Dec. 4, 1923. 1,475,982

J. F. BUHR

ATTACHMENT FOR DRILLING MACHINES

Filed July 18, 1921 2 Sheets-Sheet 1

Fig. 1.

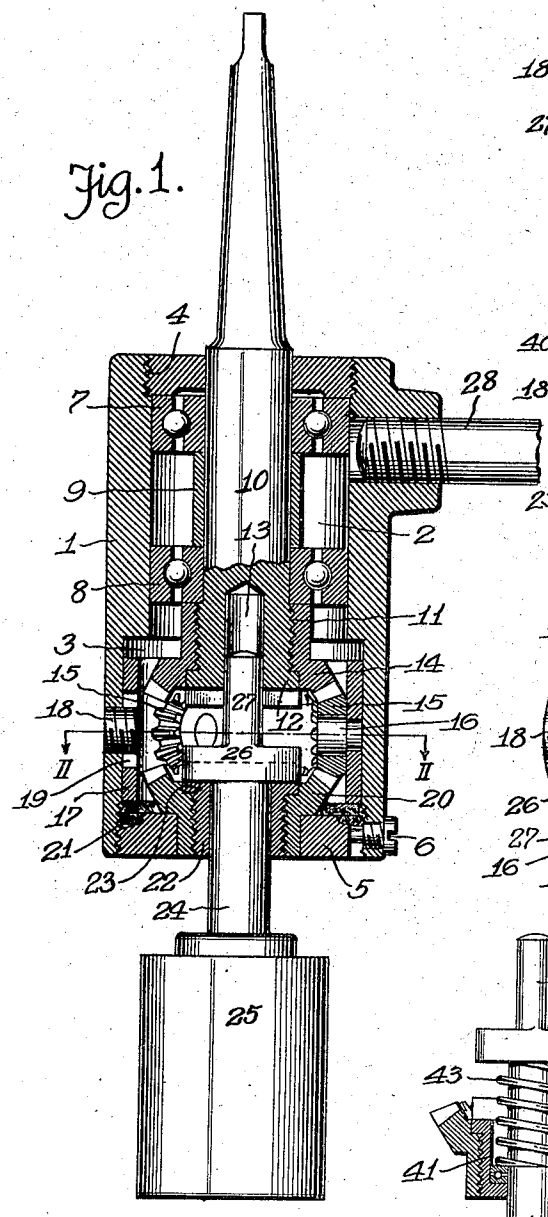
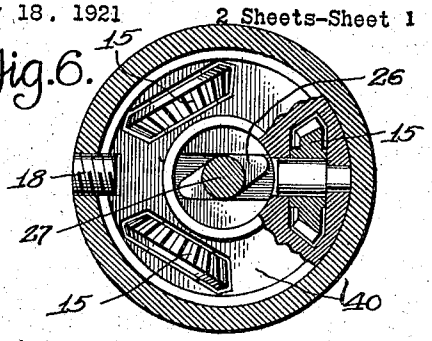


Fig. 6.



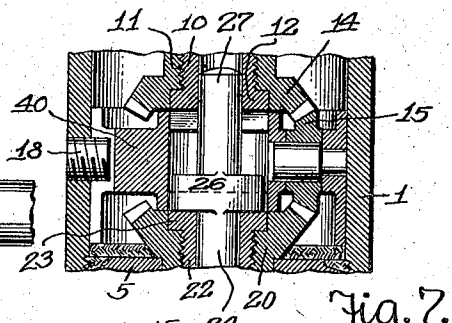


Fig. 7.

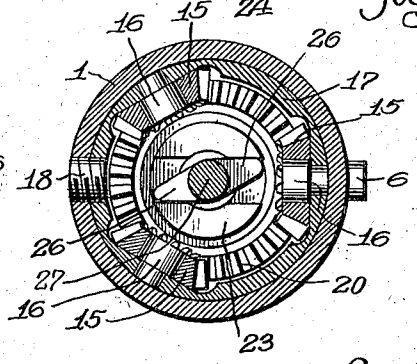


Fig. 2.

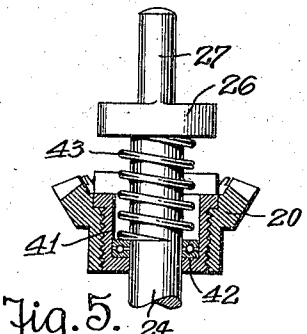


Fig. 5.

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ATTACHMENT FOR DRILLING MACHINES

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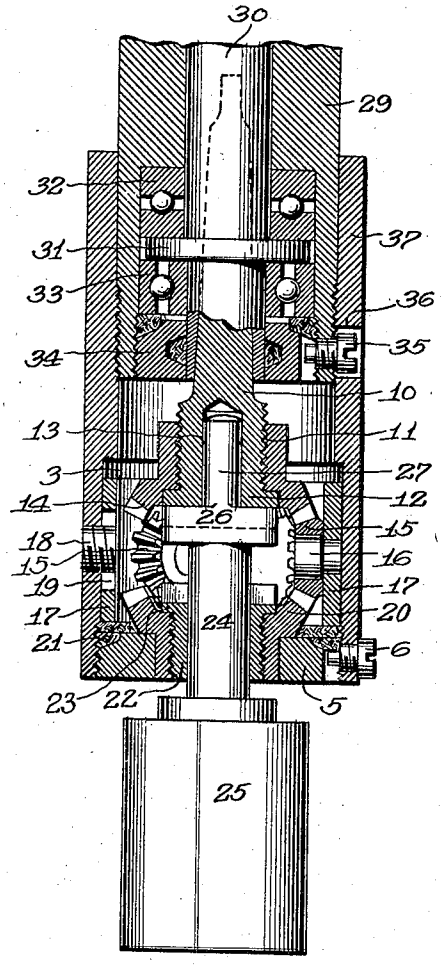

Fig. 3.

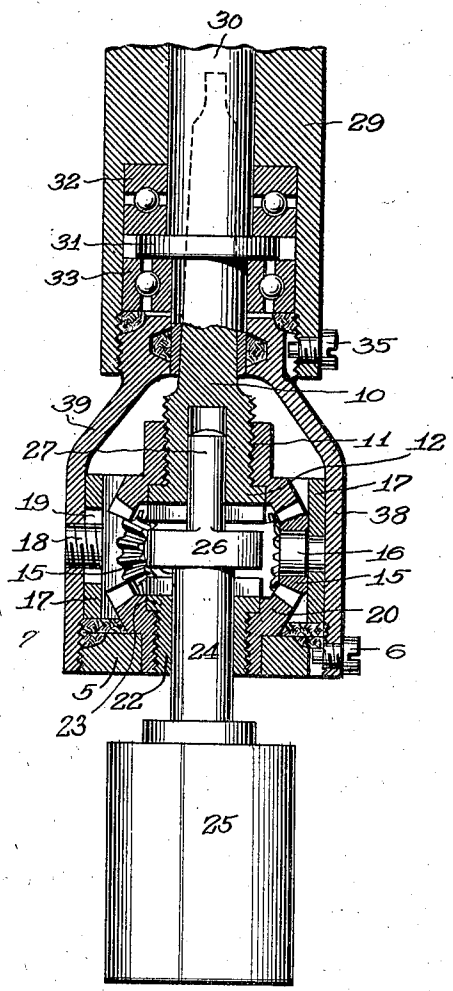

Fig. 4.

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UNITED STATES PATENT OFFICE.

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ATTACHMENT FOR DRILLING MACHINES.

Application filed July 18, 1921. Serial No. 485,774.

To all whom it may concern:

Be it known that I, JOSEPH F. BUHR, a citizen of the United States of America, residing at Detroit, in the county of Wayne and State of Michigan, have invented certain new and useful Improvements in Attachments for Drilling Machines, of which the following is a specification, reference being had therein to the accompanying drawings.

This invention relates to a tool actuating attachment for drilling machines, and my invention aims to provide a simple and efficient attachment whereby the direction of rotation of a tool holder may be readily reversed, so that the tap, bit or drill may be driven in a desired direction and when the direction of rotation is reversed the tap, bit or drill may be removed from a piece of work.

My invention further aims to provide a bit and tap chuck that is applicable to various types of drilling machines, the chuck in its various form including an adapter associated with end thrust and lateral antifrictional so that there may be a uniform and easy transmission of power from the drilling machine to the chuck.

My invention will be hereinafter described by aid of the drawings, wherein—

Figure 1 is a vertical sectional view of the drilling attachment;

Fig. 2 is a horizontal sectional view taken on the line II—II of Fig. 1;

Fig. 3 is a vertical sectional view of the attachment as designed for a socket member;

Fig. 4 is a similar view showing another design of the attachment, and

Fig. 5 is a vertical section of a spindle lifting device, that may be used in the chuck;

Fig. 6 is a horizontal sectional view of an intermediate gear ring or holder, and

Fig. 7 is a vertical section of the same.

Considering Figs. 1 and 2, the reference numeral 1 denotes a cylindrical socket or housing having a bearing chamber 2 and a reverse gearing chamber 3, said bearing chamber having its outer end closed by a plug or cap 4 screwed in the upper end of the housing 1, and the outer or lower end of the gear chamber 3 is closed by a plug or cap 5 screwed in the lower end of the housing 1 and held against accidental rotation therein by a set screw 6.

In the bearing chamber 2 are horizontally disposed anti-frictional bearings 7 and 8 spaced apart by a sleeve spacer 9 between said bearings, and the bearing 7 abuts the plug or cap 4.

Extending through the bearings 7 and 8, sleeve spacer 9, and the plug or cap 4, is an adapter 10 adapted to fit in a socket or socket member, forming part of a drilling machine not shown. The inner end of the adapter 10 is exteriorly screwthreaded, as at 11, and provided with a clutch member 12 which has an axial bore 13.

Screwed on the adapter 10 and abutting the clutch member 12 is the hub portion of an upper beveled gear wheel 14 constantly meshing with intermediate beveled gear wheels 15 rotatable on radially disposed and inwardly projecting stud shafts 16, carried by a gear ring, band or holder 17 detachably mounted within the gear chamber 3, said gear holder being held against rotation by a set screw 18 of the housing 1 extending into a slot 19 of the gear holder. The gear holder 17 having a slight vertical movement permits of the gear wheels 15 properly meshing with adjacent gear wheels.

The intermediate beveled gear wheels 15 constantly meshes with a lower beveled gear wheel 20 journaled in the plug or cap 5 with suitable packing 21 about the gear wheel 20, between the gear holder 17 and the plug or cap 5, said packing retaining a lubricant within the gear chamber 3. The gear wheels 14, 15 and 20 constitute a substantial reversing gearing.

Axially of the lower beveled gear wheel 20 and screwed therein is a bushing 22, having its inner end provided with a clutch member 23, confronting the clutch member 12 of the adapter 10. The clutch members 12 and 23 have transverse slots, one of which is best shown in Fig. 2.

Slidable in the bushing 22 is a spindle or member 24 of a chuck 25, and the inner end of the spindle 24 has a cross head 26 and a tang 27, said tang extending into the bore 13 of the adapter 10 so as to maintain the spindle 24 of the chuck 25 normally in alinement with the adapter 10 and axially of the housing 1. By reference to Fig. 2 it will be noted that the cross head 26 is provided with vertical contact faces adapted to confront and engage the side walls of the clutch member slots, so as to establish a positive driving relation between the cross head 26 and either of the clutch members 12 or 23.

The housing 1 is provided with the usual

radially disposed arm or lever 28 adapted to impinge against the frame of a drilling machine or some other abutment and prevent turning of the housing 1.

As shown in Fig. 1, the spindle or member 24 and its chuck 25 are driven in a reverse direction from that of the adapter 10, by reason of the cross head 26 engaging the clutch member 23. When the spindle or member 24 and its chuck 25 are to be driven in the same direction as the adapter 10, the spindle 24 is elevated to place the cross head 26 in engagement with the clutch member 12, thus permitting the beveled gear wheels to idle while the spindle 24 is driven direct from the adapter 10.

Reference will now be had to Fig. 3 showing the socket member 29 containing a socket 30 for the adapter 10 and in this instance the socket 30 has a peripheral flange 31 engaged by an end thrust bearing 32 and a lateral anti-frictional bearing 33, said bearings and the socket 30 being retained within the socket member 29 by a plug or cap 34 into which extends the socket 30. The plug or cap 34 is provided with suitable packing and accidental rotation of the cap is provided by a set screw 35 extending through an opening 36 in a housing 37, said housing being screwed or otherwise mounted on the lower end of the socket member 29. In this design of the attachment the housing 37 is mounted exteriorly of the socket member 29, and in Fig. 4 I show a housing 38 which has the upper end thereof reduced, as at 39 and adapted to screw into the lower end of the socket member 29 and replace the plug or cap 34, shown in Fig. 3. In both of these designs the lower end of the housing contains the same mechanism previously described in connection with Figs. 1 and 2.

Again referring to the gear wheels 14, 15 and 20, constituting a substantial reversing gearing for the tapping chuck, the three gear wheels may be mounted in a holder 40, as shown in Figs. 6 and 7, said holder surrounding the clutch and constituting a spacer between the upper and lower gear wheels. This holder may be a die casting and a bench assembled structure that may be readily mounted in the socket.

Another feature of my invention has been brought out in detail in Fig. 5, wherein the lower gear wheel 20 has a cup shaped bushing 41 which affords the usual clutch member. In the bushing 41 is placed an end thrust bearing 42 and a coiled expansion spring 43, said spring surrounding the spindle or member 24 so that the expansive force of said spring may hold the cross head 26 of the spindle or member in normal direct driving relation with the socket. As shown in Figs. 1, 3 and 4 the spindle or member 24 assumes an indirect driving relation to the socket by gravity, and in order that there may be a direct driving relation, without any chattering when tapping a piece of work, the spring 43 is installed to hold the spindle or member 24 elevated, in direct drive, except when withdrawing a tap from a piece of work.

It is thought that the operation and utility of the drilling machine attachment will be apparent without further description, and while in the drawing there are illustrated the preferred embodiments of my invention, it is to be understood that the structural elements are susceptible to such variations and modifications as fall within the scope of the appended claims.

What I claim is:—

1. In a drilling machine attachment, a socket member, a housing attached to said socket member, a socket in said socket member, said socket having a peripheral flange, an adapter mounted in said socket and provided with a clutch member, a plug in said socket member, an end thrust bearing on one side of said socket flange, a radial bearing on the other side of said socket flange, a clutch member in said housing, a chuck spindle extending through said clutch member and adapted to be placed in engagement with either clutch member, and a reversing gear mechanism in said housing and operatively supported relative to said clutch members so that said chuck spindle may be driven the reverse of said adapter.

2. The combination of a socket member, a socket in said member, an adapter in said socket, anti-frictional bearings on said socket to resist end and lateral thrust of said socket, a housing supported from said socket member, a spindle extending into said housing and adapted to be driven by said adapter, and a reversing gear mechanism in said housing adapted to cause said spindle to be driven in a reverse direction by said adapter.

In testimony whereof I affix my signature in presence of two witnesses.

JOSEPH F. BUHR.

Witnesses:
KARL H. BUTLER,
ANNA M. DORR.