O. E. OAKES.

COMPENSATING APPARATUS FOR WELL DIGGING OUTFITS.

APPLICATION FILED JAN. 9, 1919.

1,351,867.

Patented Sept. 7, 1920.

5 SHEETS—SHEET 1.

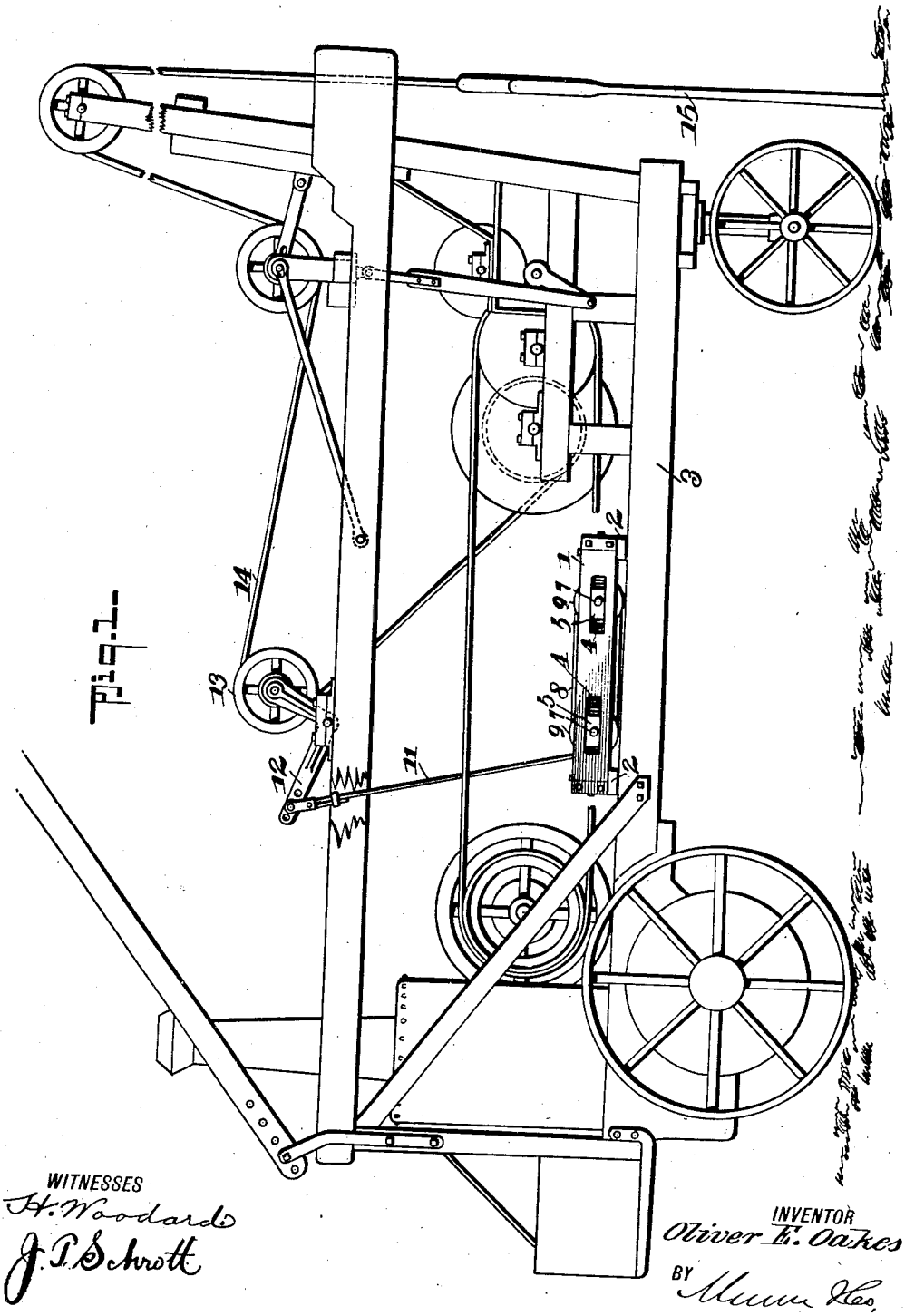


Fig. 1.

WITNESSES

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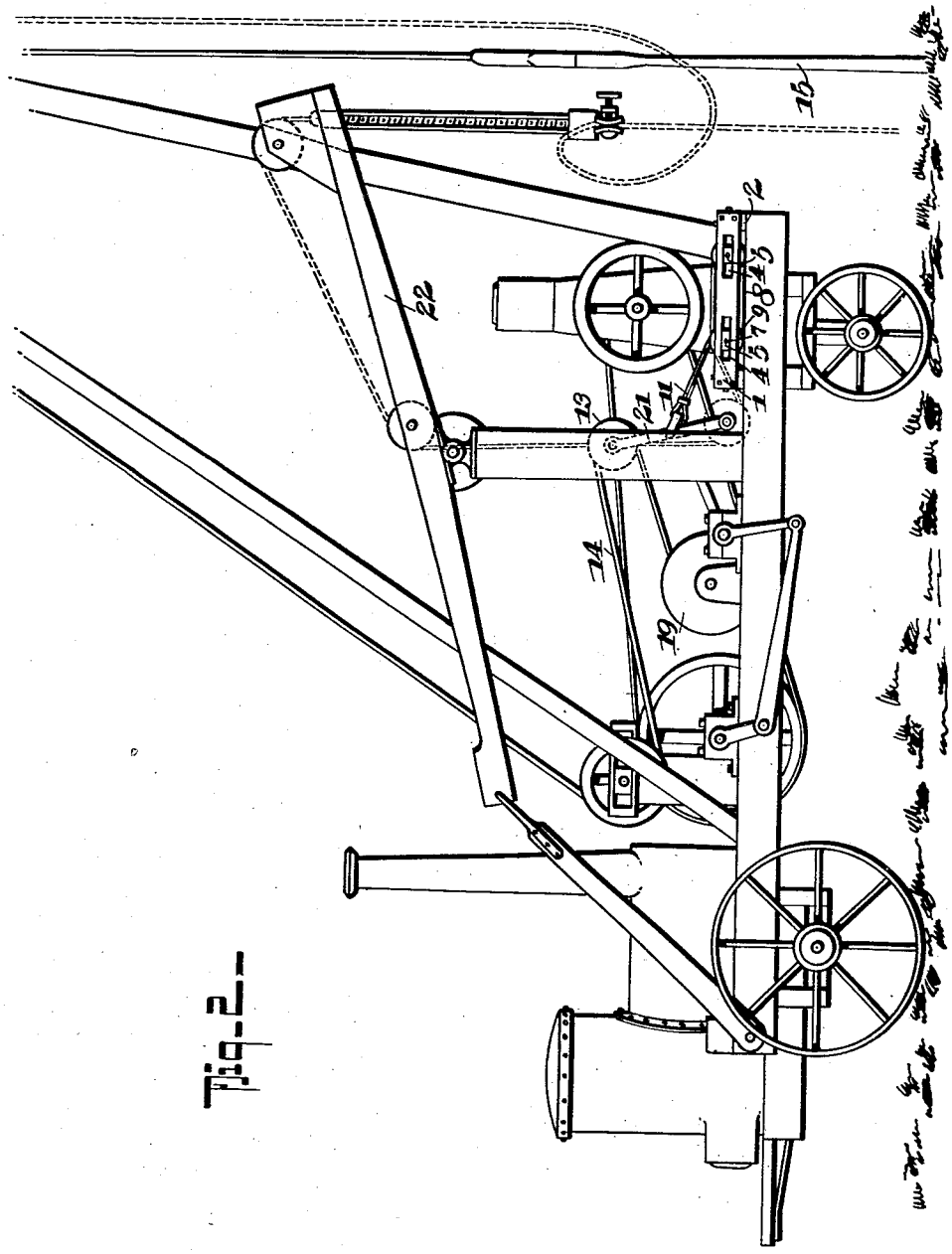


Fig. 2.

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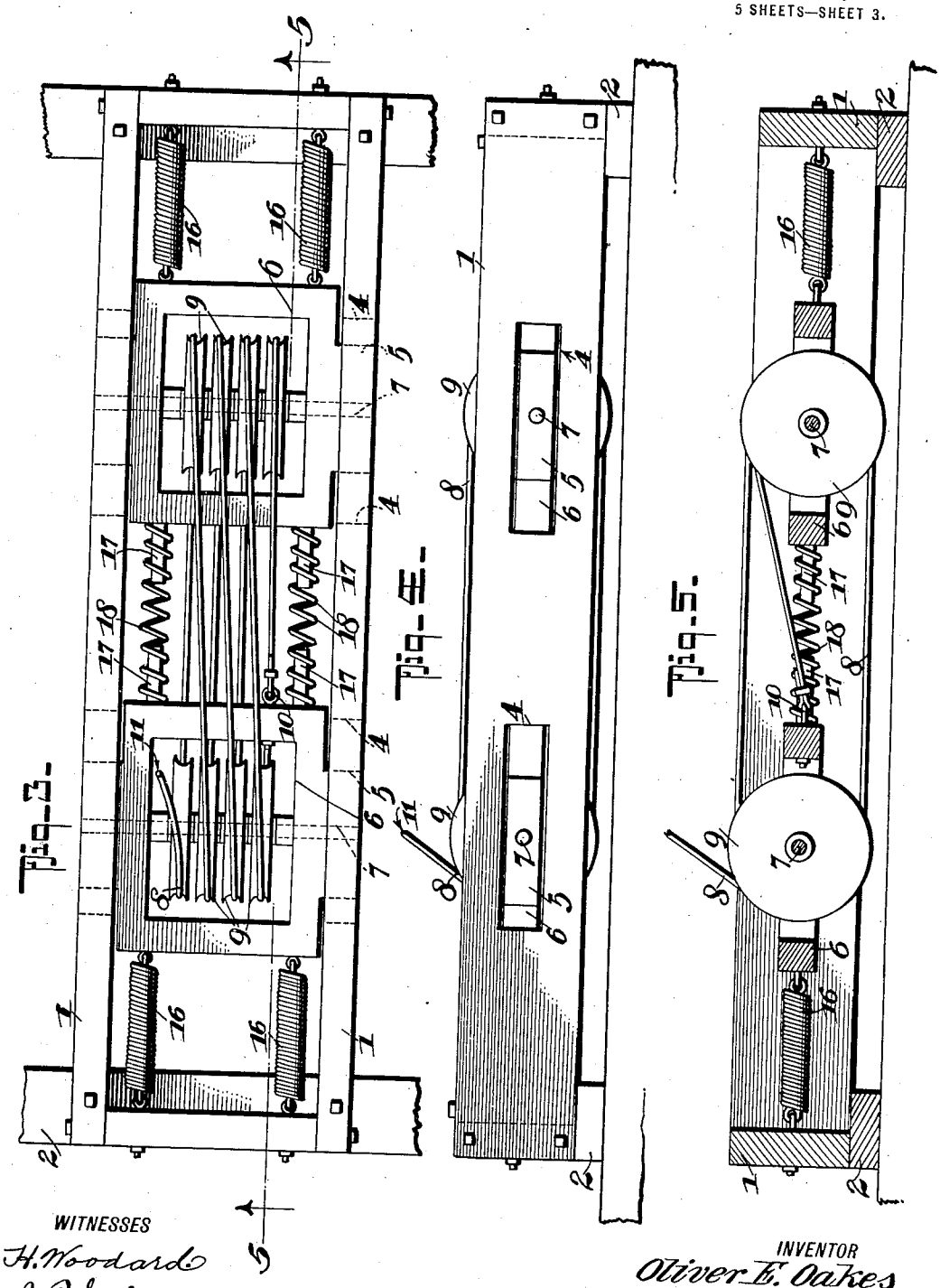


Fig. 3.

Fig. 4.

Fig. 5.

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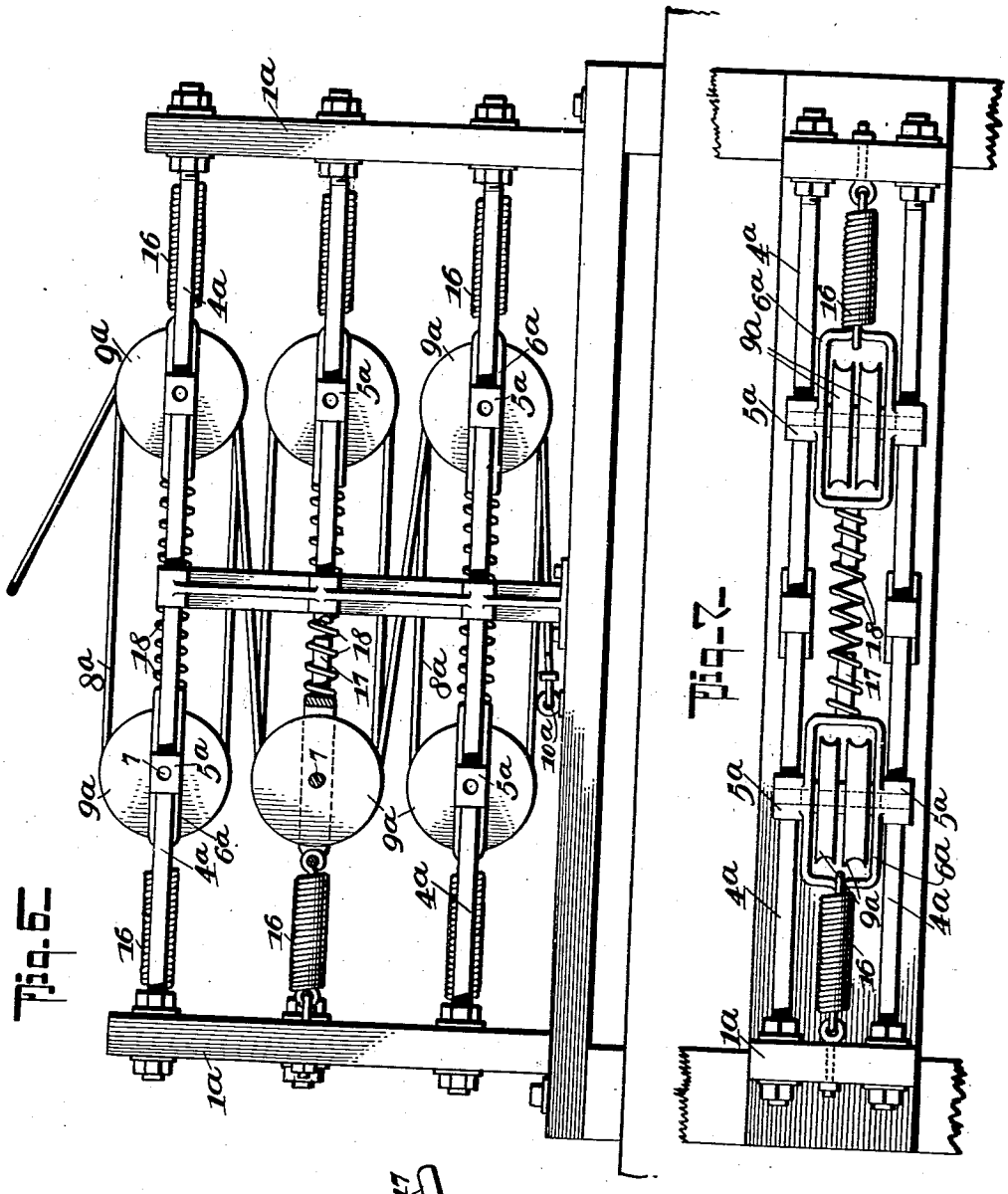


Fig. 6.

Fig. 7.

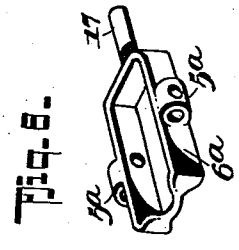


Fig. 8.

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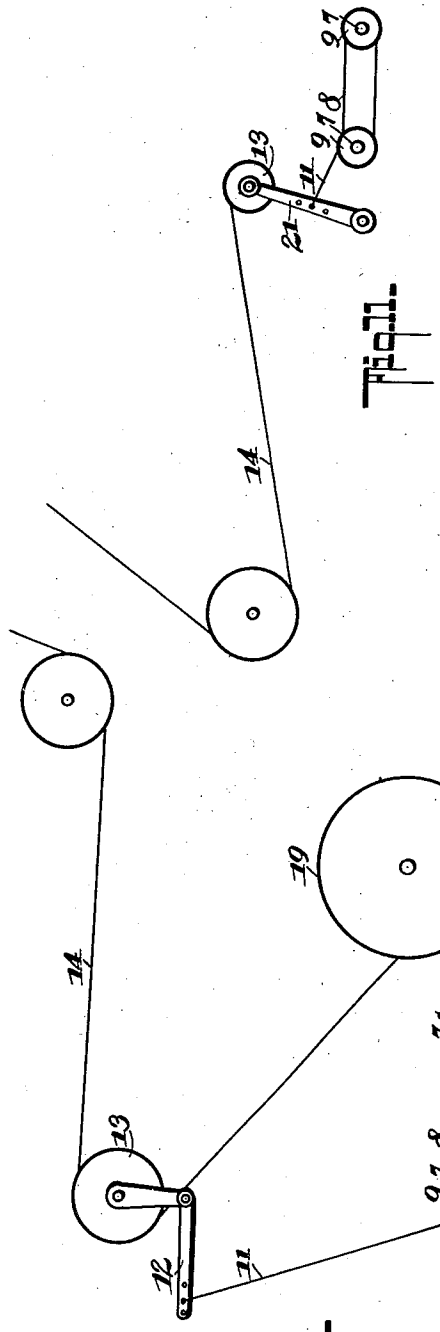


Fig. 11.

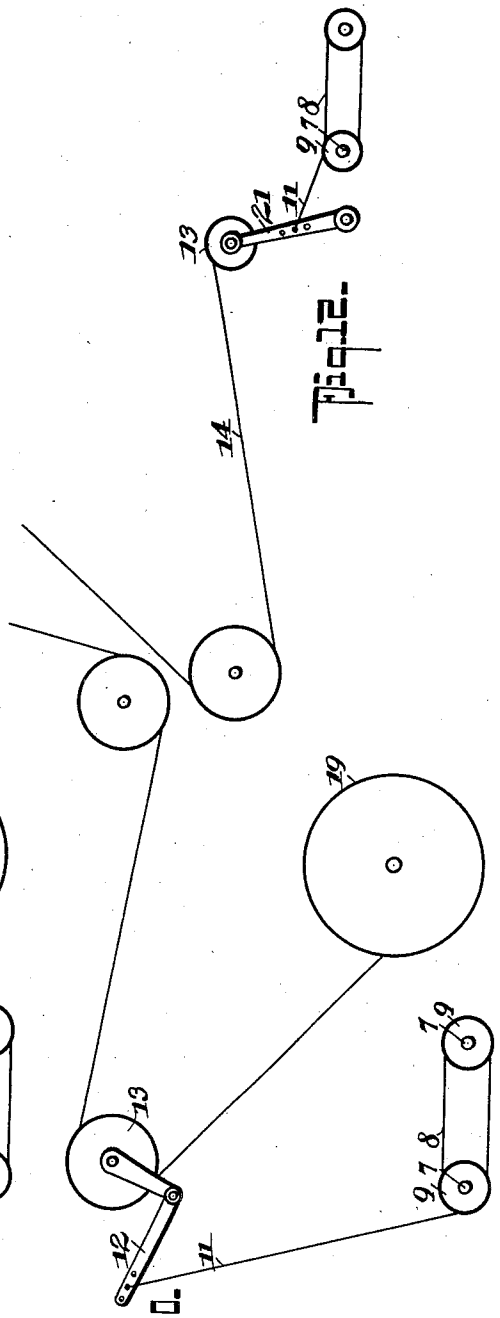


Fig. 12.

Fig. 9.

Fig. 10.

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OLIVER E. OAKES, OF ASBURY, MISSOURI.

COMPENSATING APPARATUS FOR WELL-DIGGING OUTFITS.

1,351,867. Specification of Letters Patent. Patented Sept. 7, 1920.

Application filed January 9, 1919. Serial No. 270,341.

To all whom it may concern:

Be it known that I, OLIVER E. OAKES, a citizen of the United States, and a resident of Asbury, in the county of Jasper and State of Missouri, have invented certain new and useful Improvements in Compensating Apparatus for Well-Digging Outfits, of which the following is a specification.

My invention relates to improvements in well digging outfits, and consists more particularly in providing means in the drill cable for making it resilient to a certain extent, and thus preventing the cable from breaking.

The foremost object of the invention is to enable the use of a single and entire wire drill cable throughout the whole length of the cable line regardless of the depth of the well, by providing a novel compensating or take-up apparatus for rendering the drill cable sufficiently resilient to avoid breakage.

Another and more specific object of the invention is to provide a frame with reciprocably mounted spring-held pulleys, to which a wire line is applied and which is so employed in connection with the drilling outfit that the springs are made to take up shocks and unusual strains in the drill cable to prevent breakage thereof.

Other objects and advantages will appear in the following specification, reference being had to the accompanying drawings in which:—

Figure 1 is a side elevation showing one type of digging outfit and illustrating one way of applying the compensating apparatus,

Fig. 2 is a side elevation of another type of digging outfit and illustrating another way of applying the invention,

Fig. 3 is a plan view of the compensating apparatus,

Fig. 4 is a side elevation thereof,

Fig. 5 is a section on the line 5—5 of Fig. 3,

Fig. 6 is a side elevation illustrating a modification in the construction of the compensating apparatus,

Fig. 7 is a plan view of the mechanism in Fig. 6,

Fig. 8 is a detail perspective view of one of the pulley yokes,

Figs. 9 and 10 are diagrammatic views illustrating various positions of the parts in Fig. 1, and

Figs. 11 and 12 are diagrammatic views illustrating various positions of the parts in Fig. 2.

Before describing the invention, it is thought desirable to explain under what circumstances the compensating apparatus is used and how its development and use came into being. A fact well known to well diggers, is that where the wire drill cable is attached directly to the drill tools, they will not work well and sometimes scarcely at all, unless the well is very deep and the cable long enough to impart a degree of resiliency to the cable by reason of its great length.

It is usually the case however, that the wire cable is too short to show any appreciable sign of resiliency and consequently it not infrequently happens that the machine is wrecked. It is also necessary that the cable possess a certain amount of "spring" or resiliency in order that the drills work properly especially in cutting rock.

The above objection is avoided in some measure by interposing a length of Manila rope, usually about a hundred feet long. This gives the drill cable the required resiliency, but in turn adds another objection in that the Manila rope sometimes breaks, whereupon the time consuming "fishing" operation must be resorted to in order to get the drill tool at the bottom of the well.

The compensating apparatus is applicable to any of the well known types of digging outfits, of which representative forms are shown in Figs. 1 and 2, and it is therefore thought unnecessary to describe any more of the digging outfit structure than relates directly to the invention. Attention is directed to Figs. 1 to 5 inclusive.

The frame 1 of the compensating apparatus is permanently secured to the cross sills 2 of the machine 3. The frame 1 is substantially rectangular in shape as shown, and in the sides has slots or openings 4 which serve as guides and supports for the bosses 5 of the two movable spring frames 6.

A pulley shaft 7 is journaled in any suitable manner in each of the movable spring frames. A wire line 8 is applied to each

of a plurality of pulleys 9 on the respective shafts. One end of the wire line is fastened at 10 to one of the movable frames, and the wire line is thereafter wrapped around the pulleys from one frame to the other, finally terminating in the end 11 which is attached to certain parts of the digging mechanism.

In Fig. 1, the end 11 is attached to the free arm of the bell crank 12. The other arm of the bell crank carries a movable guide pulley 13 around which one bight of the drill cable 14 passes. In the operation of the drill tool 15, the bell crank 12 rocks, the guide pulley 13 oscillates back and forth and the motion is taken up in the compensating apparatus.

The motion in the compensating apparatus is taken up by the springs shown in Fig. 3. Expansion springs 16 are respectively secured to the end rails of the frame 1 and the adjacent cross pieces of the two movable frames 6. Opposed spring guides 17 on the other sides of the movable frames, support compression springs 18. The expansion springs are normally contracted as shown while the compression springs are normally expanded.

It can now be readily understood that as the drill tool 15 moves up and down in the well bore, the movable spring frames 6 will approach toward and recede from each other in accordance with the operation of the drill tool. The respective springs 16 and 18 expand and contract as the wire line 8 is put under tension by the upward rocking of the arm 12.

The movement of the bell crank 12 is illustrated more particularly in Figs. 9 and 10. The drill cable 14 is wound on the rope spool 19, and the various other pulleys to which the drill cable is applied after it leaves the guide pulley 13, are unnecessary to describe in detail.

In Fig. 2 the structure of the compensating apparatus is the same but the matter of application is slightly different. The end 11 is attached to the rocking arm 21 which carries the movable guide pulley 13, around which the drill cable 14 passes.

The arrangement in Fig. 2 is preferred when the digging outfit is used in spudding. At this time the walking beam 22 is not used. After the spudding operation is over, the walking beam is used and the drill cable is applied as indicated in dotted lines. The end 11 is then directed downwardly so that it passes around the guide pulley 13, which for the purpose is changed in position as indicated in dotted lines at the bottom.

The modification in Figs. 6 and 7 does not differ in principle from the form of the invention in Fig. 3. The frame 1^a is disposed vertically instead of horizontally, and the pulleys 9^a are double as shown in Fig. 7 and arranged in three pairs, one above the other. The wire line 8^a is applied similarly as before, with the exception that the end 10^a is fastened to the frame.

In its other respects the device is the same as can be recognized by the similarity of the reference characters, but in place of slots and bosses for guiding the movable frames, the pulley yokes 6^a have tubular guides 5^a that slide on guide rods 4^a.

While the construction and arrangement of the compensating apparatus is that of a generally preferred form, obviously modifications and changes may be made without departing from the spirit of the invention or the scope of the claims.

I claim:—

1. A compensating apparatus for well digging machines, comprising a fixed frame, movable frames guided in said frame, resilient connections respectively between the movable frames and between the movable frames and the fixed frame, and a flexible connection reaching from one movable frame to the other and finally to a movable cable-receiving part of the digging machine, to impart resiliency to said cable by virtue of said resilient connections.

2. In combination with a drill cable, opposed pulley carrying frames guided in their movements toward and from each other, resilient members applied between and to the ends of said frames, and a flexible connection attached to one frame, wound from one pulley frame to the other and finally applied indirectly to the drill cable to impart resiliency thereto.

3. The combination, of a fixed frame including side members providing longitudinal guides, opposed frames each carrying a plurality of pulleys and operating in said guides, a flexible connection fixed at one end and threaded back and forth over the pulleys of the respective opposed frames, compression springs between the opposed frames, and expansion springs between said frames and adjacent parts of the fixed frame.

4. A compensating apparatus for well digging machines, comprising a fixed frame with guide means, movable frames with portions applied to said guide means, loosely mounted pulleys carried by the movable frames, resilient connections for the movable frames comprising compression springs between the frames and expansion springs between the frames and the ends of the fixed frame, and a flexible connection fixed at one end, then applied to the respective pulleys of the movable frames and finally attached at the free end to a movable cable-receiving part of the digging machine.

5. A compensating apparatus for well digging machines, comprising a fixed frame consisting of ends, and sides with guide slots; opposed movable frames with portions extending into the slots for guidance and

support, a plurality of pulleys loosely journaled in each movable frame, normally expanded compression springs between the opposed movable frames, means for guiding and supporting said springs, normally contracted expansion springs attached between the ends of the movable frames and the ends of the fixed frame, and a flexible connection fixed at one end to one of the frames, successively applied to the pulleys of each movable frame and arranged to be attached at the free end to a movable cable-receiving part of the digging machine.

OLIVER E. OAKES.