

Sept. 30, 1930.

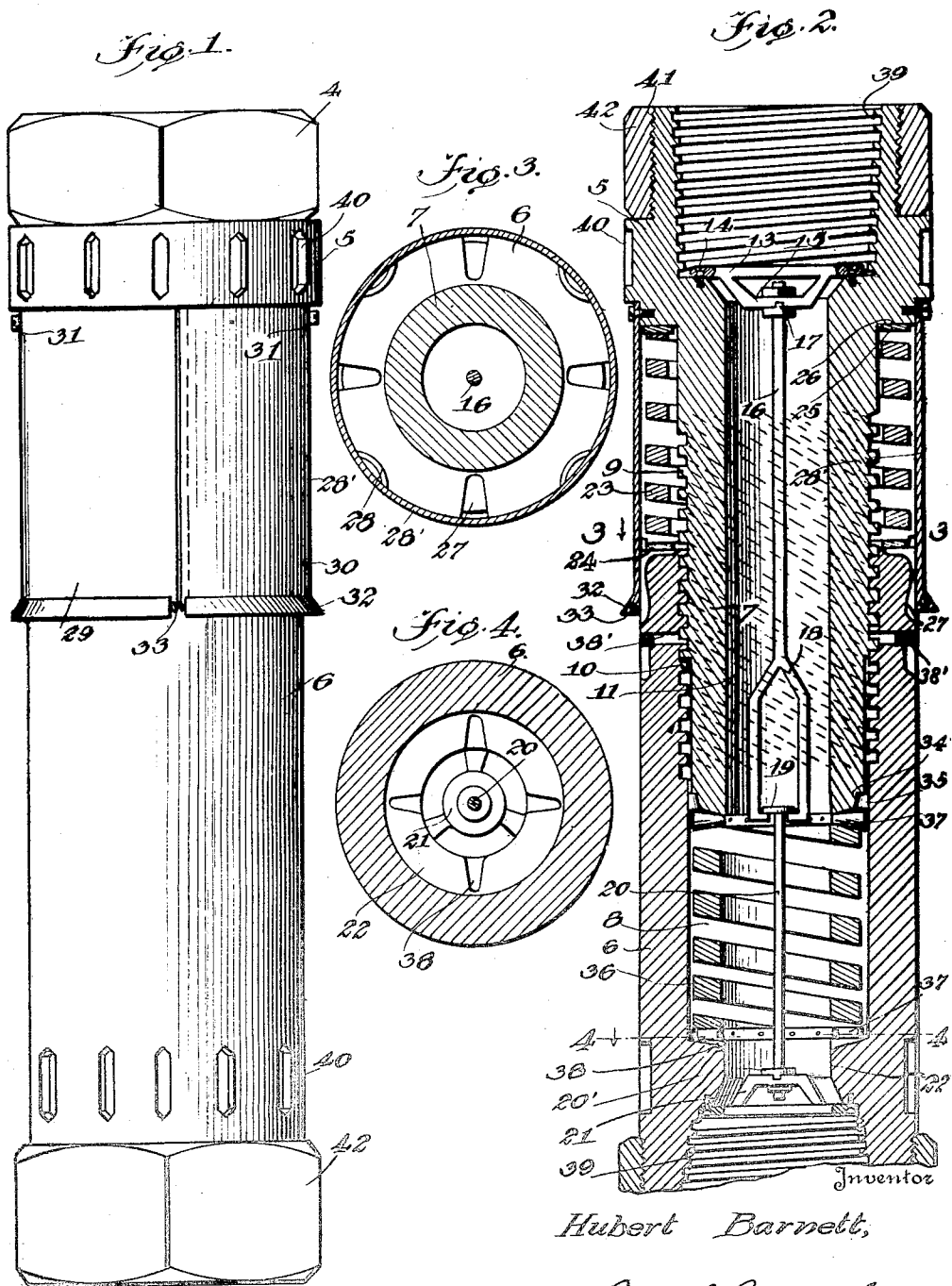
H. BARNETT

1,777,156

DRILLING APPARATUS

Filed Aug. 28, 1926

2 Sheets-Sheet 1



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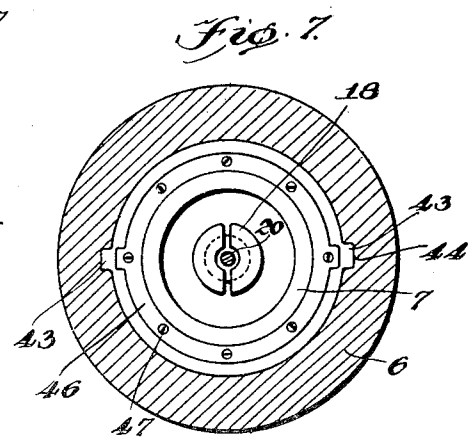
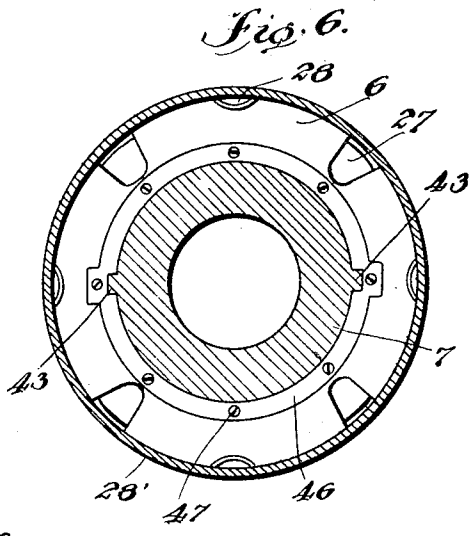
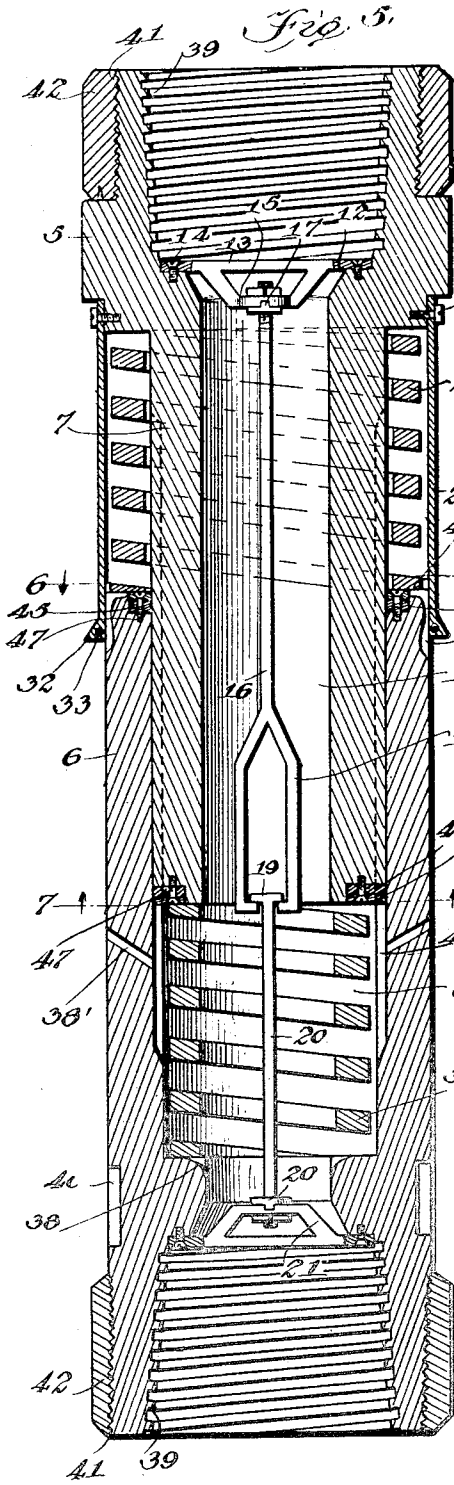
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DRILLING APPARATUS

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2 Sheets-Sheet 2



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UNITED STATES PATENT OFFICE

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DRILLING APPARATUS

Application filed August 22, 1926. Serial No. 132,195.

My invention relates to improvements in drilling apparatus and more particularly to shock-absorbing means for rotary drill pipes or rods.

5 The primary object of the invention is to provide an attachment for drill pipes or rods which will absorb the shocks and torsional strains to which the drill pipe is subjected, when in operation the movement of the drill bit is momentarily or suddenly arrested, thereby, preserving and lengthening the life of the drill pipe and bit.

15 A further object of the invention is to provide a device of the above-mentioned character which will equalize the pressure on the drill bit, increasing the speed of drilling the hole.

20 A still further object of the invention is to provide a device of the above-mentioned character having means for protecting the mechanism from sand and gravel, so its operation will not be impaired.

25 Another object of the invention is to provide a device of the above-mentioned character which is simple and durable in construction, reliable and efficient in operation and inexpensive to manufacture.

30 Other objects and advantages of the invention will be apparent during the course of the following description.

In the accompanying drawings, forming a part of this specification and in which like numerals are employed to designate like parts throughout the same,

35 Fig. 1, is a front elevation of my invention, Fig. 2, is a longitudinal sectional view of the same,

Fig. 3, is a cross sectional view taken on lines 3—3 of Fig. 2,

40 Fig. 4, is a cross sectional view taken on lines 4—4 of Fig. 2,

Fig. 5, is a longitudinal sectional view of a modified form of my invention

45 Fig. 6, is a cross sectional view taken on lines 6—6 of Fig. 5, and,

Fig. 7, is a cross sectional view taken on lines 7—7 of Fig. 5.

50 Referring to the drawings, the numerals 5 and 6 denote upper and lower sections of my attachment, the lower end of the upper

section being reduced, as at 7, and adapted to fit in the bore 8 of the lower section, as shown in Fig. 2. Connection is established between the upper and lower sections by the right handed male screw-thread 9 formed on the outside of the reduced end 7 of the upper section which engages the female screw-thread 10, formed within the bore 8 of the lower section. The upper section is provided with a central bore 11, enlarged at its upper end, forming a shoulder 12, on which the spider 13 rests, being fixedly secured thereto, by screws 14. The spider has a raised bearing plate 15, which extends into the bore 11, to which the upper end of the rod 16 is fastened by the nut lock 17. The lower end of the rod 16 is equipped with an elongated split hollow shell 18, adapted to receive the head 19 at the end of the rod 20, which has its lower end secured by a nut lock 20' to the spider 21, which is secured to the underside of the ledge 22 formed within the lower end of the bore 8 of the lower section, in the same manner as the spider 13. This provides a swivel connection which will expand and contract with the sections and prevents the sections from separating.

A spiral coil spring 23 surrounds the reduced end 7 of the upper section having its lower end bearing against the thrust bearing 24 seated on the upper end of the lower section and its upper end bearing against the thrust bearing 25, positioned against the shoulder 26. Surrounding the outside upper end of the lower section, at spaced intervals, are a series of drain grooves 27 and intermediate the grooves the upper end is provided with a series of raised lips 28 which retain the spring and thrust bearing in proper position, so as not to interfere with the contraction of the sections.

A cover or sleeve 28' composed of sections 29 and 30 encloses the spring 23 and each section is secured at its upper end to the outside of the upper section 5, adjacent the shoulder 26, by screws 31 and extend down over the upper end of the lower section 6. The confronting edges of the sleeve sections are disposed in overlapping relation to permit expansion and contraction. The lower edges of

the sleeve sections are rolled, as at 32, to form a pocket for the reception of the annular spring 33 which normally holds the sleeve in close engagement with the outside of the lower section 6, to keep out sand and gravel.

The lower outside end of the reduced end 7 of the upper section is provided with a beveled groove 34 to receive a packing ring 35 which establishes a tight connection between the reduced end 7 and the bore of the lower section. A second coil spring 36 is interposed between the lower end of the reduced end 7 and the top edge of the ledge 22 and each end of the spring bears against an annular roller thrust bearing 37. The top of the ledge 22 is surrounded by a series of spaced drain grooves 38 similar to the drain grooves 27. A series of oil vents 38' extend through the walls of the lower section 6, for lubricating the screw-threads 9.

The bores of the sections 5 and 6 at their free ends are provided with screw-threads 39 for connection with the drill pipe, not shown. The outside of each section adjacent their ends are provided with wrench openings 40 and their extreme ends are threaded, as at 41, for the attachment of special accessories, and when not in use the threads are covered by the collar 42, screwed thereon.

In Figs. 5, 6 and 7, a modified form of my invention is shown and since the construction of this form is substantially the same as the preferred form, the same reference characters are employed to designate like parts throughout the same. In this form the screw-threaded connection between the upper and lower sections 5 and 6 is replaced by a tongue and groove connection. The reduced end 7 of the upper section has longitudinal ribs 43 formed on opposite sides, which fit in longitudinal grooves 44 formed in opposite sides of the bore 8 of the lower section. The lower end of the reduced end 7 and the upper end of the lower section are recessed around their outer and inner edges, respectively, to form packing grooves 45, adapted to receive suitable packing, retained in the grooves by packing washers 46 secured in place by screws 47. In this form of my invention the thrust bearings of the springs are eliminated.

In use, one or more of my devices are interposed in the drill pipe and may be connected directly with the sections of the pipe or by means of reducers and bushings commonly known in the art. In operation the drill pipe rotates in a clock-wise direction and when the drill bit strikes an obstruction or hard substance causing its movement to be suddenly or momentarily arrested, the sections of my device will contract and the shocks and torsional strains imparted to the drill pipe will be absorbed by the coil springs, the tension of which is sufficient to resist the shocks and strains to which the drill pipe is ordinarily subjected. The expansible sleeve

protecting the parts from interference by sand and gravel and the swivel connection between the sections holding the sections from separating, and the roller bearings permit the sections to freely contract and expand. When the pressure on the drill pipe is released the sections of the device will be automatically returned to their normal positions.

It is to be understood that the form of my invention herewith shown and described is to be taken as a preferred example of the same and that certain changes in the shape, size and arrangement of the parts may be made without departing from the spirit of the invention or the scope of the subjoined claims.

Having thus described my invention, I claim:

1. A device of the character described comprising a pair of tubular sections threadedly connected together, inner and outer springs for resisting the contraction of said sections and an expansible sleeve enclosing said outer spring.

2. A device of the character described comprising a pair of telescoping tubular sections threadedly connected together, a contractible swivel connection joining said sections together, inner and outer springs for resisting the contraction of said sections, and an expansible sleeve for enclosing said outer spring.

3. A device of the character described comprising upper and lower sections, said upper section having a reduced end adapted to fit in said lower section, threads connecting said sections together, a spring surrounding said reduced end having its lower end seated on the upper end of said lower section, an expansible sleeve connected to the upper section enclosing said spring and fitting over the upper end of said lower section, a second spring mounted within said lower section having its upper end bearing against the end of the upper section and a swivel connection joining the upper and lower sections.

4. A device of the character described comprising a body composed of telescoping tubular sections, springs for expanding and resisting contraction of said sections and a contractible swivel connecting said sections and limiting the expansion thereof.

5. A device of the character described comprising a body composed of telescoping tubular sections, springs for expanding and resisting the contraction of said sections, and a contractible swivel within said tubular sections connecting said sections and limiting the expansion thereof.

6. A device of the character described comprising a body composed of telescoping tubular sections, inner and outer springs for resisting the contraction of said sections and

an expansible sleeve enclosing said outer spring.

7. A device of the character described comprising a body composed of upper and lower sections telescopically fitted together, springs for resisting the contraction of said sections, and drain grooves around the upper edge of said lower section.

8. A device of the character described comprising upper and lower tubular sections, said upper section having a reduced end telescopically fitted in the bore of said lower section, springs for resisting the contraction of said sections and an expansible sleeve connected to said upper section and extending down below the upper edge of the lower section.

In testimony whereof I affix my signature.
HUBERT BARNETT.

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