(No Model.)

2 Sheets—Sheet 1.

H. BALLIET.

Pump Rod Adjuster for Oil Wells.

No. 229,354. Patented June 29, 1880.

Fig. 1.

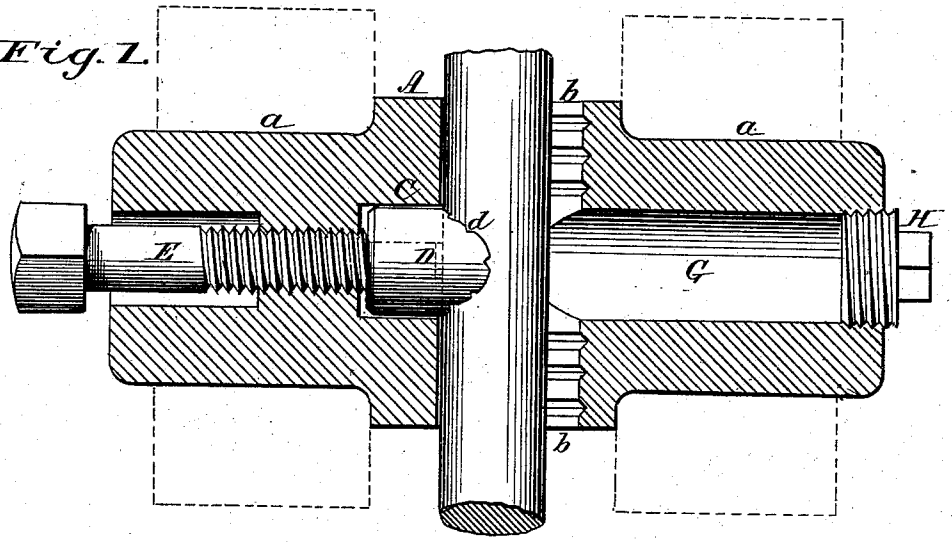


Fig. 2.

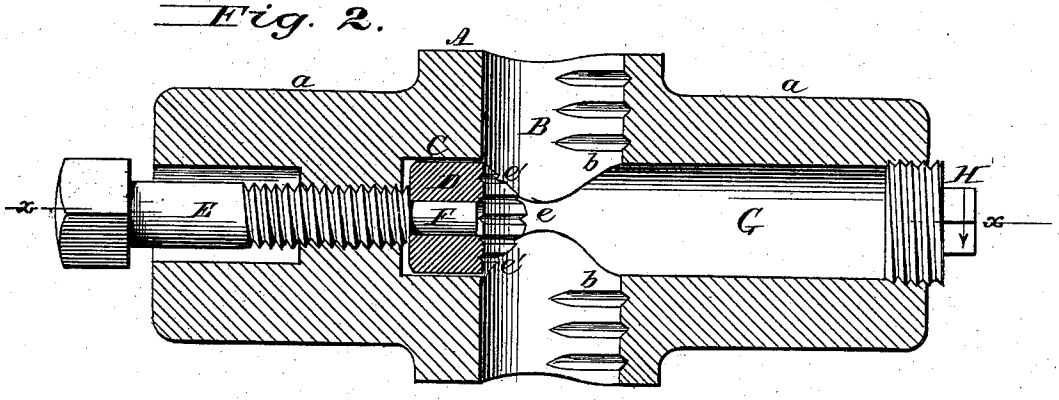
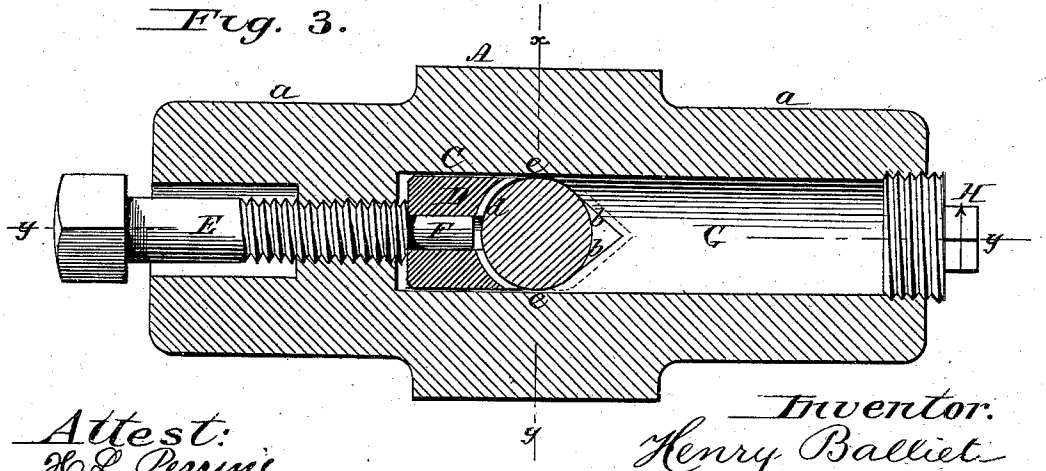


Fig. 3.



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(No Model.) 2 Sheets—Sheet 2.

H. BALLIET.

Pump Rod Adjuster for Oil Wells.

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Fig. 4.

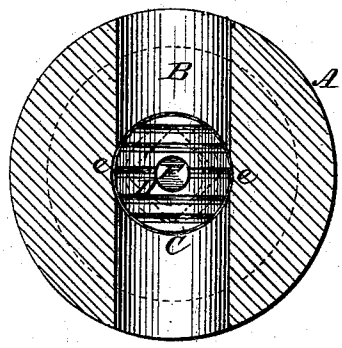


Fig. 5.

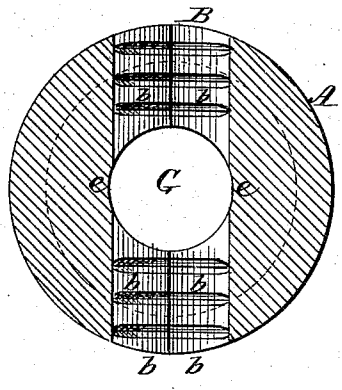
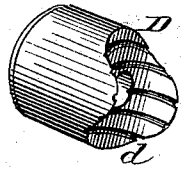


Fig. 6.



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UNITED STATES PATENT OFFICE.

HENRY BALLIET, OF OLEAN, NEW YORK.

PUMP-ROD ADJUSTER FOR OIL-WELLS.

SPECIFICATION forming part of Letters Patent No. 229,354, dated June 29, 1880.

Application filed April 23, 1880. (No model.)

To all whom it may concern:

Be it known that I, HENRY BALLIET, a citizen of the United States, residing at Olean, in the county of Cattaraugus and State of New York, have invented new and useful Improvements in Pump-Rod Adjusters for Oil-Wells, of which the following is a specification.

My invention relates to improvements in that class of cross-heads or trunnion-heads which are employed for the purpose of connecting what is commonly known as the "polish-rod" of pumps for oil or Artesian wells with the working-beam. The great strain upon the polish-rod renders it essential that the trunnion-head, which connects it with the working-beam, should hold the rod very firmly in order to prevent its slipping. It is also desirable that the trunnion-head should be of simple and durable construction, and that the parts which clamp the rod should be adapted for the convenient adjustment of the polish-rod, as required.

The objects of my improvements are to wedge the polish-rod in a mortise of peculiar shape formed through the trunnion-head, through which the rod passes, without the aid of loose or independent wedges; to provide an adjustable cylindrical bearing-jaw inclosed within a walled recess in the trunnion-head, so as to act in opposition to the wedge action of the cross-head mortise upon the polish-rod, whereby, in the adjustment of said bearing-jaw, the polish-rod will be both clamped and wedged. A cylindrical passage leads through one of the trunnions to the walled recess of the bearing-jaw, so that said bearing-jaw can be introduced at the end of said trunnion and passed along through the trunnion-head to its seat in the walled recess.

Referring to the accompanying drawings, Figure 1 represents a vertical sectional view of the trunnion-head and a portion of the polish-rod secured therein; Fig. 2, a similar view with the polish-rod removed; Fig. 3, a horizontal section, showing the polish-rod griped by the wedge action of the mortise through which it passes; Fig. 4, a cross-section through the mortise of the cross-head, looking in the direction of the bearing-jaw, the polish-rod being removed; Fig. 5, a similar section, looking in the direction of the angular corrugated sides of the mortise, and Fig. 6 the cylindrical bearing-jaw.

The head proper or center A and the trunnions *a a* are formed in one casting, and in its application for use the trunnions are journaled in the bifurcation of the forked end of the working-beam, as is usual in this class of devices. A mortise, B, is formed through the head or center, through which the polish-rod is passed. The distinguishing feature of the mortise is that it is heart-shaped, so that when the polish-rod is clamped by the devices presently described, it will be forced toward the angular portion of the mortise, the sides *b b* of which serve as wedges, thus dispensing with independent wedges and adding to the efficiency of the clamping devices in securing the polish-rod to the trunnion-head.

The head or center A is formed with a walled recess, C, which opens into the transverse mortise of the trunnion-head coincident with the axis of said trunnions, and which is designed to receive a bearing-jaw, D, of cylindrical form and seated in the line of the trunnions. This bearing-jaw consists of a cylindrical block having one end concaved, as at *d*, such concavity being made with reference to the size of the polish-rod, in order that the bearing will lap and fit closely to the said rod to nearly the extent of a semicircle. The concaved end of this bearing-jaw may be roughened or corrugated, so that it will take a better bite upon the polish-rod, and the sides of the angular portion of the transverse mortise through the trunnion-head may also be roughened or corrugated for a similar purpose. These corrugations are formed so as to be at right angles to the length of the polish-rod.

In order to clamp the bearing-jaw against the polish-rod, and also to force the polish-rod as far as practicable between the walls of the angular portion of the mortise through which it passes, a set-screw, E, is employed. One of the trunnions is formed with a suitable passage for this set-screw, a portion of said passage being screw-threaded to receive the screw-threaded part of the set-screw, said passage being continued inwardly across the mortise B and on opposite sides thereof, so as to open into the walled recess which contains the bearing-jaw D. In the drawings the set-screw is

represented as being formed with a cylindrical end bearing-pin, F, which is passed through a passage in the bearing-jaw D. This pin F, however, may be dispensed with, so that the end of the set-screw alone acts upon the bearing-jaw. In either case the bearing-jaw will be effectively clamped against the polish-rod by turning the set-screw, and the said rod will, by such action, be forced toward the angular part of the mortise and thereby firmly wedged and held in place.

It is, of course, understood that in the above-mentioned instance, where the pin is formed upon the end of the set-screw, the area of the opening through the bearing will be sufficiently great to admit of the free rotation of the pin conjointly with the turning of the set-screw.

In order to seat the bearing-jaw within the walled recess, the trunnion which is opposite to that trunnion through which the set-screw is passed is formed with a central bore, G, which opens into the mortise B. The bore through said trunnion is of sufficient area to admit of the passage of the bearing-jaw, which is first introduced into the outer end of the bore and then passed along until it reaches the mortise, and as a continuation of said bore the area of the mortise will at this point be sufficiently enlarged to admit of the further passage of the bearing-jaw into the walled recess, such enlargement being on opposite sides of said mortise and forming guides *e* to said jaw in its passage across the mortise.

The bearing-jaw is of such dimensions that it can by no possibility drop out through either end of or turn in the mortise B, and hence, in case of the detachment of the polish-rod from the trunnion-head, there will be no liability of the falling out of the bearing-jaw. The trunnion last mentioned is screw-tapped at the end of the bore, and a screw-tap, H, is fitted to such end, so as to close the bore after the bearing-jaw has been introduced and passed to its proper position.

It will be observed that the enlargement of the mortise to admit of the passage of the bearing-jaw constitutes two guide-channels, *e*, for said jaw at opposite sides in the mortise, said channels running parallel with the axis of the cross-head.

It will also be seen that the walls of the recess C converge into said channels at *e'*, such conformation being required in order to bring the concave face of the bearing-jaw flush with the wall of the mortise, or at least to prevent the bearing from presenting any obstacle to the insertion of the polish-rod through the mortise.

After the bearing-jaw has been placed in proper position within the walled recess and the polish-rod passed through the mortise in the trunnion-head, the set-screw will be tightened up until the rod has been firmly griped between the concave face of the bearing-jaw and the walls of the angular portion of the heart-shaped mortise.

The trunnions will, during operation, have the usual rotary movements in their bearings incident to the working of the pump.

By having the gripe upon the polish-rod in the line of the axis of the trunnions the strain upon the clamping parts is concentrated and very much reduced, and the clamping-screw is not so liable to work loose; and, in connection with such arrangement, it is important that the gripe upon the rod should be as effective as possible. It is for this purpose that I make one side of the cross-mortise in a head having side trunnions of angular form, and opposite this angular side, within an inclosed recess, and midway between the ends of the mortise, the cylindrical bearing-jaw is seated within a cylindrical recess open at both ends in the line of the axis of the trunnions, and of a diameter just about equal to that of the polish-rod, so that the gripe is made at a point between the ends of the mortise and within an area less than the diameter of the trunnions, the effect of which is to give a long bearing for the rod within the mortise and a comparatively short griping-surface arranged at a point to exert the most effective clamp upon the rod. The action of this griping-plug is infinitely more reliable than that of a screw and gives a far better bearing than could be obtained by a pressure-block of equal length with the cross-mortise, whether kept to its set by a screw acting at right angles to the axis of the trunnions or a cam-lever acting in the line of the axis of the trunnions upon such long pressure-block.

The important matter is to get a long bearing in the cross-head and a short and perfectly effective and reliable griping-point upon the rod in the line of the axis of the trunnions.

An angular mortise within which the polish-rod is clamped and within which it is adjusted is not claimed, broadly; but such form of mortise crossing the axis of the trunnions, in connection with a griping-jaw of cylindrical form placed in the line of said axis and of a diameter less than that of the trunnions, has functions and advantages not possible in the former plans.

But there is still another point of great importance in my invention, and that is that the interception or interruption of the angular sides or walls of the mortise by the trunnion-bore G practically divides the bearing, so that there will be no contact of the rod at the crossing of the trunnion-bore G; or, in other words, there will be no bearing-point for the rod in the mortise directly opposite the cylindrical griping-jaw, and therefore the rod will be practically secured against the angular mortise-walls at points on each side of the trunnion-bore, because the griping pressure of the jaw will be opposed to the rod at a point in line with and opposite a space which affords no bearing-surface for the rod. The pressure upon the rod at this point will give it an inappreciable bulge or spring, and therefore effect a

secure and positive gripe at two points of bearing, beyond which the rod cannot slip, because the rod will practically have a bearing on each side of the bore G, with the pressure-jaw in intermediate relation thereto and on the side of the rod opposite to said separate bearings. The bore G is therefore not only important as a way through which the cylindrical bearing-jaw is introduced to its seat, but as the means of forming the cross-division in the mortise and open back opposite the pressure-plug.

I claim—

1. The combination, in an oil-well pump, of the trunnion-head having the trunnions *a a*, the mortise B, formed with angular sides *b b*, divided in the line of the axis of said trunnions to form a non-bearing interval, with the clamping-jaw in position opposite to and in line with said intermediate non-bearing interval for the purpose of holding the polish-rod, substantially as herein set forth.

2. The trunnion-head of an oil-well-rod adjuster, having the angular mortise B, the trunnion-bore G, forming a junction with said mortise, the opposite trunnion having a screw-threaded axial opening and a cylindrical recess larger than the said screw-opening and communicating therewith and with the cross-mortise B, and adapted for use with the cylindrical bearing-jaw to hold the polish-rod, substantially as herein set forth.

3. In a polish-rod adjuster for oil-wells, the combination of the trunnion-head, having an angular cross-mortise, with a cylindrical bearing-jaw having a concave end and seated within an inclosed recess of corresponding form in one side of said mortise, and a screw, E, arranged axially within one of the trunnions to enter said recess and act upon the cylindrical bearing-jaw to hold the rod, substantially as herein set forth.

4. The trunnion-head formed with a walled recess at one side of a mortise formed transversely through the trunnion-head, and a central bore leading from one end of one of the trunnions through the trunnion-head to the walled recess, whereby a passage is provided for the introduction of the bearing-jaw at one end of the said trunnion, substantially as and for the purpose specified.

5. In a trunnion-head adapted to connect the polish-rod with the working-beam in a pump for oil or Artesian wells, the heart-shaped mortise B, enlarged at a point between the walled recess C and the bore G of one trunnion, whereby to provide a guideway for the bearing-jaw in its passage to the walled recess, substantially as set forth.

6. In a trunnion-head adapted to connect the polish-rod with the walking-beam, the trunnion-head A, formed with a heart-shaped or angular mortise, through which the polish-rod passes, in combination with the bearing-jaw arranged for action upon the polish-rod in direct opposition to the point or angular sides of the said mortise, substantially as herein set forth.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

HENRY BALLIET.

Witnesses:
M. A. DODGE,
A. H. ABBEY.