

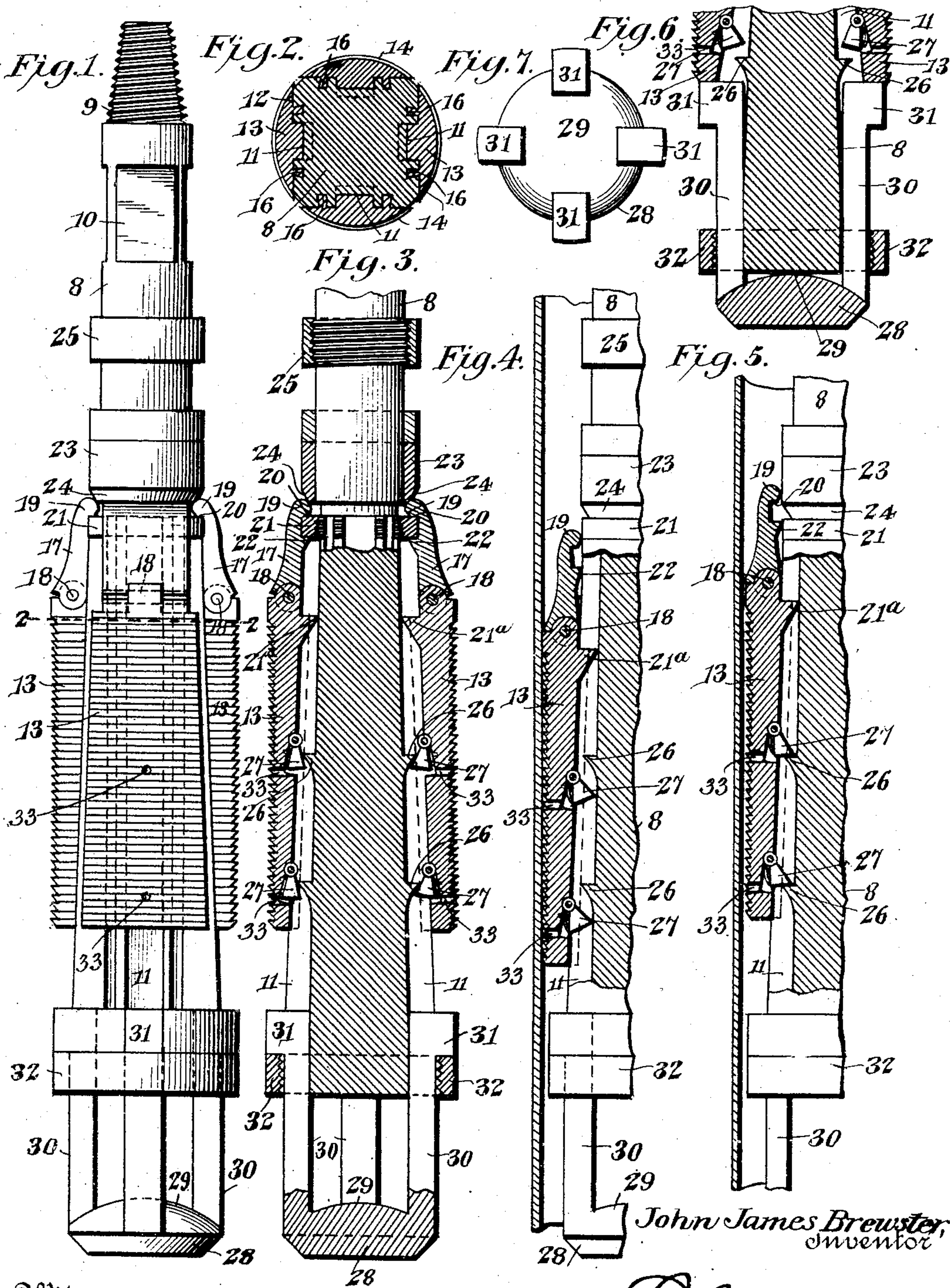
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J. J. BREWSTER.

CASING SPEAR.

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CASING-SPEAR.

SPECIFICATION forming part of Letters Patent No. 786,480, dated April 4, 1905.

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To all whom it may concern:

Be it known that I, JOHN JAMES BREWSTER, a British subject, residing at San Francisco, in the county of San Francisco and State of California, have invented a new and useful Casing-Spear, of which the following is a specification.

This invention relates to that class of implements employed in driven wells and adapted to engage the tubing or casing for the purpose of starting or pulling the same.

The object is to provide a novel structure of a simple character which will operate efficiently to grip the casing when the desired position of the tool has been reached, which can be readily disengaged therefrom and withdrawn from the well when desired, and if accidentally or from any cause lowered to the bottom of the well and locked can be released and removed.

The preferred embodiment of the invention is illustrated in the accompanying drawings and is described in the following specification. An inspection of the claims heretopended will clearly indicate, however, that the invention is not limited to the structure shown and described, but is open to various changes and modifications.

In the drawings, Figure 1 is a side elevation of the spear when in condition to be lowered into a well. Fig. 2 is a cross-sectional view of the same, taken on the line 2 2 of Fig. 1. Fig. 3 is a longitudinal sectional view. Fig. 4 is a detail sectional view showing one of the section-jaws when in engagement with the casing. Fig. 5 is a similar view showing the jaw when relocked out of engagement with the tube or casing. Fig. 6 is a detail sectional view through the lower portion of the instrument, illustrating the head elevated and contracted by the depending elevating device; and Fig. 7 is a top plan view of said device.

Similar reference-numerals indicate corresponding parts in all the figures of the drawings.

In the embodiment illustrated a support in the form of a stem 8 is employed, the upper end of which is provided with a tapering threaded nipple 9, said stem below the nipple being provided with angular faces 10 to receive a wrench or other tool. The lower por-

tion of the stem is angular in cross-section, as shown in Fig. 2, and tapers upwardly, as illustrated. The various sides are provided with centrally-disposed channels 11, that extend longitudinally of the stem and are located between undercut longitudinally-disposed guideways 12. These channels and guideways preferably extend to the bottom of the stem.

An expansible head is employed consisting of independent section-jaws 13, the outer faces of which are curved and provided with transversely-disposed teeth 14, the inner sides having longitudinally-disposed dovetailed ribs 16, that engage in the guideways 12. It will thus be apparent that when the sections move downwardly they will also move outwardly, and thus the head will be expanded. On the other hand, when said sections move upwardly they will also be moved inwardly, and consequently the head will be contracted. For the purpose of holding the head in contracted condition each section carries at its upper end a hook 17, that is pivoted thereto, as shown at 18, and has an overhanging bill 19 at its upper end, which bill is preferably provided with a curved upper edge. The bills are adapted to engage over an annular shoulder 20, formed upon the stem by the upper edge of a collar 21, that is threaded upon said stem and constitutes a stop for preventing the abnormal upward movement of the section-jaws of the head, said collar being engaged by shoulders 21^a on the jaws when the same move upward to a predetermined position. The hooks are furthermore provided with inwardly-extending lugs 22, which engage the under edge of the collar 21 when the bills are engaged thereover, so that the section-jaws, and consequently the head, are thus held against relative movement in either direction upon the stem. For the purpose of detaching the hooks from the collar a device is employed in the form of a detaching or jarring sleeve 23, preferably composed of sections slidably mounted on the stem above the collar 21, the lower section having its lower end beveled, as shown at 24, so as to engage the inner sides of the bills 19. The upward movement of the sleeve 23 is limited by a stop-collar 25, threaded upon the stem above the same.

The longitudinally-disposed channels 11 of

the stem are provided with upper and lower outstanding shoulders 26, and adapted to co-operate with the same are dogs 27, carried by the section-jaws, being preferably pivoted thereto and urged inwardly by springs. It will be observed by reference to Fig. 3 that when the hooks 17 are engaged over the collar 21 the lower ends of the dogs 27 are disposed below the upper end faces of the shoulders 26. Suspended from the lower end of the stem is an elevating device comprising a base 28, having an upper face 29 and provided with upstanding fingers 30, which are slidably mounted in the channels or guideways 11, the upper ends of said fingers being provided with outstanding lugs 31, located in the path of movement of the lower ends of the section-jaws. The elevating device is held in place upon the stem by means of a collar 32, threaded upon the lower end of said stem and surrounding the fingers below the lugs, said collar thus permitting the sliding movement of the device.

The operation of the spear may be briefly described as follows: Before introducing the stem into the casing the hooks 17 are engaged over the collar 21, with the sleeve 23 resting upon the bills 19. In this condition the head is contracted, so that the tool can be lowered into the well. In case the jaws strike the casing during its downward movement there will be no bad results, as the lugs 22 will prevent the relative upward movement of said jaws. When the spear has reached the desired position in the casing the same is jarred in any suitable manner, whereupon the detaching-sleeve 23 will drive the hooks 17 from their engagement with the collar 21, and the section-jaws, being released, will drop downwardly. This, as already explained, will secure the expansion of the head, and the teeth will engage or bite into the inner face of the casing. This will be apparent by reference to Fig. 4. If now it is desired to release the head or jaws from the casing and elevate the tool, it is only necessary to lower the stem slightly, and by jarring the same the jaws will be elevated sufficiently to permit the dogs 27 to engage over the shoulders 26, as illustrated in Fig. 5. Consequently the head will be relocked in contracted condition and the spear may be readily withdrawn. If through carelessness or from any cause the instrument is lowered to the bottom of the well and locked, so that there is not sufficient room to unlock the same by jarring, it will be evident by reference to Fig. 6 that when the spear is dropped to the bottom of the well the base 28 of the elevating device will rest thereupon and the stem, continuing its downward movement, will carry the lower ends of the jaws into engagement with the upper edges of the lugs 31, so that the dogs 27 and shoulders 26 will be brought into coöperation and the head locked in contracted condition, as before.

The jaws 13 are provided below the pawls or dogs 27 with holes 33, which in practice will be about one-half inch in diameter and which will permit a hook to be introduced into the device for disengaging the pawls or dogs 27 from the outstanding shoulders 26.

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

1. In a casing-spear, the combination with a support, of an expansible head movably mounted on the support and having a detachable interlocking engagement therewith to prevent their relative movement, and means movably mounted on the support for effecting the detachment of the head and support to permit their relative movement.

2. In a casing-spear, the combination with a supporting-stem, of an expansible head slidably mounted on the stem, detachable interlocking connections between the stem and head to prevent their relative movement, and means slidably mounted on the stem for effecting the disconnection of the interlocking means to permit the relative movement of said head and stem.

3. In a casing-spear, the combination with a support, of an expansible head movably mounted on the support, holding means carried by the head and having a detachable engagement with the support, and means movably mounted on the support for disengaging the said holding means therefrom to permit the relative movement of the head and support.

4. In a casing-spear, the combination with a supporting-stem, of an expansible head slidably mounted on the stem, holding means movably secured to the head and having a detachable engagement with the stem, and a detaching device slidably mounted on the stem and engaging the holding means for detaching the same from the stem and permitting the movement of the head upon the stem.

5. In a casing-spear, the combination with a supporting-stem, of an expansible head comprising a plurality of sections slidable longitudinally of the stem, holding devices movably mounted on the sections and having detachable interlocking engagements with the stem, and a device slidably mounted on the stem and arranged to disengage the device therefrom to permit the sliding movement of the head-sections.

6. In a casing-spear, the combination with a supporting-stem having a shoulder, of an expansible head slidably mounted on the stem, holding means for the head including hooks carried by the head and having a detachable engagement with the shoulder, and a detaching device slidably mounted on the stem and movable to disengage the hooks from the shoulder.

7. In a casing-spear, the combination with a supporting-stem, of an expansible head comprising a plurality of downwardly and out-

wardly movable sections, a collar carried by the head, hooks pivoted to the sections and detachably engaging over the collar, and a detaching-sleeve slidably mounted on the stem and having a tapered lower end that engages the hooks for detaching the same from the collar.

8. In a casing-spear, the combination with a stem having an enlarged angular lower end that tapers upwardly, said end being provided with longitudinally-undercut guideways, of an expansible head comprising a plurality of toothed sections having dovetailed ribs that engage in the guideways, an annular collar located upon the stem above the guideways, hooks pivoted to the sections and arranged to engage over the collar, and a detaching-sleeve slidably mounted on the stem above the collar, said sleeve comprising sections, the lower one of which has a beveled lower end that is arranged to engage the hooks for the purpose of detaching the same from the collar.

9. In a casing-spear, the combination with a support, of an expansible head movably mounted on the support, movable holding means for detachably interlocking the head and support to hold the same against relative movement, and means movably mounted on the support and arranged to engage the said holding means for effecting the detachment of the head and support to permit their relative movements.

10. In a casing-spear, the combination with a support, of an expansible head movably mounted on the support, means carried by the head and detachably interlocking with the support for holding the head against movement thereon and in contracted condition, a detaching device movably mounted on the support and engaging said means for thus effecting its disengagement from the support, and other means detachably interlocking with the support for relocking the head in contracted position after the same has been released and expanded.

11. In a casing-spear, the combination with a support, of an expansible head comprising sections slidable on the support, means movably carried by the sections and interlocking with the support for holding the sections against movement on the support, and separate devices also movably mounted on the sections and having detachable interlocking engagements with the support for relocking the sections against movement after their release and the expansion of the head.

12. In a casing-spear, the combination with a supporting-stem, of an expansible head slidably mounted thereon, means carried by the head and detachably interlocking with the support for holding the head against movement thereon and in contracted condition, coacting shoulders, and pivoted dogs respectively carried by the head and stem, said dogs

being out of coacting relation with the shoulders when the means are interlocked and also when the head is expanded and said dogs being arranged to engage the shoulders when the head is in a predetermined position to relock said head against expansion.

13. In a casing-spear, the combination with a supporting-stem, of an expansible head slidably mounted thereon, hooks pivoted to the upper end of the head and having a detachable engagement with the stem for holding the same in contracted condition, shoulders carried by stem, and pivoted dogs carried by the head, said dogs being out of coacting relation with the shoulders of the stem when the hooks are in engagement therewith and also when the head is expanded, and said dogs being arranged to engage over the shoulders of the stem when the head is in a predetermined elevated position.

14. In a casing-spear, the combination with a supporting-stem having an annular collar and sets of shoulders located below the same, of an expansible head comprising a plurality of section-jaws slidable upon the stem, hooks carried by the jaws and having detachable engagements with the collar of the stem, and dogs mounted on the jaws and arranged to coact with the shoulders, said dogs being normally out of engagement with the shoulders to engage over the same when the jaws have been elevated to a predetermined position.

15. In a casing-spear, the combination with a supporting-stem having guideways, of an expansible head comprising a plurality of section-jaws slidable in the guideways, and an elevating device for the jaws comprising a base depending below the stem and having a plurality of upstanding fingers slidable upon the stem and arranged to move into engagement with the jaws for elevating the same.

16. In a casing-spear, the combination with a supporting-stem having longitudinally-disposed guideways extending to its lower end, of an expansible head comprising a plurality of section-jaws slidable in the guideways, an elevating device for the jaws comprising a base depending below the stem and having a curved upper face, a plurality of upstanding fingers carried by the base and slidable in the guideways, said fingers having upstanding portions that are movable into engagement with the lower ends of the jaws, and a collar surrounding the lower end of the stem and the fingers of the elevating device.

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

JOHN JAMES BREWSTER.

Witnesses:

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