Jan. 12, 1943. M. O'FARRELL 2,308,203

DRILL STEEL CENTRALIZER

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Fig. 1.

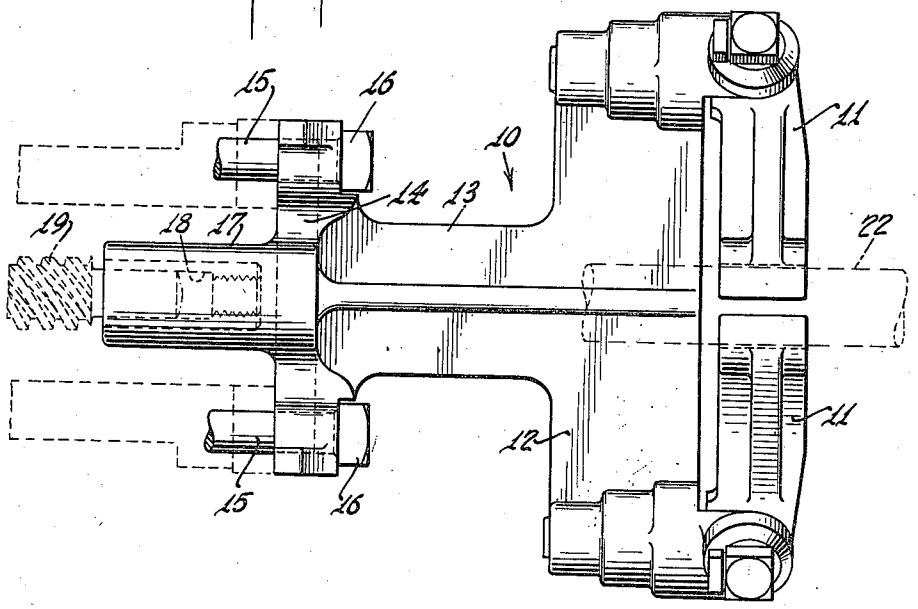
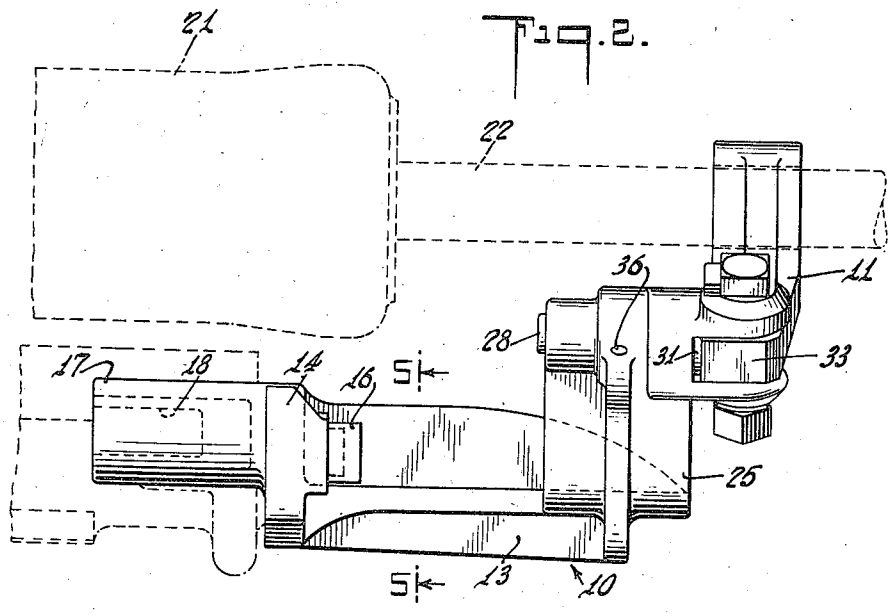


Fig. 2.



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Fig. 3.

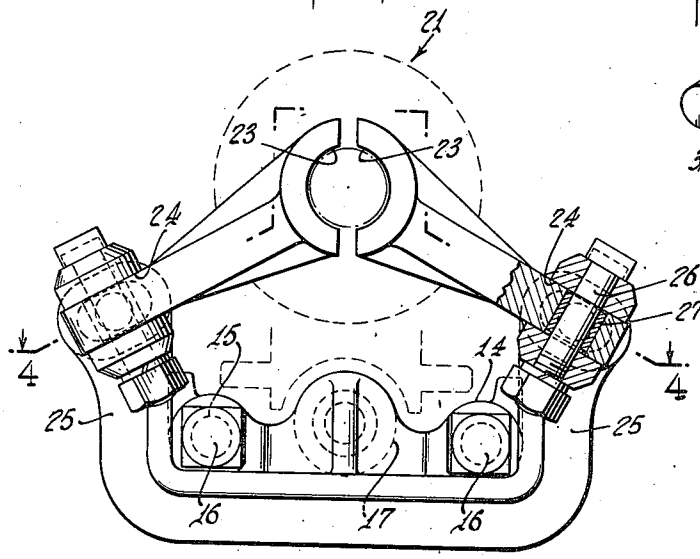


Fig. 6.

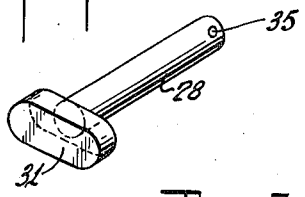


Fig. 7.

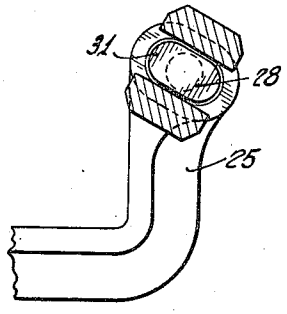


Fig. 4.

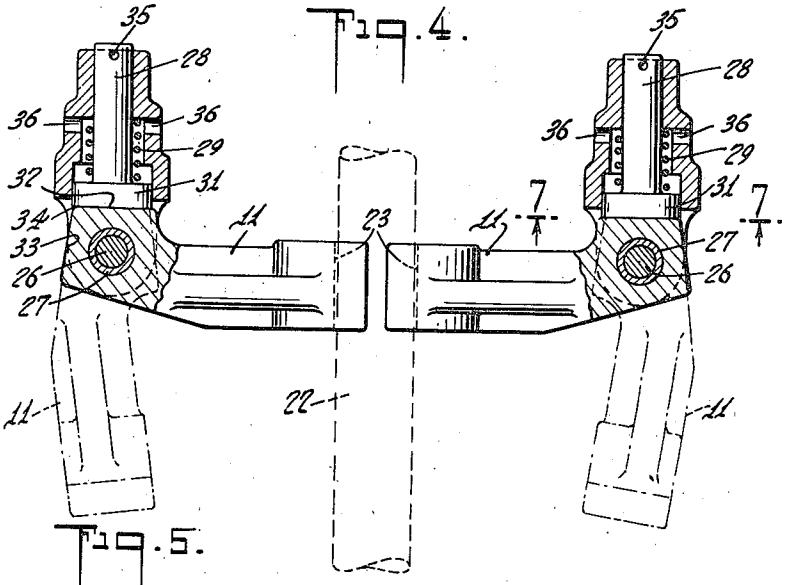
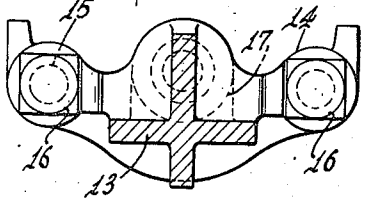


Fig. 5.



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DRILL STEEL CENTRALIZER

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Application July 2, 1940, Serial No. 343,526

1 Claim. (Cl. 255—51)

This invention relates generally to drill steel centralizers and more particularly to devices of this class having guide arms which are settable into and out of guiding position and yieldingly held in each position.

A centralizer of this class is generally constructed for use with rock drills of the drifter type. The centralizer functions to maintain the steel in axial alignment with the drill when spotting or starting holes in irregular surfaces, or at an angle, and to prevent the steel from departing from the desired course through the rock when the elements of the regular drill steel bearing become worn. In order that the drill may be fed out to its full capacity the guiding element or elements for the steel are rocked out of guiding position by the front head of the advancing drill.

The centralizer of the present invention is broadly similar to those of the prior art in that it is mounted at the front end of the supporting shell and has a pair of guide arms movable into and out of guiding position with respect to the drill steel at a point between the free end of the steel and the front head of the drill. By this invention, however, certain specific improvements are presented over the prior art including:

1. The combining of the centralizing mechanism and the end plate of the shell mount in a single unitary structure acting as an extension of the shell.

2. The provision of a yielding means adapted to maintain the guide arms in each of a plurality of set positions.

3. A simple and durable mounting for the guide arms which renders unnecessary the frequent replacement of the parts of the mounting.

One object of the invention is to produce a drill steel centralizer of simple and rugged construction which opens on contact with the front head of the drill.

Another object of the invention is to combine the functions of the conventional shell end plate and drill steel centralizer in a unitary structure to be mounted on the shell as an extension thereof.

Another object of the invention is to enable the guide arms of the centralizer to be yieldingly held in each of a plurality of set positions.

Another object of the invention is to improve the pivotal action of the guide arms and reduce the wearing effect of such action through the provision of a novel guide arm mounting.

Other objects and structural details of the invention will be more apparent from the following description when read in conjunction with the accompanying drawings, wherein:

Fig. 1 is a plan view of a centralizer unit, showing one form of the invention;

Fig. 2 is a view in side elevation of the centralizer unit shown in Fig. 1;

Fig. 3 is a view in front elevation of the centralizer unit shown in Fig. 1, with the mounting for one guide arm shown in cross section;

Fig. 4 is a detail view, in section, of the guide arms and associated yielding retaining means shown in Fig. 1, and is taken substantially along the line 4—4 of Fig. 3;

Fig. 5 is a view in cross section through the mid-portion of the centralizer unit, and is taken along the line 5—5 of Fig. 2;

Fig. 6 is a detail view, in perspective, of the spring pressed plunger that engages each guide arm; and

Fig. 7 is a detail view of a guide arm mounting of the type shown in Fig. 1, showing the position of the yielding retaining means relative thereto and is taken substantially along the line 7—7 of Fig. 4.

It will be seen that the centralizer comprises, generally, a frame piece, or support 10 and a pair of guide arms 11 supported by the frame piece 10. The frame piece 10 is formed with a head portion 12, a neck 13 (see Fig. 5) and a shouldered portion or face plate 14 by which the frame is secured to the front of the guide shell. The face plate 14 is formed with suitable openings to receive the adjacent ends of the usual supporting rods 15, of the shell, and is fastened to the rods by nuts 16. A projecting portion 17 of the frame extends beyond the face plate 14 and is formed with a recess 18 into which the reduced front end of the feed screw 19 extends. The frame piece 10 is thus an extension of the conventional shell and, in functioning as a bearing for the feed screw 19 and end piece for the rods 15, replaces the usual end plate of the shell.

The frame piece 10, when mounted on the shell, extends forwardly and underlies the front end of the rock drill 21 (Fig. 2) and the drill steel 22. The rock drill 21 is mounted in a manner not shown upon the shell and, by rotation of the feed screw 19, is caused to move relatively to the shell to advance and retract the drill steel through the rock. The centralizer guide arms 11 extend inwardly and upwardly from respective pivot points on opposite sides of the frame piece 10 and the outer end of each arm is formed with a concave surface 23 (Fig. 3) which encircles a portion of the drill steel 22. Through the cooperation of

the pair of arms 11 the drill steel is positively held against deviation from its axial movement. The arms 11, when set in cooperative relation with the steel 22, lie in the path of the front head of the drill. Therefore, in order that the drill may be fed out to its full capacity the arms 11 are given a pivotal mounting so that they may be rocked out of effective position by the advancing drill.

The inner end of each arm 11 is positioned in an angled slot 24 cut in an upstanding portion 25 of the frame piece 10. The upstanding portions 25 are formed at the front of the frame 10, on opposite sides thereof, and give a U-shaped appearance to the frame, when viewed in front elevation (Fig. 3). The jaws forming the slots 24, and the inner end of each arm 11, are perforated to permit the passage therethrough of a bolt 26 which acts as a fulcrum about which the guide arm rocks. Suitable locking nuts are provided to hold the bolts 26 in place, and a spacing ring 27 (see also Fig. 4) is positioned in each slot 24 to prevent the jaws which form the slot from being compressed to a position in which they might hinder movement of the guide arms 11. The rings 27 surround the bolts 26 and serve the additional function of acting as bearings for the arms 11. The bolts 26 are thus not worn by operation of the guide arms 11 and do not require frequent replacement.

Referring to Figs. 4, 6 and 7 the means for yieldingly holding the guide arms 11 in the positions to which they are set resides in a pair of plungers 28, one of which is mounted in each of the upstanding portions 25 of the frame 10 in a position at substantially right angles to the associated guide arm 11. The plungers 28 are pressed by means of springs 29 into the slots 24 where the enlarged heads 31, thereof, engage the respective inner ends of the guide arms 11. The inner end of each arm 11 is formed with a pair of flat engaging surfaces 32 and 33 (Fig. 4) which lie adjacent the head 31 of plunger 28 and at an angle, somewhat greater than 90 degrees, with respect to each other. With the guide arms in cooperative relation with the drill steel 22, as shown in Figs. 3 and 4, the surface 32 of each arm is in position to be engaged by the plunger 28 and the guide arms are so held from movement until a positive force acts on the arms to displace them. The application of such a force by the drill 21, as it nears its most advanced forward position, serves to rock the guide arms outward or downward as viewed in Fig. 4, to the positions shown in dot-dash outline therein. This movement of the guide arms 11 places them out of cooperative relation with the drill steel 22 and out of the path of the drill 21, and brings the engaging surfaces 33 into position opposite the plungers 28. The guide arms will then be held in ineffective position and must be restored manually to guiding position upon withdrawal of the drill from advanced position.

To facilitate the rocking movement of the guide arms the point 34 between the surfaces 32 and 33 is rounded.

For assembly purposes each plunger 28 is formed with a hole 35 near its outer end. When assembling the guide arms 11, the plungers 28 are pressed outward until the holes 35 lie outside the plunger housing. Pins or nails may then be inserted in the holes to hold the springs 29 compressed until the guide arms have been bolted in place. Openings 36, communicating with the plunger chambers in the portions 25, are for the purpose of allowing any dirt or foreign matter which might enter the plunger chambers to drop out.

What is claimed is:

A drill steel centralizer comprising a fixed support formed with separate sets of jaws, a pivot bolt passed transversely through each of said sets of jaws, guide arms each having one end positioned within a respective set of jaws and mounted on a pivot bolt therein for pivotal movement relative to said fixed support, and a bushing surrounding each of said pivot bolts and interposed between the associated set of jaws, said bushing serving as a friction bearing between said bolt and guide arm and as a wedge between said jaws to prevent compression of the jaws into binding engagement with the guide arm.

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