporting apparatus than can be readily accomplished by the operator in charge of the machine, and that the number of times the supporting apparatus as a whole should be taken from its support and bodily shifted from one place to another,—an operation requiring the services of several men,—should be reduced as much as possible.

My invention aims to provide a simple, light, strong, and easily operated apparatus intended for the employment specified, and characterized by the foregoing desiderata.

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

In the accompanying drawings,

Figure 1 is a top plan view of an apparatus embodying my invention, assumed supported in place upon the side wall of a tank, hull, or other structure.

Figure 2 is a fragmentary detail view of the bracket.

Figure 3 is a view in side elevation of a modified or simpler form of my invention shown in position for operation upon the under side of a hull or other structure.

Figure 4 is a detail of the bracket shown in Figure 3.

Figure 5 is a sectional view on the line A A of Figure 3.

Similar letters of reference indicate corresponding parts.

Referring first to the structures shown in Figures 1 and 2, *a* is the side plate of a vessel, tank, or other structure; and *b* is a bracket the inner end of which is, as a convenient means of temporary attachment, shown as provided with a threaded shank extending through an aperture in the structure *a* and provided as to its inner end with a nut.

The dimensions of the parts are such as the strain to which they may be subjected may require.

The outer end of the bracket *b* is shown as constructed as a split collar *c*, of circular section the lips *d* of which may be drawn together by a set-screw *e* engaged in suitable apertures fromed in said lips.

The shank of said set screw may be provided with an operating bar *f*.

g is a circumferential flange formed on the inner face of the split ring as plainly shown in Figure 1.

h is the shank of a swivel block, said shank fitting within the cylindric space in the interior of the split ring, and having an extension of smaller diameter projecting above the flange *g* where it is threaded and equipped with a nut *i*, which nut, bearing upon the flange *g*, supports the swivel block in position free for rotation.

j j are cheek pieces of the swivel block, arranged in parallelism at a given distance apart and each embodies a recess at each end in which is journaled an anti-friction roller *k*. The peripheries of the rollers *k* reach the space between, or are flush with the inner faces of, the cheek pieces.

l is a roller mounted on a suitable axle the respective extremities of which are journaled in the lower portions of the respective cheek pieces, the body of said roller occupying the central space between the cheek pieces and

conveniently filling said space except for a space of approximately U-shaped outline existing between the upper portion of said roller and the sides and top of said space.

m is a carrier bar of any desired length and in the form shown of approximately U-shaped section, which bar extends through the interspace between the body of the swivel block or hanger and the roller *l*, the side members of said bar embracing the respective sides of the roller *l*, and its top member extending across the periphery of said roller.

In the construction described, the outer faces of said side members are adapted to make contact with the rollers *k*.

n is a power operated riveting machine mounted on the carrier bar, conveniently through an intermediate yoke *o*.

Manifestly the operator in charge of the riveting machine may shift said machine, in moving it from rivet to rivet, toward and away from the bracket *b* by slight force exerted upon the machine in such direction as to occasion the sliding movement of the carrier bar through the swivel block, said bar, when the bracket projects from a side wall as it is assumed to do in Figure 1 bearing most of its weight upon the under rollers *k*; the roller *l*, in such travel of the carrier bar, incidentally serving with the body of the swivel block, as a guide for the bar.

When the parts are in the position shown in Figure 2, the weight of the bar comes on the roller *l*, and the rollers *k* incidentally serve as anti-friction guides.

The swivel block and the carrier bar may of course, be rotated together with relation to the supporting bracket, by the operator in shifting the riveting machine from rivet to rivet.

When the swivel block and carrier bar have been rotated to a desired position, said block may be secured in such position by tightening the screw *e*, which will bind the split collar *c* tightly upon the shank of the swivel block.

The carrier arm and swivel block may describe a complete circle, and, therefore, the operator may without assistance move the supported riveting machine in turn to every rivet within a circular area the center of which is the bracket *b* and the radius of which is something less than the length of the carrier bar.

If desired, the split ring may remain sufficiently loose upon the shank of the swivel block to allow the desired rotative movements of the parts unaccompanied by the manipulation of the screw *e*.

In some cases, however, in operating upon the sides of tanks or vessels, as, for instance, when the parts are in about the position shown in Figure 1, it may be desirable to tighten the screw *e* and clamp the split ring upon the swivel block to relieve the operator from the work of supporting all or part of the weight of the riveting machine which would tend to descend to a position in line vertically below the bracket *b*.

When the apparatus is supported on the under side of a vessel, however, so that the swinging movement of the carrier bar is in a horizontal plane, there is usually no occasion for tightening said split ring.

The yoke *o* is in the form shown in Figure 1 provided with a spherical recess, and the riveting machine *n* is provided with a spherical enlargement *p* fitting said recess, with the result that said enlargement and recess form as it were a ball and socket flexible or universal joint whereby the riveting machine may be tilted to any desired inclination with relation to the rivet to be operated upon.

The end of the carrier bar is conveniently provided, as shown particularly in Figures 1, 3, and 5, with a filling block *q* rigidly secured in place between its side walls, which filling block embodies an axial aperture as shown in Figure 5.

The yoke is provided with a shank *r* of length in excess of the length of said block and extending through said aperture, the free end of which shank is provided with a head or enlargement to prevent the withdrawal of the shank from the aperture.

By reason of the excess of the length of the shank over that of the block, said yoke and the machine may be moved a corresponding distance toward and away from the carrier bar without moving the carrier bar itself.

This movement or play is not only valuable in allowing the riveting machine to be shifted from one side to another of a rivet operated upon, but, when the rivets are close together enables the machine to be carried from one rivet to its neighbor without moving the carrier bar itself, so that movement of said bar only becomes necessary after operating upon every second rivet.

The modified form of the invention shown in Figures 3 and 4 is one especially adapted for employment upon the under sides of vessels or other structures where the riveting tool is driven upward against the rivets.

The swivel block, which, in the form shown in Figures 3 and 4, I designate *s*, is, instead of being entered in a bracket,—provided with a screw threaded shank *t* adapted to be extended through the wall *a* of the structure operated upon, a nut on the inner end of said threaded shank serving to draw the same inward until a shoulder on the body of the shank comes in contact with said wall.

The swivel block shown in Figures 3 and 4 differs from the form shown in Figures 1 and 2 mainly in that the rollers *k* are omitted.

Inasmuch as this form of device is intended to be supported, as stated, from the under sides of structures, the carrier bar will when the swivel block is so supported or suspended always rest fairly upon the roller *l*.

The swivel block *s* is connected to the shank *t* by any suitable swivel connection so as to be free for rotation with respect to said shank

t, or it may have such rotation, as is the case in the form illustrated, merely by reason of its threaded engagement with the lower portion of the shank t.

The end of the carrier bar opposite that occupied by the riveting machine is provided with an upwardly extending strut of any desired character adapted to operate against the structure to relieve the carrier bar and bracket from the strain due to the vibration of the tool.

This strut which I designate u, is in Figure 1 shown as equipped with an anti-friction roller.

In the form shown in Figure 3 it is composed of two members w, v, one entered within the other, in telescopic relationship, which members are in threaded engagement, so that by rotation of the member v in one direction or the other, it is lowered or raised with respect to the member w, and the strut as a whole correspondingly lengthened or shortened.

I do not herein claim or seek to cover broadly in a riveting apparatus a swivel block or kindred structure provided with a carrier bar supported upon and adapted to move longitudinally with respect to said swivel block or kindred structure, which swivel block is mounted for rotation on a support, and in connection with which features are provided means for locking said swivel block or kindred structure in various positions of rotative adjustment, as claim is made to such feature broadly in an application filed by me contemporaneously herewith as Serial No. 10,330.

It will now be understood that my invention comprehends the provision of a riveting apparatus including a swivel roller provided block or kindred bracket like structure, adapted to be detachably connected free for rotation to the structure upon which the riveting machine is at work, and to exist either in a vertical position,—as, for instance, when supported from the under side of the hull of a vessel,—or in a horizontal position,—as, for instance, when projecting from the side of a vessel or kindred structure, and so arranged that a roll mounted in said block exists beneath the under face of the carrier bar to support and ease the longitudinal travel of the same, whether said swivel block exists in a vertical or in a horizontal position.

The preferred embodiment of my invention is one in which a series of at least three independent rolls are employed, two of which are arranged with their axes in parallelism, and the third of which is arranged with its axis perpendicular with respect to the axes of the rolls last mentioned, as illustrated in figures of the drawings.

It will, of course, be understood, that in the last named arrangement the carrier bar in its longitudinal movement will rest and bear upon one of the rolls, according to the set of the swivel block, and that one or both of the other rolls, will incidentally serve as anti-friction guide rolls.

It will, furthermore, be understood that while a carrier bar of angular section is advantageous and useful, it is not necessarily employed in connection with, for instance, the embodiment of my invention illustrated in Figures 1 and 2, as the said carrier bar may be of any selected profile, and the bearing surfaces of the rolls may similarly be made of any preferred configuration.

Having thus described my invention, I claim—

1. A riveting apparatus, including, in combination, a swivel block having two cheek pieces, a roller mounted in each of said cheek pieces, a roller supported between said cheek pieces, a carrier bar of angular section having depending sides which embrace said last mentioned roller, and which bar is adapted to be shifted longitudinally through said swivel block, the individual rollers alternately acting in different positions of the block as carrying and as guiding rollers, substantially as set forth.

2. A riveting apparatus, including, in combination, a swivel block, having two cheek pieces, two rollers mounted in each of said cheek pieces, a roller supported between said cheek pieces, with its axis transverse to the planes of said cheek pieces, a carrier bar of angular section, the sides of which embrace the roller last mentioned, and the exterior of which makes contact with the rollers first mentioned, substantially as set forth.

3. A riveting apparatus, including, in combination, a block provided with cheek pieces, a roller mounted in each cheek piece, a roller journaled between said cheek pieces, a shank forming an extension of said block, a support in which said shank is journaled for rotation, and a carrier bar supported by and adapted to have longitudinal movement with respect to said swivel block, substantially as set forth.

4. A riveting apparatus, including, in combination, a carrier bar, a swivel block having a shank and depending cheek pieces, rollers mounted in recesses in said cheek pieces, a roller mounted between said cheek pieces, a bracket having a split ring in which the shank of the swivel block is entered, and means for drawing together the ends of said split ring, substantially as set forth.

5. A riveting apparatus, including, in combination, a carrier bar, a swivel block having a shank and depending cheek pieces, rollers mounted in recesses in said cheek pieces, a roller mounted between said cheek pieces, a bracket having a split ring in which the shank of the swivel block is entered, means for drawing together the ends of said split ring, a flange or projection on the inner face of said bracket, an extension of said shank which extends above said flange or projection, and a nut or enlargement on said extension to sustain the weight of the swivel block, substantially as set forth.

6. A carrier bar for a riveting machine pro-

vided with a block or solid portion at one end, which solid portion has an aperture, a yoke having a shank of length in excess of the solid portion and extending through said aperture, a head or enlargement on the free end of said shank, and a riveting machine connected to said yoke through a universal joint, substantially as set forth.

7. A riveting apparatus, including, in combination, a block, means for supporting said block in vertical or horizontal position, and free for rotative movement, upon the structure upon which riveting work is to be done, a plurality of rollers mounted in said block with their axes in angular relationship with respect to each other, said block being so arranged that whether in vertical or horizontal position it receives the weight of an applied longitudinally movable carrier arm or bar through a roller supported in said block and presented against the under side of said bar, while another of the rollers acts as a guide for the movement of said bar, substantially as set forth.

8. A riveting apparatus, including, in combination, a block, means for supporting said block in vertical or horizontal position, and free for rotative movement, upon the structure upon which riveting work is to be done, a plurality of rollers carried by said block, and arranged with their axes in angular relationship with respect to each other, a carrier bar mounted free for longitudinal movement in said block with one face free to rest upon one roller and another face opposing another roller, according to the position of said block, an individual roller acting alternately as a guide and as a support according to the position of the block, and a riveting machine connected by a flexible or universal joint to said arm or bar, substantially as set forth.

9. In a riveting apparatus, the combination, to form a support for a carrier arm, of a rotatable block, means for detachably connecting said block in either vertical or horizontal position to a structure upon which riveting work is to be done, and a plurality of rollers mounted on said block, and arranged on different sides of a carrier arm pass, each roller presenting its face to said pass, individual rollers alternately acting as guides and as supports for a carrying arm, according to the position of the rotatable block, substantially as set forth.

In testimony that I claim the foregoing as my invention I have hereunto signed my name this 21st day of March, A. D. 1900.

JAMES HENRY MULL.

In presence of—

F. NORMAN DIXON,

THOS. K. LANCASTER.