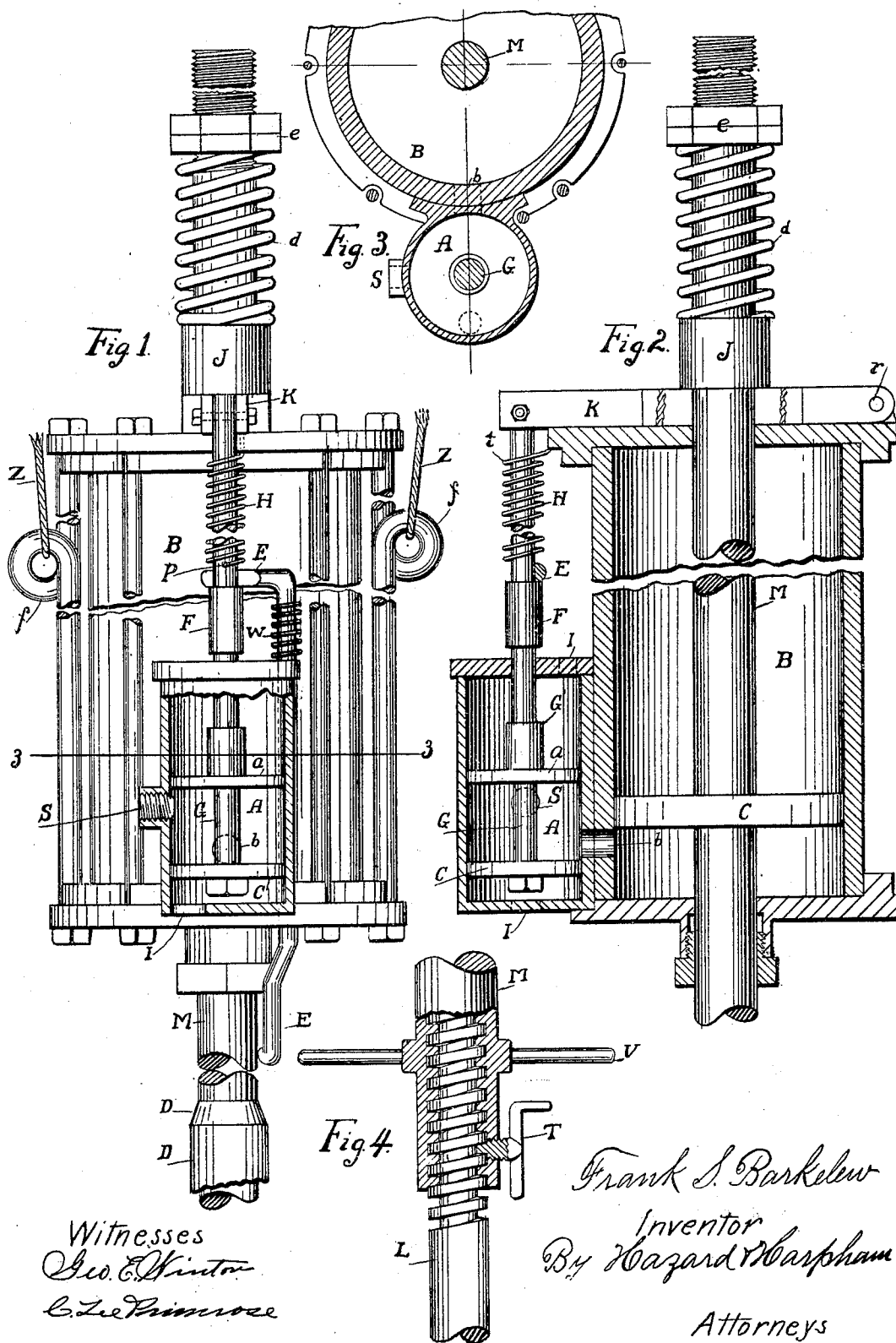


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STEAM MOTOR FOR OPERATING TOOLS IN DRILLING RIGS.

APPLICATION FILED AUG. 3, 1903.



Witnesses
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STEAM-MOTOR FOR OPERATING TOOLS IN DRILLING-RIGS.

SPECIFICATION forming part of Letters Patent No. 795,017, dated July 18, 1905.

Application filed August 3, 1903. Serial No. 168,113.

REISSUED

To all whom it may concern:

Be it known that I, FRANK S. BARKELEW, a citizen of the United States, residing at Los Angeles, in the county of Los Angeles and State of California, have invented new and useful Improvements in Steam-Motors for Operating Tools in Drilling-Rigs, of which the following is a specification.

My invention relates more particularly to the means whereby the drilling-bit is elevated in drilling wells; and the object of my invention is to provide a motor for operating drilling-rigs in which the steam is employed directly to elevate the drilling-tool. I accomplish this object by means of the device described herein and shown in the accompanying drawings, in which—

Figure 1 is a side elevation of my drill-operating device. Fig. 2 is a central vertical longitudinal section, and Fig. 3 is a transverse section taken on line 3 3 of Fig. 1. Fig. 4 is a fragment of the lower end of the piston-rod and the upper end of the temper-screw.

The device is secured to the drilling rig or derrick by the ropes *Z*, Fig. 1, secured to eye-lets *f* on the device, the drilling-bit (not shown) being secured in the usual manner to the temper-screw *L*. When in this condition, steam connection is made with the port *S*, whereby live steam is fed into the primary cylinder *A* (having an opening in the top and bottom for the escape of steam) between the pistons *a* and *c* on the stem *G*, and the steam passes thence through the port *b* under the piston *C* on the piston-rod *M* into the cylinder *B*. This will cause the piston *C* on the rod *M* to move up and carry with it the temper-screw *L* and the attached drilling-bit. As the piston-rod *M* moves up it will carry with it the lock-nuts *e*, which form the upper seat of the spiral spring *d*, the lower end of the spring *d* resting on the sleeve *J*, loose on the piston-rod *M*.

On the right-hand side and at the upper end of the cylinder *B* is pivoted the lever *K*, as at *r*. To the free end of this lever is pivotally secured the piston-rod *G*, upon which is mounted the pistons *a* and *c*. On the upper head of the cylinder *B*, as at *t*, the spiral

spring *H*, surrounding the piston-rod *G*, is secured. The lower end of this spring is secured to the stem *G*, as at *p*. The tendency of this spring is to elevate the piston-rod *G*. Below the point where the spring *H* is secured to the rod *G* is keyed a sleeve *F*.

Mounted on the side of the primary cylinder is rotatably secured the trip-rod *E*. Coiled around the upper part thereof is the spring *W*, the tendency of which is to cause the horizontal portion *E'* of the trip-rod to contact with the piston-rod *G* above the sleeve *F* and is normally held in contact with the piston-rod *G* by this spring. The trip-rod is thrown out of engagement therewith as the piston *C* in the main cylinder moves up, carrying with it the cone-shaped sleeve *D*, adjustably mounted on the piston-rod *M*. The upper cone-shaped portion *D'* of the sleeve *D* engages with the rounded lower end of the trip-rod *E*. This will operate to throw the upper horizontal portion of the trip-rod *E'* away from the stem and off the collar *F*, which will permit the spring *H* to raise the piston-stem *G*, secured thereto.

When the piston *C* moves up after the admission of steam into the cylinder *B*, the lock-nuts *e*, forming the upper seat of the spring *d*, will permit the sleeve *J* to move up. When the tension on the spring *d* is removed, the spring *H*, acting on the piston-stem *G*, pivoted to the free end of the lever *K*, will cause the free end of the lever to move up, carrying with it the piston-rod *G* and the pistons *a* and *c* thereon. This spring will move the piston-stem *G* up until the shoulder *G'* on the piston-stem contacts with the upper head of the primary cylinder, and thereby limit the upward stroke of the pistons *a* and *c*. Thus it will be seen that when the shoulder *G'* is in contact with the upper head of the cylinder the lower piston *c* will rest between the ports *S* and *b* and while in this position the steam will exhaust from the cylinder *B* through the ports *I* and *b*. When in this position, the steam having been removed from below the piston *C*, the weight of the tool and temper-screw secured thereto will carry the piston down, and with it the piston in the primary cyl-

inder will assume the position shown in Fig. 2, when steam will again be fed into the cylinder B and again raise the piston C, when the operation is repeated. The lock-nuts 5 *e* on the piston-rod M may be adjusted as to height so as to regulate the time when steam is readmitted into the cylinder B. In operating the rig the usual handles V are rigidly affixed to the piston M, and in rotating 10 the handles the piston C turns with it. The lower part of the piston-rod M is screw-threaded for the reception of the temper-screw L. I have shown the usual set-screw T, by means of which the temper-screw and 15 the piston-rod are rigidly secured together during the operation of drilling, the temper-screw being released when it is desired to drop the drilling-bit farther down.

Having described my invention, what I 20 claim as new, and desire to secure by Letters Patent, is—

The herein-described means to operate the

drilling-tool in a drilling-rig comprising the following elements in combination; the cylinders A and B the port *b* leading from one 25 cylinder to the other, the piston-stem M having piston C thereon in the cylinder B, the piston-stem G having pistons *a* and *c* thereon; and provided with fixed sleeve F thereon; the steam-inlet port S communicating 30 with the cylinder A, the spiral spring *d* on the piston-rod M mounted as shown and described; the spiral spring H mounted on the piston-stem G as shown and described, the trip-rod E revolubly mounted on the frame, 35 the spring W, and the adjustable cone-shaped sleeve D.

In witness that I claim the foregoing I have hereunto subscribed my name this 23d day of July, 1903.

FRANK S. BARKELEW.

Witnesses:

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