(No Model.)

W. H. EDWARDS.

CASING SPEAR FOR WELLS.

No. 395,318. Patented Jan. 1, 1889.

Fig. 1.

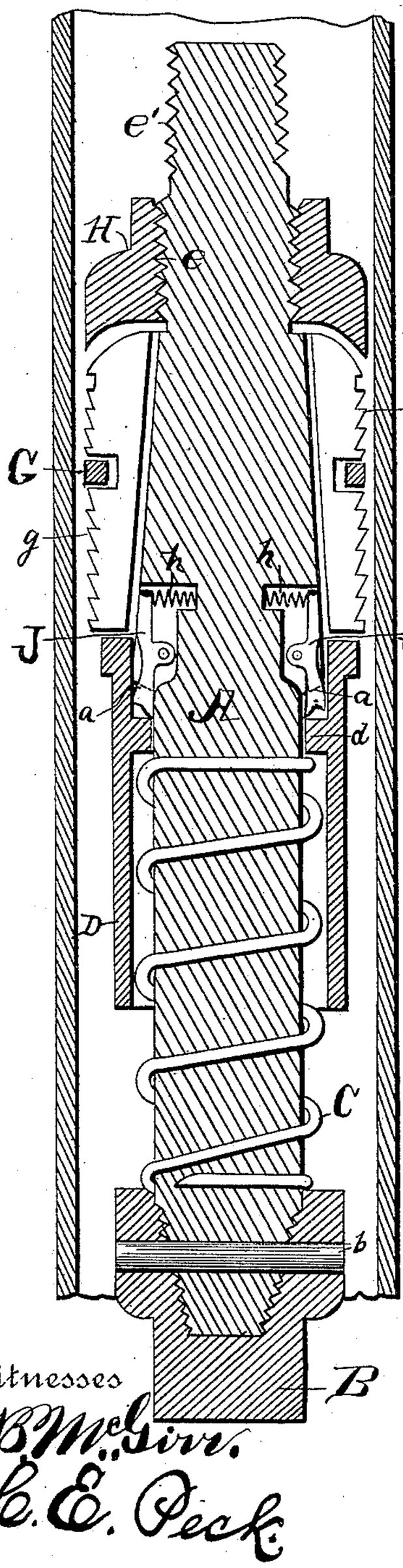
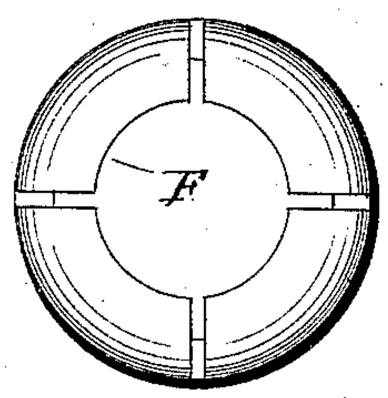


Fig. 3.



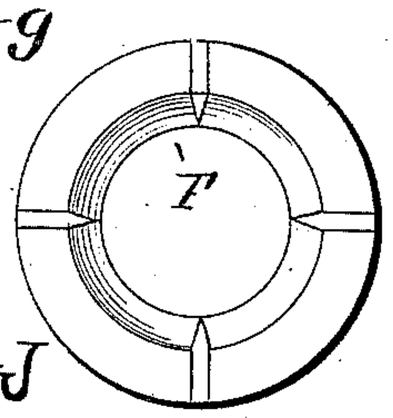
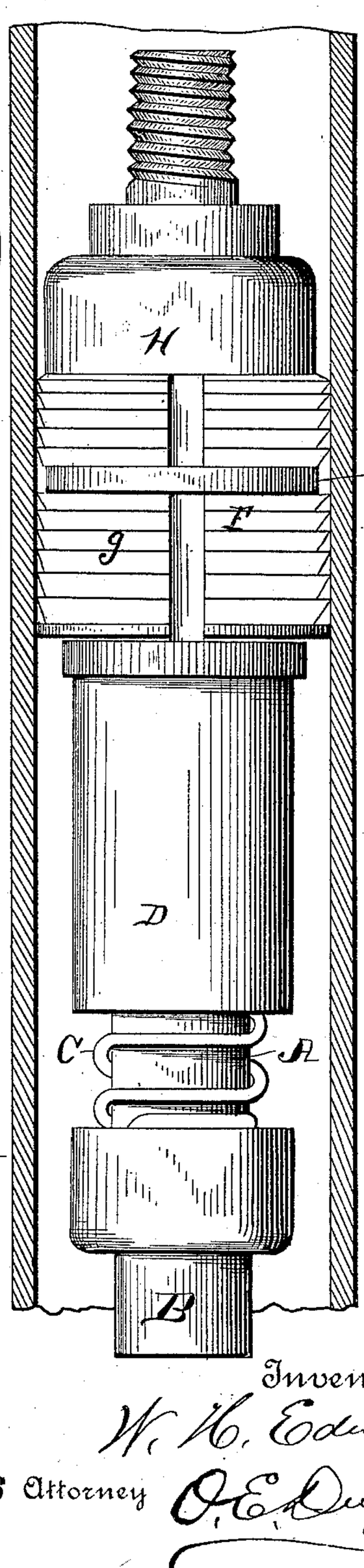


Fig. 4.

Fig. 2.



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UNITED STATES PATENT OFFICE.

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CASING-SPEAR FOR WELLS.

SPECIFICATION forming part of Letters Patent No. 395,318, dated January 1, 1889.

Application filed April 16, 1888. Serial No. 270,772. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM H. EDWARDS, of Foxburg, in the county of Clarion and State of Pennsylvania, have invented certain new and useful Improvements in Casing-Spears for Wells; and I do hereby declare that following is a full, clear, and exact description of the invention, which will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form part of this specification.

My invention relates to an improvement in casing-spears for removing the casings of Artesian or similar wells.

The object of my invention is to provide an improved casing-spear which shall be extremely simple and cheap in construction, effective and reliable in operation, and which can be released from its hold in the casing at any time during the operation of pulling or extracting the casing by throwing the slips or wickers from engagement with the casing by the action of a spring.

With these ends in view my invention consists in certain novel features of construction and combinations of parts, more fully described hereinafter, and particularly pointed out in the claims.

Referring to the accompanying drawings, Figure 1 is a central longitudinal section of the casing-spear, showing a portion of a well-casing in section. Fig. 2 is a side elevation of the device, showing a portion of a well-casing in section. Fig. 3 is a detail top plan of the expansible slips or wickers, and Fig. 4 is a detail elevation of the opposite end of the same.

In the drawings, the reference-letter A indicates the main stem or central mandrel of the spear, the lower end of which is preferably cone-shaped and screw-threaded to receive the internally-threaded portion of a cap or sleeve, B, rigidly secured to said cone-shaped end by means of a pin, *b*, passing through the cap and mandrel, and provided with a nut on its lower end. A coiled spring, C, embraces the lower portion of the central mandrel and bears at its lower end against the upper face of the cap B, while its opposite end is surrounded by a cylindrical sleeve, D, loosely embracing the mandrel, and provided near its upper interior with an internal annular flange or projection, *d*, against which the opposite or upper end of the spring bears. Thus the spring tends to constantly force the sleeve D upwardly on the mandrel to the limit of its movement in that direction.

The lower portion of the main stem or mandrel which is embraced by the coil-spring is cylindrical and preferably of uniform diameter, while the upper portion of the mandrel is enlarged in diameter at the upper end of the cylindrical portion to form the shoulder *a*, forming the limit of upward movement of and against which the internal flange, *d*, is normally forced by the pressure of the spring. The portion of the mandrel above the spring is tapered upwardly from its enlarged portion, and the upper end thereof above the taper is provided with screw-threaded portions *e e'*, for the purpose hereinafter to appear.

Expansible slips or wickers F are mounted upon the upwardly-tapered portions of the mandrel, and said wickers consist of four (a greater or less number can be employed) oblong segmental pieces or slips provided upon their convex outer surfaces with the upwardly-extending serrations or teeth *g*, adapted to engage and bite into the inner periphery of the casing to be pulled, and the inner face of each slip or wicker is transversely concaved and longitudinally reduced, so that when the slips are placed upon the tapered portion their inner faces will fit snugly on the periphery of the mandrel. The circumferential series of segmental pieces which compose the expansible slips are longitudinally placed around the tapered portion of the mandrel, side by side, and said oblong slips are expansibly held together and upon the mandrel by a ring, G, passing around the same and confined in transverse slots correspondingly located in the outer surface of each oblong piece.

The connecting-ring G should be of such diameter and thickness and the different sections of the wickers of such width that the sections will be correspondingly drawn toward or thrown from each other and the general circumference of the wickers increased or diminished as they are moved longitudinally up or down on the tapered portion.

The lower ends of the slips or wickers nor-

mally rest upon the upper edge of the sleeve D, and their upward movement is limited by a sleeve or nut, H, internally screw-threaded and screwed upon the lower screw-threaded portion, *e*, of the mandrel, thus loosely securing the slips upon the tapered portion.

The upper or lower faces of the nuts or sleeves H and B are rounded, as shown, to allow the spear to pass freely through the casing if it be filled with water or other fluid.

One or more spring-actuated catches or dogs, J J, are pivoted upon opposite sides of the mandrel, and are adapted to engage the upper edge of the sleeve and hold the same when it has been forced downwardly a suitable distance against the tension of the spring. These dogs J J are pivoted in slots or apertures in the opposite sides of the tapered portion, preferably, so that their lower free ends will extend to or nearly to the shoulder *a* at the lower end of the taper, and the same are pivoted at or about their longitudinal centers, with their locking or engaging ends extending downwardly and their outer edges lying about flush with the outer surface of the taper of the mandrel. The locking or engaging ends of the catches are constantly forced outward by the tension of springs *h*, interposed between the dogs and the bottoms of the slots in which the same are pivoted.

It should be observed that the nut H limits the upward movement of the wickers, that the upper edge of the movable collar or sleeve D limits the downward movement of the same, and that the projection *d*, against which the spring bears, is so located that when bearing against the shoulder *a* the upper portion of sleeve D will extend a suitable distance over the larger portion of the taper, and thus contract the wickers by confining them to the smaller portion of the taper. When the device is "set," the sleeve D is forced down and held off of the taper by the spring dogs or catches, thereby allowing the wickers free longitudinal movement upon the same from the larger portion of the taper to the smaller portion thereof.

In operation, before the spear is inserted in a casing to withdraw the same it should be set by forcing the sleeve D downward against the tension of the spring and until its upper edge passes below the locking ends of the dogs, which ends, the moment the sleeve releases them, will spring out and hold the sleeve removably depressed, and thereby allow the wickers free play upon the taper of the stem, gravity, of course, tending to removably hold them upon the larger portion of the taper bearing upon the sleeve. The jarring or other tool is secured to the spear by means of the threads *e'* of the stem, and as the spear is being inserted in the casing the wickers rise upon the tapers of the stem and are momentarily contracted to allow the free downward passage of the spear; but as soon as upward strain is exerted upon the spear the wickers are forced downward and expanded, and their teeth bite into the casing, thus causing the wickers to bear downwardly upon the sleeve with sufficient pressure to force it downward out of engagement with the dogs, and the spring is free to operate on the slips.

If when the spear is in the casing operating to withdraw the same it is desired to throw the slips out of engagement with and withdraw the spear from the casing, the main stem should be suddenly and quickly thrust or jarred downward, which will for the instant loosen the hold of the slips on the casing, and the moment the slips are loosened the spring, constantly pressing upward against the same, will push the slips from the large to the small or upper portion of the taper, and thus contract or draw each slip inward out of engagement with the casing, and in which position they are held by the pressure of the spring, and the spear will readily slide from the casing. When the spear is thus disengaged from the casing, the spring forces the sleeve upwardly so suddenly and rapidly that the spring-dogs do not have a chance to engage the upper edge of the same and hold the sleeve depressed.

It is evident that the sleeve embracing part of the length of the spring serves to protect the same; and it is also evident that various slight changes might be resorted to in the form and arrangement of the parts described without departing from the spirit and scope of my invention; hence I do not wish to limit myself strictly to the precise construction herein set forth, but consider myself entitled to all such slight changes as fall within the spirit and scope of my invention.

What I claim as new is—

1. A casing-spear comprising a central stem or mandrel provided with a tapered portion, expansible slips or wickers movably confined on the tapered portion, a spring-actuated sleeve longitudinally movable on the stem and normally tending to force the slips from the larger portion of the taper, and one or more dogs or catches adapted to detachably hold the sleeve in a depressed position, for the purpose described.

2. In a casing-spear, the combination, with a central stem provided with a tapered portion, of slips loosely confined on said taper, a sleeve embracing the stem below the taper and provided with an internal flange, and a spring embracing the lower part of the stem and partly surrounded by the sleeve and bearing against the internal flange, substantially as described.

3. A casing-spear comprising a main stem provided with an upwardly-tapered portion, slips longitudinally movable on the taper and loosely and expansibly confined on the same, a collar or sleeve longitudinally movable on the stem and independent of and normally tending to force the slips from the larger portion of the taper, and a spring embracing the

stem and exerting a constant upward pressure upon the sleeve, for the purpose set forth.

4. In a casing-spear, the combination, with a main stem having an upwardly-extending taper, of expansible slips separate from other parts and confined on the taper and having a longitudinal movement thereon, and comprising a circumferential series of separate and independent rectangular pieces, and a ring loosely surrounding the same, by which they are expansibly and movably confined on the taper, substantially as described.

In testimony that I claim the foregoing as my own I affix my signature in presence of two witnesses.

W. H. EDWARDS.

Witnesses:
STEPHEN RAPP,
F. L. HARVEY.