May 31, 1932. J. A. KAMMERDINER 1,860,675

ROTARY JAR

Filed Nov. 24, 1931

Fig. 1

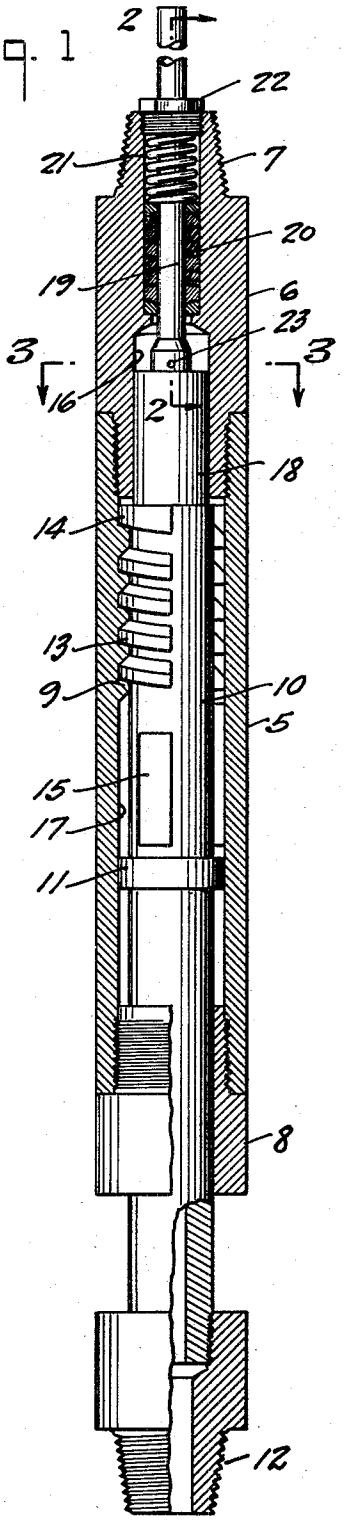


Fig. 2

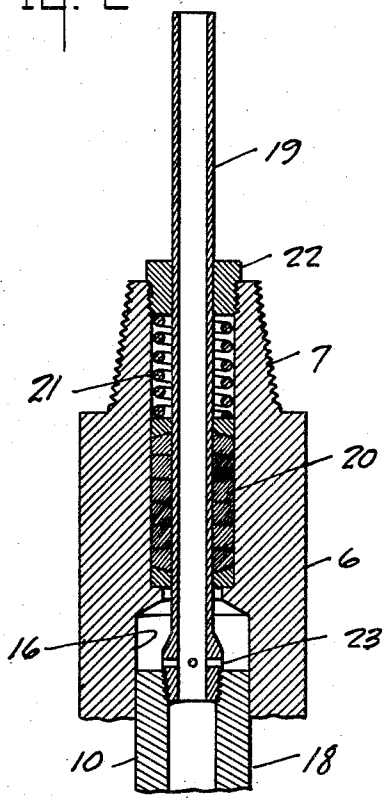
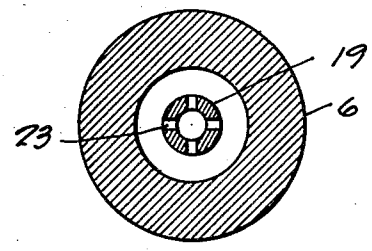


Fig. 3



INVENTOR
James A. Kammerdiner
BY Ernest L. Wallace
ATTORNEY

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UNITED STATES PATENT OFFICE

JAMES A. KAMMERDINER, OF LOS ANGELES, CALIFORNIA

ROTARY JAR

Application filed November 24, 1931. Serial No. 577,015.

This invention relates to a rotary jar for use in well drilling. It appertains to the type of device which may be placed in a string of drill pipe and enables circulation of fluid through the string. Such rotary jars are used to jar loose tools or objects which become stuck or lodged in a well hole. They consist of a longitudinally collapsible hollow device with trip means whereby the jar may be set in collapsed position and placed in the drill string, then by rotation the trip is operated to release the jar for expansion and a hammer blow is obtained. Such jars are well known in the art. They comprise a bowl portion and mandrel forming a telescopic connection therewith. The mandrel has its bore for circulation fluid connected by a wash pipe slidably extending through the head of the bowl for connection with the bore of the string above the jar. The mandrel acts with the chamber in the bowl to form a barrel and plunger. The expansion of the mandrel and bowl should be unimpeded to obtain greatest hammer impact for the jarring blow. As now constructed, the plunger and bowl act as a check due to a closed expansible chamber being formed at the head of the bowl between the plunger and bowl. It is a primary object of this invention to provide relief for such chamber so as to reduce the impedance to the expansion. These objects are accomplished by means of the embodiment of my invention illustrated in the accompanying drawings, in which:—

Fig. 1 is an axial section partly in elevation of a rotary jar; Fig. 2 is a fragmental view in section on an enlarged scale showing the relief structure; and Fig. 3 is a section as seen on the line 3—3 of Fig. 1.

Referring more particularly to the drawings, a bowl is shown comprising a tubular shell 5 internally threaded to receive a head 6 with a tapered threaded pin 7 for attachment to a drill string. The bottom of the shell 5 is internally threaded to receive an anvil member 8. Within the bore of the shell 5 is a mutilated thread 9 formed of two diametrically opposed spaced portions.

Disposed within the shell is a mandrel 10 of tubular form having a cylindrical hammer portion 11 adapted to engage the anvil 8. The mandrel slidably extends through the bore in the anvil. Attached to the lower end of the mandrel is a tapered threaded pin 12 to which any suitable tool may be attached. The mandrel above the hammer is provided with mutilated threads 13 diametrically opposite and adapted to be engaged with threads 9 or to be disposed between the ends of the threads such that the mandrel may slide between the threads. Above the threads 13 are bosses 14 of such length and position that they will keep the threads 13 from engaging the threads 11 until the tool is entirely collapsed and the full number of threads can engage each other. There are keys 15 adapted to cooperate with abutments on the shell 5. It will be noted that the chamber 16 formed in the head is of reduced diameter, as compared with the bore 17 of the shell, and that the upper portion of the mandrel 18 is reduced in diameter to snugly slide within the chamber 16. The portion 18 of the mandrel constitutes a plunger operating in the chamber 16. Threaded into the upper end of the mandrel is a wash pipe 19. The wash pipe extends through a bore in the head which provides a stuffing box in which packing 20 is held in place surrounding the wash pipe by means of a compression spring 21 and a gland 22. Thus, a leak-tight fit is provided. The jar disclosed herein is in general of the same type as that disclosed in my patent for rotary jars Number 1,672,321 granted June 5, 1928. The difference is that in the stuffing box structure and the wash pipe.

It will be obvious that when the jar is in collapsed position as shown in Fig. 1 and the string is turned so that there is sufficient clear space between the thread sections 9 for the thread sections 13 to pass, that the jar is free to be expanded. However, there is a space between the plunger portion 11 of the mandrel and the chamber 16 in the head of the bowl to form a check to the expansion. The expansion is thus impeded unless relief is afforded for this chamber. The present invention relates to such relief and, as shown, comprises ducts 23 connecting the bore of

the wash pipe 19 and the chamber. Thus, circulation fluid may pass from the bore of the wash pipe into the chamber 16 and break the tendency to form a vacuum therein. It is obvious that the invention resides in any means to relieve the tendency to create a vacuum in the chamber 16 and which does not interfere with circulation or cause a loss in circulation fluid.

What I claim is:

1. A jar comprising a bowl section and a hollow mandrel section longitudinally slidable in the bowl for circulation of fluid therethrough, trip means positionable to hold said sections collapsed and to take a tensile strain and positionable to release said sections, said bowl having a chamber at one end in which said mandrel snugly slides longitudinally and a bore of reduced diameter through said end, and a wash pipe on said mandrel extending through said bore to form a slip connection therewith, there being relief ducts opening into said chamber adjacent said mandrel for communication between the bore of said pipe and said chamber.

2. A jar comprising a bowl section and a hollow mandrel section longitudinally slidable in the bowl for circulation of fluid therethrough, trip means positionable to hold said sections collapsed and to take a tensile strain and positionable to release said sections, said bowl having a chamber at one end in which said mandrel snugly slides longitudinally and a bore of reduced diameter through said end, and a wash pipe on said mandrel extending through said bore to form a slip connection therewith, said wash pipe having relief ducts adjacent said mandrel for communication between the bore of said pipe and said chamber.

3. A rotary jar comprising a bowl section and a hollow mandrel section longitudinally slidable in the bowl for circulation of fluid therethrough, rotary trip means positionable to hold said sections collapsed and to take a tensile strain and positionable to release said sections, said bowl having a chamber at one end in which said mandrel snugly slides longitudinally and a bore of reduced diameter through said end, and a wash pipe on said mandrel extending through said bore to form a slip connection therewith, there being relief ducts opening into said chamber adjacent said mandrel for communication between the bore of said pipe and said chamber.

4. A rotary jar comprising a bowl section and a hollow mandrel section longitudinally slidable in the bowl for circulation of fluid therethrough, rotary trip means positionable to hold said sections collapsed and to take a tensile strain and positionable to release said sections, said bowl having a chamber at one end in which said mandrel snugly slides longitudinally and a bore of reduced diameter through said end, and a wash pipe on said mandrel extending through said bore to form a slip connection therewith, said wash pipe having relief ducts adjacent said mandrel for communication between the bore of said pipe and said chamber.

5. A rotary jar comprising a bowl section and a mandrel section longitudinally slidable in the bowl, rotary trip means positionable to hold said sections collapsed and to take a tensile strain and positionable to release said sections, said bowl having a chamber at its top in which said mandrel snugly slides longitudinally and a bore of reduced diameter through the top, a wash pipe on said mandrel extending through said bore to form a slip connection therewith, and a stuffing box in said bowl at said top for packing said wash pipe, said wash pipe having relief ducts adjacent said mandrel for communication between the bore of said pipe and said chamber.

In witness that I claim the foregoing I have hereunto subscribed my name this 16th day of November, 1931.

JAMES A. KAMMERDINER.