June 3, 1930. J. G. BONE 1,761,292

CORE BARREL

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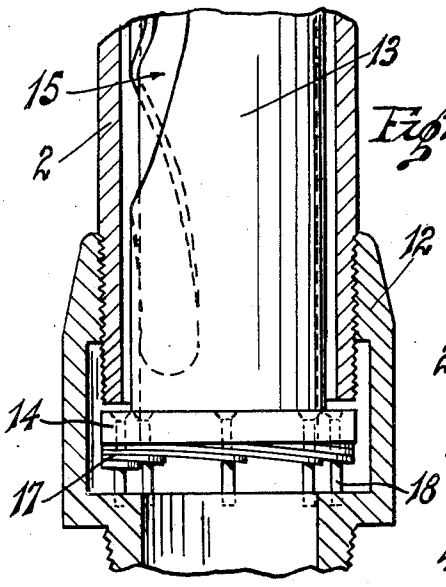

Fig. 4.

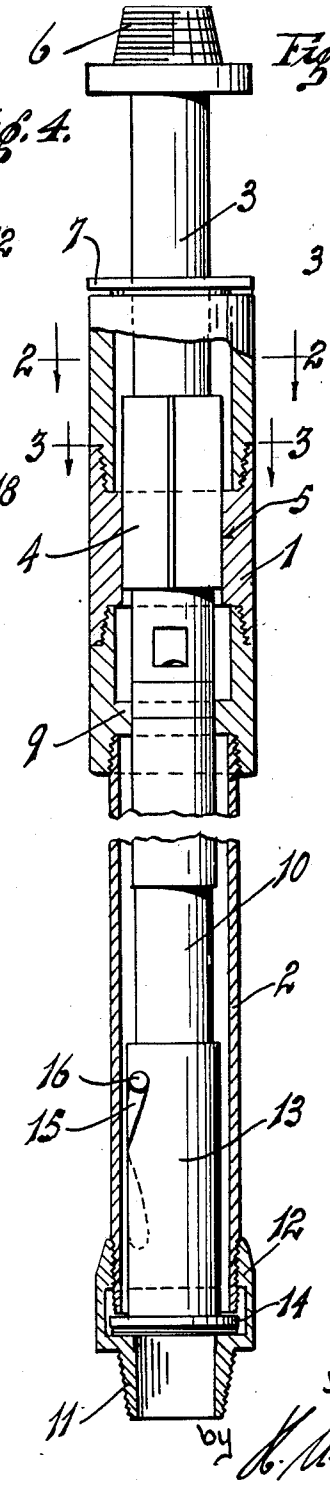

Fig. 1.

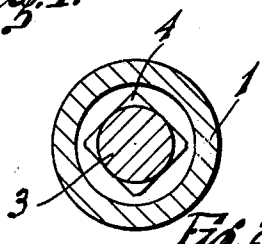

Fig. 2.

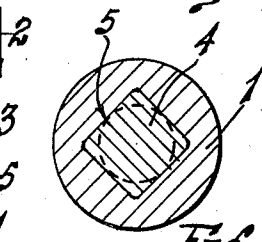

Fig. 3.

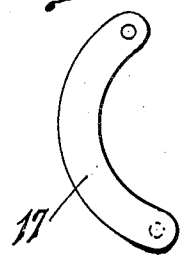

Fig. 5.

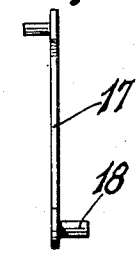

Fig. 6.

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CORE BARREL

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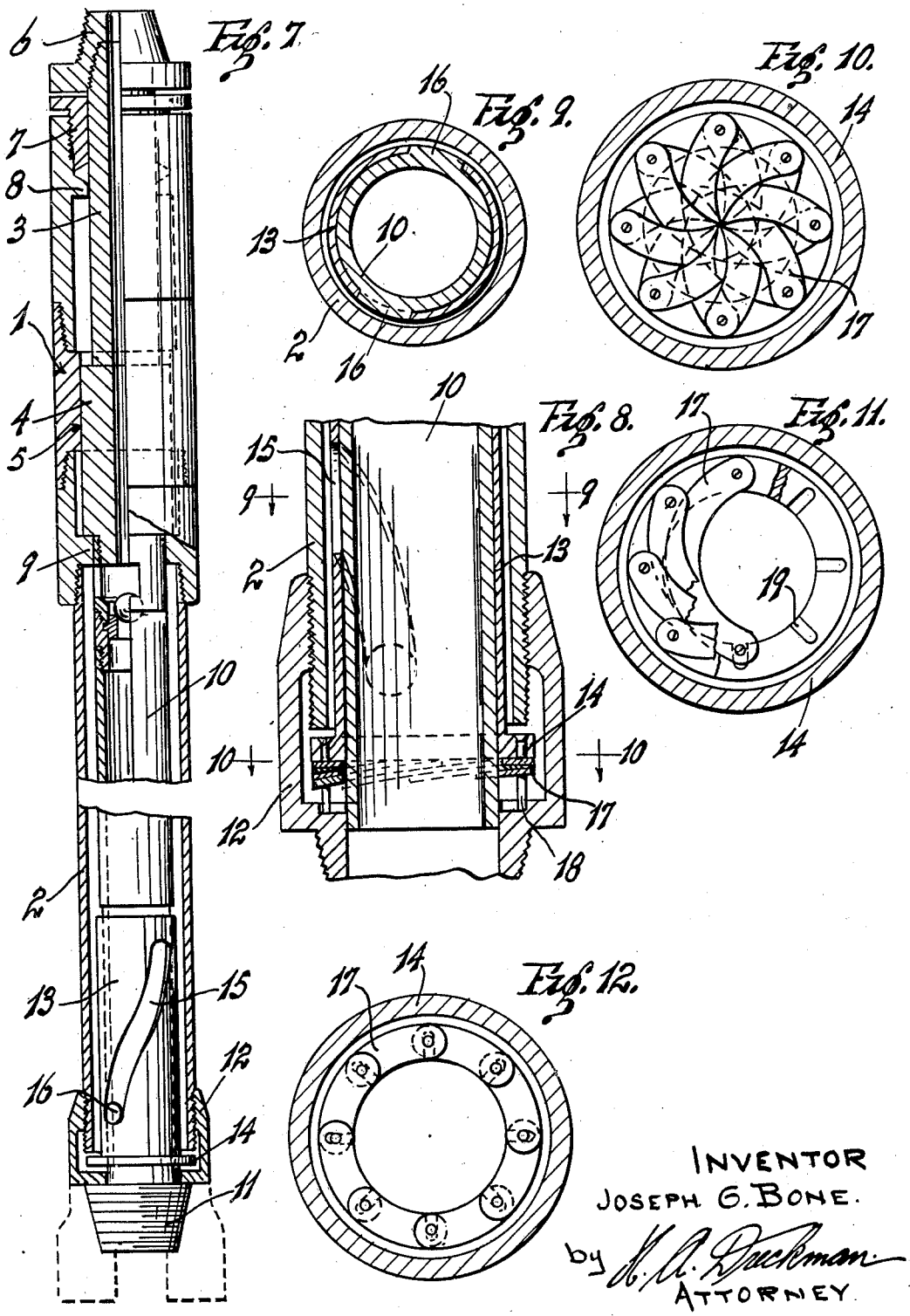

Patented June 3, 1930 1,761,292

UNITED STATES PATENT OFFICE

JOSEPH G. BONE, OF LONG BEACH, CALIFORNIA

CORE BARREL

Application filed August 14, 1929. Serial No. 385,838.

This invention relates to a core barrel particularly useful in obtaining cores during the drilling of an oil well.

The prime object of my invention is to provide a novel means for completely closing the lower end of the barrel as the barrel is lifted off of the bottom of the hole, so that all of the core in the barrel is retained, and can not be lost while the tool is being removed from the well.

Another object is to provide a novel and effective automatic means for closing the lower end of the core barrel as the tool is lifted preparatory to removing the same from the well.

Other objects, advantages and features of invention may appear from the accompanying drawing, the subjoined detailed description and the appended claims.

In the drawing:

Figure 1 is a side elevation of my barrel with parts broken away to show interior construction.

Figure 2 is a sectional view taken on line 2—2 of Figure 1.

Figure 3 is a sectional view taken on line 3—3 of Figure 1.

Figure 4 is an enlarged fragmentary sectional view of the lower part of the barrel.

Figure 5 is a plan view of one of the closure segments.

Figure 6 is an end view of the same.

Figure 7 is a fragmentary longitudinal sectional view of the core barrel.

Figure 8 is an enlarged fragmentary longitudinal sectional view of the lower part of the core barrel.

Figure 9 is a sectional view taken on line 9—9 Figure 8.

Figure 10 is a sectional view taken on line 10—10 Figure 8.

Figure 11 is a sectional view on the same line as Figure 10 with part of the closure segments broken away to show concealed structure.

Figure 12 is a sectional view on the same line as Figure 10 and showing the closure segments in open position.

Referring more particularly to the drawing, the numeral 1 indicates the head of my core barrel, which may consist of a plurality of members, each screwed into the other so as to form the completed head. The purpose of the various pieces is to provide a means of assembling the core barrel. An outer barrel 2 screws into the head 1 and depends therefrom. A mandrel 3 extends into the head 1 and is slidably, but non-rotatably held in the head by means of an elongated squared section 4 which fits into a squared opening 5. A suitable coupling 6 such as a threaded pin is provided on the top of the mandrel 3 whereby the mandrel is coupled to drill pipe or the like.

A packing nut 7 screws into the top of the head 1 and fits around the mandrel to prevent the leakage of fluid downwardly past the mandrel. A shoulder 8 is provided in the head 1 against which the section 4 strikes to limit the upward movement of the mandrel in the head, whereby the entire tool may be removed from the well by lifting upon the mandrel. The downward movement of the mandrel is limited in a similar manner by a shoulder 9 in the lower end of the head.

An inner core retaining barrel 10 screws on to the lower end of the mandrel 3, and said core retaining barrel extends downwardly through the outer barrel 2. A threaded pin 11 or the like is provided on the lower end of the barrel 2, or upon the cage 12 to receive the coring head. This head is of well known and usual construction and forms no part of this invention.

A cage 12 screws on to the lower end of the barrel 2 and fits rather closely around the inner barrel 10. A sleeve 13 is slidably and rotatably mounted upon the barrel 10. The sleeve 13 is provided with a flange 14 on the lower end thereof, which flange extends out-

wardly into the cage 12. This flange serves to limit the longitudinal movement of the sleeve 13 for a purpose to be further described.

A plurality of cam slots 15 are cut through the sleeve 13 and the inner barrel 10 is provided with pins 16 which fit and extend into the slots 15. It will be seen that when the mandrel 3 and inner barrel 10 are raised or lowered, the pins 16 moving in the cam slots 15 will cause the sleeve 13 to rotate. This sleeve must rotate since the mandrel is non-rotatably held in the head. The rotation of the sleeve 13 will cause the bottom of said sleeve to be closed by the following means: A plurality of arcuate closure segments 17 are pivotally secured to the flange 14 at one end thereof, and at the other end of each segment I provide a pin 18 which extends downwardly into a slot 19 in the bottom of the cage 12. Rotation of the sleeve 13 will cause all of the segments to move inwardly upon their pivots in the flange 14 as shown in Figure 10. When the sleeve is rotated in the opposite direction, the segments are all moved into the position shown in Figure 12, thus leaving a non-restricted opening into the inner core retaining barrel.

The raising or lowering of the mandrel 3 will open or close the segments 17 so that the core barrel is free to receive the core during the drilling operations, but it is instantly closed to trap the core when the mandrel is raised to remove the barrel from the well.

Having described my invention, I claim:

1. A core barrel comprising an outer barrel, an inner barrel within said outer barrel, means slidably mounting said inner barrel, pipe coupling means on the top of said inner barrel, a sleeve rotatably mounted on said inner barrel, means coupling said sleeve and inner barrel whereby the sleeve is rotated as the inner barrel is raised or lowered, and means on said sleeve adapted to extend across the inner barrel when said inner barrel is raised.

2. A core barrel comprising a head, an outer barrel depending from the head, a mandrel extending into the head, means slidably and non-rotatably mounting the mandrel in the head, pipe coupling means on the mandrel, an inner barrel depending from the mandrel, said inner barrel extending into the outer barrel, a sleeve slidably and rotatably mounted on the inner barrel, means coupling said sleeve and inner barrel whereby said sleeve is rotated as the inner barrel is raised or lowered, and means mounted on said sleeve extending across the inner barrel when said inner barrel is raised.

3. A core barrel comprising a head, an outer barrel depending from the head, a mandrel extending into the head, means slidably and non-rotatably mounting the mandrel in the head, pipe coupling means on the mandrel, an inner barrel depending from the mandrel, said inner barrel extending into the outer barrel, a sleeve slidably and rotatably mounted on the inner barrel, means coupling said sleeve and inner barrel whereby said sleeve is rotated as the inner barrel is raised or lowered, a plurality of arcuate closure segments pivotally mounted on said sleeve and means pivotally mounting one end of said segments to the outer barrel.

4. A core barrel comprising a head, a mandrel extending into said head, a square section on said mandrel, said head having a square bore to receive the section, an outer barrel depending from the head, an inner barrel depending from the mandrel, a sleeve slidably and rotatably mounted on the inner barrel adjacent the lower end thereof, said sleeve having cam slots formed therein, lugs on the inner barrel fitting into said cam slots whereby the sleeve is rotated when said inner barrel is raised or lowered, and closure means on said sleeve extending across said inner barrel when the inner barrel is raised.

5. A core barrel comprising a head, a mandrel extending into said head, a square section on said mandrel, said head having a square bore to receive the section, an outer barrel depending from the head, an inner barrel depending from the mandrel, a sleeve slidably and rotatably mounted on the inner barrel adjacent the lower end thereof, said sleeve having cam slots formed therein, lugs on the inner barrel fitting into said cam slots whereby the sleeve is rotated when said inner barrel is raised or lowered, a plurality of arcuate closure segments pivotally mounted on said sleeve and means pivotally securing one end of said segments to the outer barrel.

6. A core barrel comprising a head, a mandrel extending into said head, a square section on said mandrel, said head having a square bore to receive the section, an outer barrel depending from the head, an inner barrel depending from the mandrel, a sleeve slidably and rotatably mounted on the inner barrel adjacent the lower end thereof, said sleeve having cam slots formed therein, lugs on the inner barrel fitting into said cam slots whereby the sleeve is rotated when said inner barrel is raised or lowered, a cage secured to the lower end of the outer barrel, a flange on the sleeve extending into the cage whereby the longitudinal movement of the sleeve is limited, a plurality of arcuate closure segments pivotally secured to the flange, at one end thereof, and means pivotally mounting the other end of said segments to the cage.

7. A core barrel comprising a head, a mandrel extending into said head, a square section on said mandrel, said head having a square bore to receive the section, an outer barrel depending from the head, an inner barrel depending from the mandrel, a sleeve slidably and rotatably mounted on the inner

barrel adjacent the lower end thereof, said sleeve having cam slots formed therein, lugs on the inner barrel fitting into said cam slots whereby the sleeve is rotated when said inner barrel is raised or lowered, a cage secured to the lower end of the outer barrel, a flange on the sleeve extending into the cage whereby the longitudinal movement of the sleeve is limited, a plurality of arcuate closure segments pivotally secured to the flange at one end thereof, a pin depending from the free end of each of said segments, said cage having slots formed therein into which said pins extend.

In testimony whereof, I affix my signature.

JOSEPH G. BONE.