Dec. 1, 1953 H. A. GILLERSTROM 2,661,189

CENTRALIZER

Filed Sept. 29, 1951 2 Sheets-Sheet 1

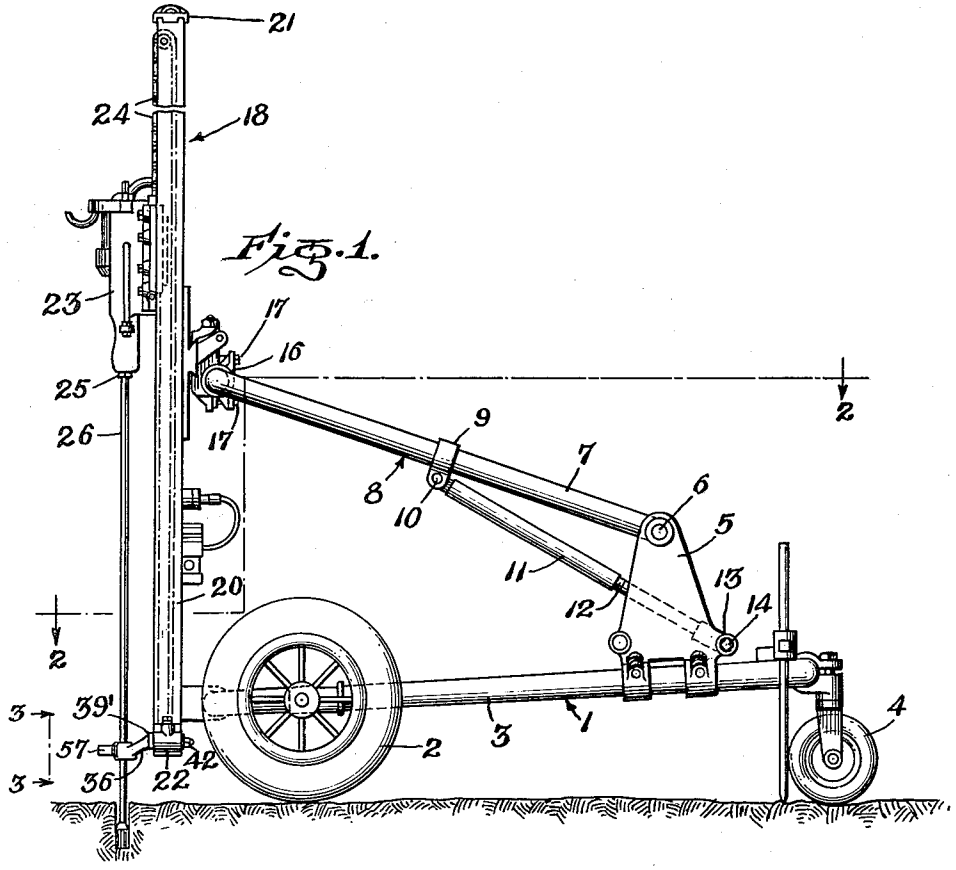


Fig. 1.

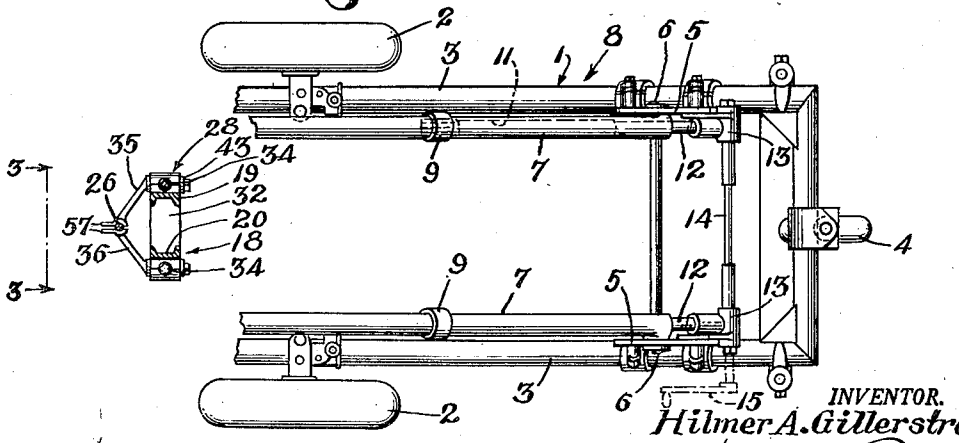


Fig. 2.

INVENTOR.
Hilmer A. Gillerstrom
BY
Attorney.

Dec. 1, 1953 H. A. GILLERSTROM 2,661,189

CENTRALIZER

Filed Sept. 29, 1951 2 Sheets-Sheet 2

Fig. 3.

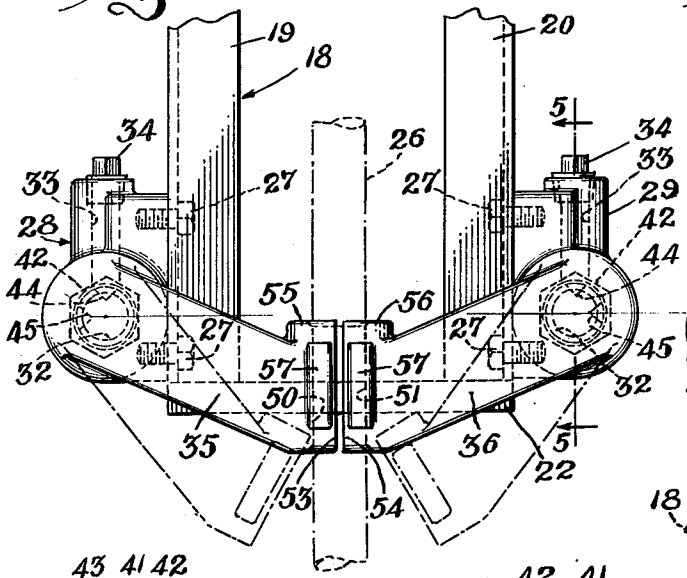


Fig. 5.

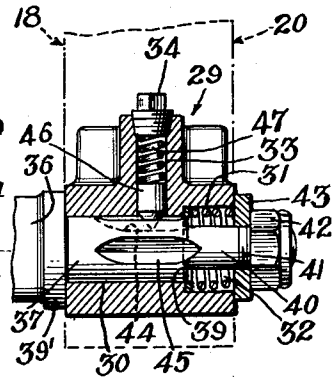


Fig. 6.

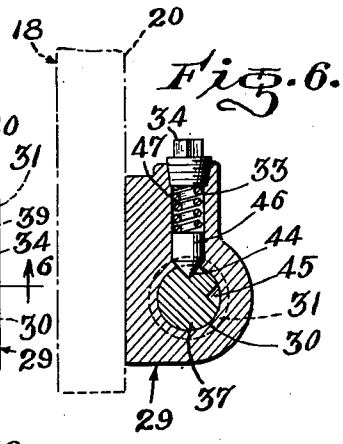
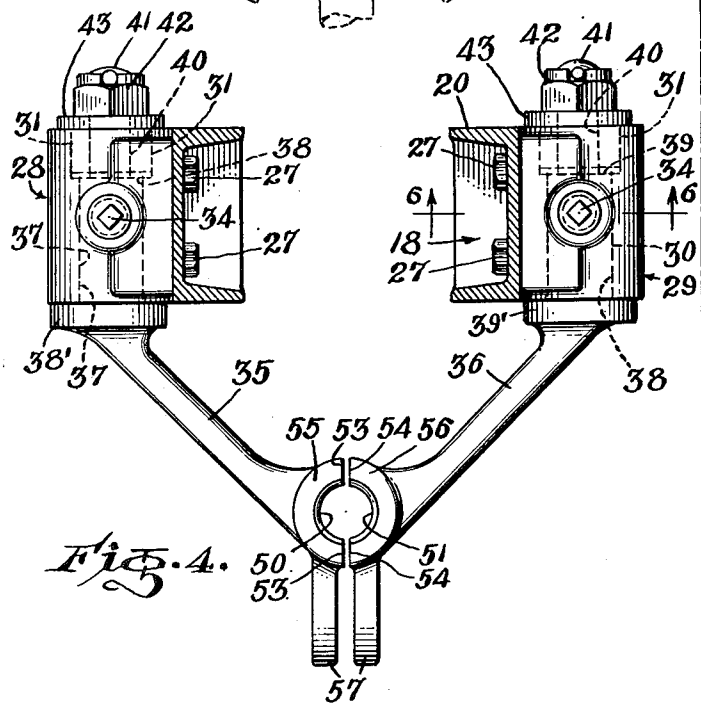


Fig. 4.



INVENTOR.
Hillmer A. Gillerstrom
BY
Attorney.

Patented Dec. 1, 1953

2,661,189

UNITED STATES PATENT OFFICE

2,661,189

CENTRALIZER

Hilmer A. Gillerstrom, Arcadia, Calif., assignor to Independent Pneumatic Tool Co., Aurora, Ill., a corporation of Delaware

Application September 29, 1951, Serial No. 248,939

3 Claims. (Cl. 255—51)

1

This invention relates to rock drilling machines in general and particularly to an improved form of guide means for drill steels which guides are commonly known as "centralizers."

In the drilling of rock and like materials the drilled hole must be started in axial alignment with the drill steel and must thereafter be maintained on that line to prevent the drill from wandering off at an angle with resultant difficulties in operation including bending and possible breaking of the drill steel or the chuck in which it is held, excessive consumption of power due to bending of the drill steel and its frictional engagement with the sides of the hole, and the jamming of the drill steel in the hole with the attendant difficulty of removal and the consequent loss of productive time.

It is an object of the present invention to provide a centralizer for rock drilling apparatus which may be readily opened and closed about a drill steel and which when closed will accurately hold the drill in proper axial alignment with the driving motor so that the hole will be accurately started and maintained in alignment.

Another object of the invention is to provide a device of the above character which may be operated by the operator or by the forward movement of the drill itself, and which in a preferred form may be operated by the foot of the operator so that it can be opened without the necessity of the operator manually releasing the throttle control of the drill operating motor.

A further object of the invention is to provide a rock drill centralizer in which the bearing surfaces between relatively moving parts are completely enclosed and protected against the entrance of injurious dust and chips and the like.

Still another object of the invention is to provide a centralizer for rock drilling apparatus in which all relatively moving parts are spring biased to prevent vibration and rattling as the parts become worn.

A still further object of the invention is to provide a centralizer for rock drilling apparatus which is simple in construction, is composed of few parts, is economical to manufacture, and which is reliable and efficient in use.

With the foregoing objects in view, together with such other objects and advantages as may subsequently appear, the invention resides in the parts, and in the construction, combination, and arrangement of parts, disclosed by way of example, in the following specification of one mode of execution of the invention, reference being had

2

to the accompanying drawings which form a part of said specification and in which drawings:

Figure 1 is a side elevation of a typical portable rock drilling machine in which the present invention is incorporated;

Figure 2 is a top plan view of Figure 1, partly in section on the staggered line 2—2 thereof to disclose parts otherwise concealed from view;

Figure 3 is an enlarged front elevation of the centralizer of the present invention, the area viewed being indicated by the arrowed lines 3—3 of Figures 1 and 2;

Figure 4 is a top plan view of Figure 3;

Figure 5 is a fragmentary sectional view taken on the line 5—5 of Figure 3; and

Figure 6 is a fragmentary sectional view taken at right angles to Figure 5 and indicated by the line 6—6 on Figure 4.

Referring to the drawings, the illustrated machine to which the invention is applied comprises a horizontally disposed U-shaped frame member 1 having a pair of main wheels 2 attached to the ends of the legs 3 of the frame and a dirigible caster wheel 4 attached to the center of the closed end of the frame. Clamped to each leg portion 3 near the closed end of the frame and extending upwardly therefrom are bracket elements 5 having oppositely disposed bearings 6 in which the ends of the legs 7 of a U-shaped support 8 are pivotally mounted. Each leg portion 7 at about its mid-length carries a clamp collar 9 having depending ear portions connected by bolts 10, and the bolts 10 between the clamp collar ear portions also pivotally support one end of internally threaded sleeves 11 the opposite ends of which are threadedly engaged by adjusting screws 12 pivotally mounted in bearings 13 at the lower ends of the brackets 5, 5 and geared for rotation in unison by a shaft 14 also mounted in bearings in the brackets 5, 5 and operated by any suitable means such as the crank 15. As the adjusting screws are rotated with resultant extension or contraction of the combined length of the sleeves 11 and screws 12 the angular position of the U-shaped support 8 will be varied with consequent raising and lowering of the closed end thereof. Pivotally mounted on the closed end of the member 8 with provision for being secured in adjusted angular position thereon, including the clamping plate 16 and bolts 17, is a mast assembly 18 including spaced parallel rails 19 and 20 held in spaced relation at their upper end by a mast crown plate 21 and at their lower end by a cross-bar 22. Slidingly mounted on the rails is a drill mo-

tor 23 movable therealong by power operated means including a sprocket chain 24 trained over sprockets at the upper and lower ends of the mast assembly. The motor 23 includes a chuck 25 adapted to receive the ends of drills such as shown at 26 and imparts both impact and rotation to the drills as is common in drilling rock or the like. The above described portable frame structure and adjustable mast supporting means forms no part of the present invention and have been described merely by way of providing a better understanding of the purpose of and mode of operation of the invention.

Mounted on the outer faces of the rails 19 and 20, respectively, at the lower ends thereof and secured thereto by bolts 27 are brackets 28 and 29 each having a transverse bore 30 extending therethrough parallel to the face of the rail to which the bracket is attached and perpendicular with respect to the axis of the drill 26, each of said bores at the end thereof remote from the drill being coaxially enlarged, as at 31, to house a compression spring 32 to be later referred to in more detail. Additionally, each bracket 28 and 29 on the side thereof opposite the lower end of the mast assembly is provided with a bore 33 which intersects the bore 30 at its inner end and is threaded at its outer end to threadedly receive a plug 34. The drill engaging and centralizing elements of the invention comprise swinging arm members 35 and 36 having shank portions 37 and 38, respectively, which are journaled in the bores 30 of the brackets 28 and 29 (see Figure 4) and include shoulder portions 38 and 39 which engage the ends of the brackets adjacent the drill and reduced diameter portions 40 which extend through the enlarged bores 31 and the springs 32 therein and terminate in threaded ends 41 beyond the brackets which threaded ends are engaged by nuts 42 with washers 43 interposed between the nut and the face of the bracket completely enclosing the bearing surface, while the springs 32, being compressed in the enlarged bore, supply a frictional bias to resist unintentional rotative movement of the arms 35 and 36 in the brackets 28 and 29.

Each of the shank portions 37 and 38 is provided with a pair of parallel longitudinally extending grooves 44 and 45 which are engageable by spring biased detents 46 mounted in the bores 33 in the brackets 28 and 29 and yieldingly urged toward the grooves by compression springs 47 compressed between the inner ends of the plugs 34 and the outer ends of the detent elements 46 (see Figures 5 and 6). The side walls of the grooves 44 and 45 are inclined and the groove engaging faces of the detents are correspondingly inclined so that upon the application of sufficient turning effort on the shank the detent will be raised out of the groove with which it is engaged and allow the shank to be turned. Normally, the pressure exerted by the springs 47 is sufficient to hold the shank in either of the two positions determined by the location of the grooves 44 and 45. It is to be noted that the above described detent construction is also enclosed to prevent the intrusion of rock dust or muck or other deleterious matter.

The shanks 37 and 38, respectively, carry outwardly extending and converging arms 35 and 36 which terminate in opposed semi-circular drill engaging faces 50 and 51 generated about the axial line of the drill chuck, the end faces 53 and 54 of the arms being slightly separated from each other (see Figure 4). Referring to Figure 3, the arms 35 and 36 are shown in drill engaging and centering position and it is to be noted that the end faces 55 and 56 of the drill engaging faces toward the drill chuck are so disposed that a plane P containing the axes of the shanks 37 and 38 passes between the drill chuck and the faces 55 and 56. Consequently, as the arms 35 and 36 are swung out of drill engaging position, all portions thereof will be moving away from the drill and thus, by the novel expedient of the selection of the proper location of the bearing for the drill engaging arms a simplified construction is achieved. Additionally, it is to be noted that in the event that the drilling progresses to an extent that the end of the drill chuck encounters the faces 55 and 56, the only effect will be that the arms 35 and 36 will be swung about their pivotal mounting and thus preclude the possibility of damage to the drill rig. The groove 44 in each of the shanks 37 and 38 is so located that when engaged by the detent 46, the arms are in drill engaging position while the grooves 45 are located approximately 90 degrees from the grooves 44 so that when engaged by the detents 46, the arms 35 and 36 are substantially at right angles to their drill engaging position and afford clearance for the advancing drill motor to pass between them. Each of the arms 35 and 36 is further provided with an outwardly extending lug portion 57 adjacent the drill engaging face thereof to facilitate manual operation thereof. When drilling a vertical or nearly vertical hole the driller can move the arms 35 and 36 out of drill engaging position by stepping on the lugs 57 and without necessity for releasing the manual control of the motor throttle or the feed control with the resultant stoppage of the drilling operation.

From the foregoing it will be realized that there has been created a centralizing means for rock drilling machines which is simple in construction and which is composed of parts of simple design and susceptible of economical manufacture. The device, further, is so designed that accidental engagement between the drill motor and the device will merely disengage it from the drill guiding function without damage to the motor or the other parts of the rig. Other advantages will be apparent to those skilled in the art.

While in the foregoing specification I have described and illustrated a specific embodiment of my invention by way of example, the invention is not to be understood to be limited to the specific form thereof so disclosed and it includes in its scope all such modifications in the parts, and in the construction, combination and arrangement of parts as shall come within the purview of the appended claims.

I claim:

1. A drill centralizer for use with a drilling apparatus of the type having a pair of spaced rails disposed in a common plane and parallel to each other, a drill motor mounted on said rails, and a drill steel driven by said motor and extending parallel to said rails for engagement with the substance to be drilled, said drill steel being disposed approximately midway between said rails but being displaced a substantial distance from said common plane of said rails; which comprises a pair of brackets having corresponding cylindrical bores therein and mounted one on each of said rails adjacent the point of drilling, the axes of said bores being perpendicular to said common plane of said rails and being disposed in a transverse plane which is perpendicu-

lar to said drill steel and to said rails, a pair of arms respectively journalled at their inner ends in said bores and converging toward said drill steel to form at the outer ends thereof complementary end faces, said end faces being canted relative to said arms to engage and guide opposite portions of said drill steel when said end faces are disposed wholly on the side of said transverse plane which is remote from said drill motor, and means to hold said arms in guiding position at which said end faces are disposed wholly on said side of said transverse plane remote from said drill motor.

2. A drill centralizer for use with a drilling apparatus having a pair of spaced rails disposed in a common plane and parallel to each other, a drill motor mounted on said rails, and a drill steel driven by said motor and extending parallel to said rails for engagement with the substance to be drilled, said drill steel being disposed approximately midway between said rails but being displaced a substantial distance from said common plane of said rails; which comprises a pair of brackets having corresponding cylindrical bores therein and mounted one on each of said rails adjacent the point of drilling, the axes of said bores being perpendicular to said common plane of said rails and being disposed in a transverse plane which is perpendicular to said drill steel and to said rails, a pair of arms respectively journalled at their inner ends in said bores and converging toward said drill steel to form at the outer ends thereof complementary end faces, said end faces being canted relative to said arms to engage and guide opposite portions of said drill steel when said end faces are disposed wholly on the side of said transverse plane which is remote from said drill motor, and spring biased detents mounted, respectively, in said brackets and adapted to ride into radially spaced longitudinal grooves in said inner ends of said arms, said detents and grooves being disposed to hold said arms in guiding position at which said end faces are disposed wholly on said side of said transverse plane remote from said drill motor.

3. A drill centralizer for use with a drilling apparatus having a pair of spaced rails disposed in a common plane and parallel to each other, a drill motor mounted on said rails, and a drill steel driven by said motor and extending parallel to said rails for engagement with the substance to be drilled, said drill steel being disposed approximately midway between said rails but being displaced a substantial distance from said common plane of said rails; which comprises a pair of brackets having corresponding cylindrical bores therein and mounted one on each of said rails adjacent the point of drilling, the axes of said bores being perpendicular to said common plane of said rails and being disposed in a transverse plane which is perpendicular to said drill steel and to said rails, a pair of arms respectively journalled at their inner ends in said bores and converging toward said drill steel, a pair of end faces provided at the outer ends of said arms and canted relative thereto to guidingly engage opposite portions of said drill steel at points wholly on the side of said transverse plane remote from said drill motor, said bores in each of said brackets at the ends thereof remote from said drill steel being enlarged and the corresponding cylindrical inner ends of said arms being reduced in diameter and terminating in threaded end portions extending beyond said brackets, a shoulder portion on each arm engaging the end face of the corresponding bracket relatively adjacent said drill steel, a nut threaded on said end portion of each arm, a helical compression spring mounted in said enlarged portion of each bore to urge the corresponding arm shoulder portion into snug engagement with the associated bracket end face, and detent means to hold said arms in guiding position at which said end faces are disposed wholly on said side of said transverse plane remote from said drill motor.

HILMER A. GILLERSTROM.

References Cited in the file of this patent

UNITED STATES PATENTS

Number	Name	Date
2,055,520	Curtis	Sept. 29, 1936
2,108,035	Fuehrer et al.	Feb. 15, 1938
2,244,127	Smith, Jr.	June 3, 1941
2,274,698	Feucht et al.	Mar. 3, 1942
2,308,203	O'Farrell	Jan. 12, 1943
2,357,001	Hope	Aug. 29, 1944
2,365,686	Osgood	Dec. 26, 1944
2,523,512	Nast	Sept. 26, 1950
2,540,574	Feucht	Feb. 6, 1951