

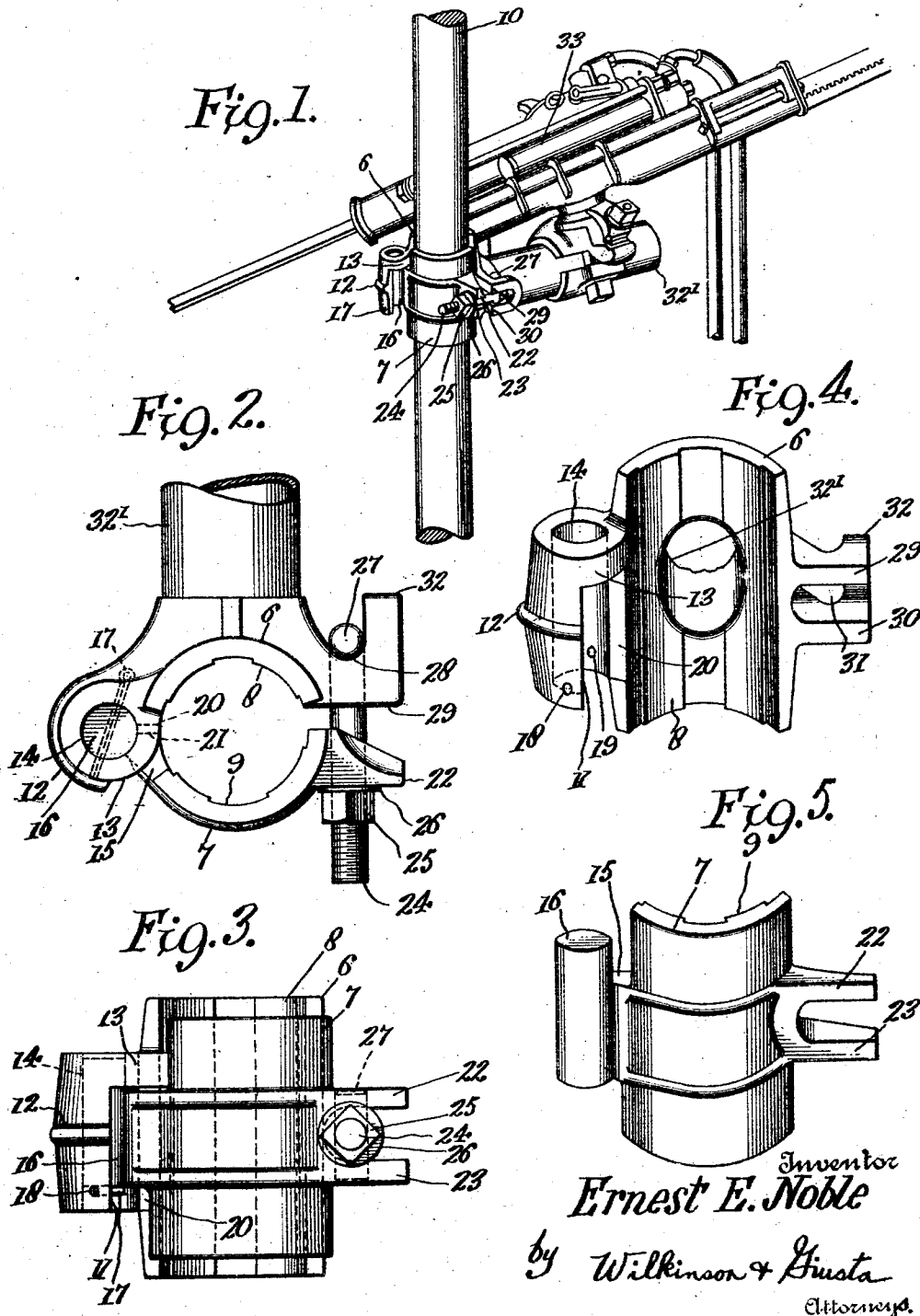
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E. E. NOBLE

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CLAMP

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UNITED STATES PATENT OFFICE.

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CLAMP.

Application filed January 12, 1925. Serial No. 2,000.

To all whom it may concern:

Be it known that I, ERNEST E. NOBLE, a citizen of the United States, residing at Lead, in the county of Lawrence and State of South Dakota, have invented certain new and useful Improvements in Clamps; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

The present invention relates to improvements in clamps and more particularly refers to certain improvements over the construction shown and described in my prior Patent No. 1,509,022, granted September 16, 1924.

In the patented clamp, the trunnion 16 had only a small amount of bearing on the retaining wall 13, and therefore exhibited a tendency to batter, particularly when the clamp was used at the position indicated at 31 in the patent, the miners carelessly permitting the column arm clamp to drop to the bottom of the drill column when readjusting the column arm 32. The present invention intends to remedy this situation by giving the trunnion a full cylindrical bearing on the retaining wall at the upper portion thereof, great strength being secured and excessive wear on the column arm clamp being avoided.

Another object of the invention consists in providing for a simpler assembly of the parts and to diminish the great amount of friction necessarily encountered with the use of the closed bottom wall 15 in the patent.

A further object of the invention resides in providing a securing bolt that will permit of removing it entirely from both parts of the clamp, so that should the threads or other parts become worn, it is no longer necessary to remove the clamp to the shop to replace the bolt, but this replacement may be made by the miner himself at the point of drilling.

With the foregoing and other objects in view, the invention consists in the construction, combination and arrangement of parts more fully described hereinafter and more particularly pointed out in the appended claims.

In the drawings, wherein like symbols refer to like or corresponding parts throughout the several views:

Figure 1 is a fragmentary perspective view showing a drilling machine with the invention applied thereto;

Figure 2 is an enlarged plan view of the clamp, with a portion of the drill arm broken away;

Figure 3 is a side elevation of the clamp on an enlarged scale;

Figure 4 is a perspective view of one member of the clamp; and

Figure 5 is a similar view of the other member of the clamp.

Referring more particularly to the drawings 6 and 7 designate generally the two parts or elements forming the clamp; these elements having complementary formed surfaces for fitting about an object. The surfaces shown are the semi-cylindrical depressions 8 and 9, disposed opposite one another and adapted to fit a cylindrical bearing such as the drill column 10, shown in Fig. 1. The parts 6 and 7 of the clamp are made of cast iron or other appropriate material, and they may be suitably reinforced by ribs and the like.

At one end the clamp member 6 is provided with a head 12 projecting substantially radially from the cylindrical bearing formed by the two members or substantially radially from the drill column 10. The center line or diameter of the head 12 substantially coincides with the diameter of the drill column 10 or combined cylindrical bearing surfaces 8 and 9, and portions of the head 12 overlap the radial line of contact between the two members. Within the head 12 is a substantially cylindrical bearing surface 14 closed entirely at its top portion by the retaining wall 13. Below this wall is a slot 11 open at the bottom to permit of the insertion and the turning therein to a limited extent of the web 15, which connects the cylindrical trunnion 16 to the other member 7 of the clamp. The cylindrical bearing 14 is a true complete cylinder only at the top portion of the head 12, but save for the slot 11 this bearing extends all the way to the bottom of the head and opens at both upper and lower ends. The upper portion of the web 15 on the companion clamp member 7 is re-

moved, or the trunnion 16 extends above the web to leave a space between the upper part of the trunnion and the adjacent part of the clamp member to receive the retaining wall 13 of the head 12. The trunnion 16 is inserted through the lower end of the bearing 14 and pushed up substantially into the position shown in Fig. 3, where this trunnion fits snugly for free rotation in the bearing and occupies substantially the entire bearing, although the lower end of the trunnion is spaced above the lower end of the head 12, in order to accommodate the cotter pin or key 17, which is inserted through the openings 18 and 19 made at diametrically opposite points in the head 12. These openings are made substantially above the lower end of the head in order not to unduly weaken the metal and to secure ample strength for supporting the trunnion and connected clamp member. The cotter pin or key is of restricted surface area and contacts only with a very small portion of the area of the lower end of the trunnion 16 and hence friction between the two parts incident to the rotation of the trunnion 16 is reduced to a minimum. The center of the trunnion also coincides with the diameter of the drill column in order to permit the clamp members to close about the drill column, but limited relative rotary movement being permitted in the two clamp members by virtue of the fact that the web 15 is of less width as compared with the slot 11 in the head 12. The clamp member 6 is provided with a shoulder 20 extending substantially diametrically of the head 12 and adjoining the head for use in cooperating with the similar shoulder 21 made upon the other clamp member or upon the web 15, these shoulders being arranged to abut when the clamp is entirely closed. The clamp member 7 upon the end opposite the trunnion is provided with spaced horns 22 and 23 for receiving therebetween the threaded bolt 24 having a nut 25 and one or more washers 26, the washers adapted to engage against the outer faces of the horns 22 and 23. Such outer faces are made at substantially right angles to the axis of the bolt 24, in order to avoid the slipping of the bolt out of the horns. The slot or space between the two horns is open at its outer end to permit of a swinging movement of the bolt in moving into and out of operative position. The other end of the bolt is provided with a T-head 27 fitting within the socket 28 made in the rear portions of the spaced lugs 29 and 30 cast or otherwise provided upon the end of the clamp member 6 opposite to the head 12. The lugs are open or slotted as indicated at 31 between their rear portions, but are connected together at the part indicated at 32 for the purpose of reinforcing the lugs at this point. The two branches of the T-head fit in sockets of the

lugs 29 and 30 and the shank passes through the slot 31. The bolt is enabled to swing as the T-head is of rounded cross-section and the socket 28 made accordingly. The fact that the lugs 29 and 30 are spaced apart permits the free swinging of the bolt and the connected part 32 prevents the bolt from becoming disconnected except when the nut 25 and washers 26 are removed and the bolt drawn axially through the opening 31. This construction permits the miner to remove the bolt when the threads are worn or when the bolt is otherwise incapacitated at the place of work without having to remove the entire clamp member and transfer it to a workshop.

The clamp may be fitted about the drill column 10, as shown in Fig. 1 for securing the drill arm 32' in position, this drill arm being secured to one of the clamp members, for instance the clamp member 6, as represented. The drilling machine 33 is affixed to this arm 32, and the column will permit of varying the height of the drilling machine and also for the angular adjustment thereof about the column.

In the use of the device, the clamp members are assembled by fitting the trunnion 16 up through the cylindrical bearing 14 in the head 12 of the companion member 6 and subsequently inserting the cotter pin 17 through the openings 18 and 19. The member 7 will thus be supported upon the cotter pin and will be free to rotate thereon, the cotter pin at the same time providing for the ready disassembly of the members by virtue of its easy removability. The upper end of the trunnion fits snugly into the closed cylindrical top portion of the bearing and relative movement of the two clamp members in a direction axially of the drill column is prevented, as the top edge of the web 15 will avoid movement in one direction by cooperating with the lower edge of the retaining wall 13 of the head 12 and the cotter pin will prevent downward movement of the trunnion or upward relative movement of the other clamp member.

The clamp members are tightly closed into gripping engagement with the drill column by tightening the nut 25 upon the bolt 24. This action causes the drawing together of the clamp members about the trunnion center. When the nut 25 is reversely rotated, the clamp members are permitted to open a relatively great distance, so as to loosen the same and permit adjustment either axially or circumferentially upon the drill column. It is also a comparatively easy operation to remove the cotter pin 17 to secure the disassembly of the two clamp members.

On the arm 32' is shown a clamp member constructed according to my prior Patent No. 1,509,022 as this particular clamp member is found adapted for use at this

particular point. It is quite obvious, however, that the present form of clamp member may be utilized also at this point.

I desire it to be understood that the drawings only show one embodiment of which the invention is susceptible, and those skilled in the art will, of course, be enabled to change the size and proportion of the device and parts thereof and to make other constructional changes therein, but I reserve the right to alter such changes and modifications as come within the scope of the following claims.

I claim:

1. A clamp comprising complementary clamp members, one of said members having a head projecting from one side thereof, with a substantially cylindrical recess therein closed all around at its upper side portion to form a continuously cylindrical bearing and having a slot below the closed upper portion and opening upon the bottom edge of the head, said slot having side walls running from the open bottom substantially straight to the closed top portion, a trunnion on the other clamp member adapted to be fitted up through said recess and into the cylindrical bearing at the upper portion of the head, a web connecting said trunnion with the clamp member and being thinner than said slot is wide whereby to permit the

web to rotate in said slot back and forth between said straight side walls, said web being spaced below the upper end of the trunnion and lying below said closed upper side portion of the head, a narrow key removably fitted diametrically across the lower portion of said bearing beneath said trunnion to receive the weight of the latter at its intermediate portion, and means at the free edges of said clamp members for drawing the same together.

2. A clamp comprising companion clamp members hinged together at one side, spaced horns upon the free end of one member, spaced lugs on the free end of the other member disposed opposite said horns, said lugs having complemental sockets in their rear faces, a member connecting said lugs together at their rear outer end portions whereby to reinforce the lugs at the outer sides of said sockets, a T-headed bolt, the lateral portions of the head of said bolt adapted to fit in the sockets in said lugs and to turn therein, the shank of the bolt adapted to fit between said lugs and to rotate freely therein being restricted by said connecting member and prevented from escape from the space between said lugs, and a nut on said bolt adapted to engage with said horns of the other member.

ERNEST E. NOBLE.