F. H. HATFIELD.

CASING SWAGE.

APPLICATION FILED JAN. 12, 1921.

1,422,762.

Patented July 11, 1922.

2 SHEETS—SHEET 1.

Fig. 1.

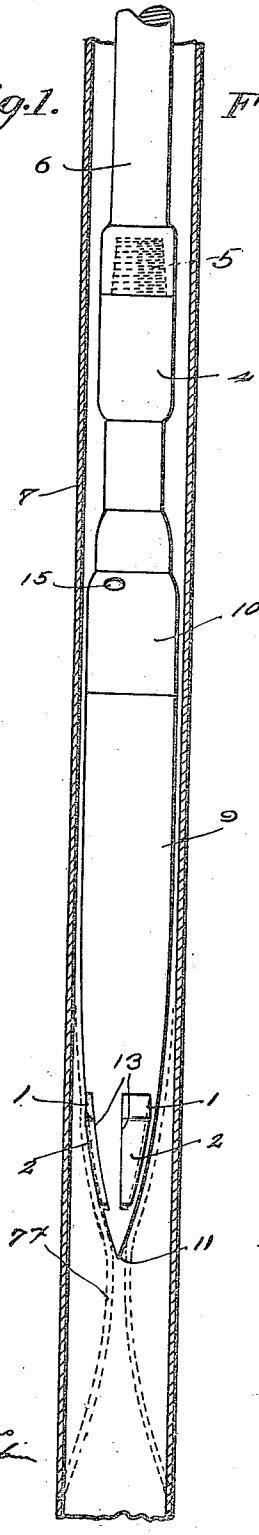


Fig. 2.

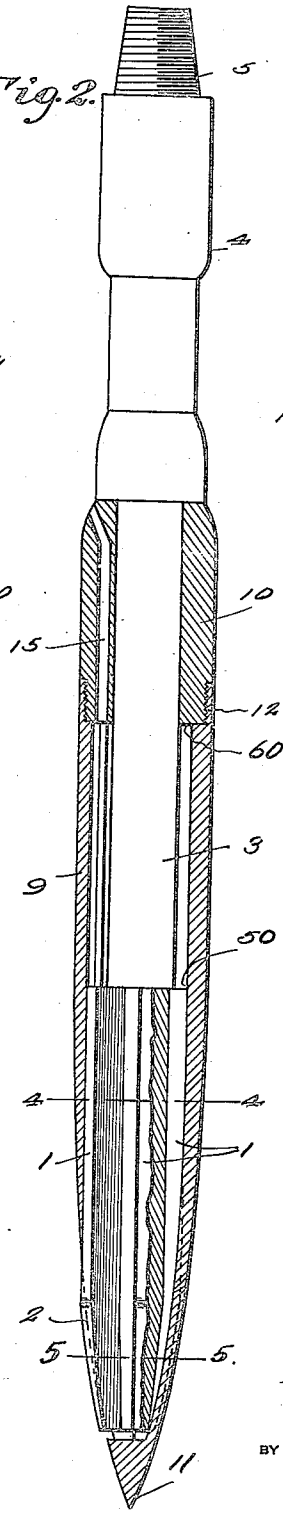
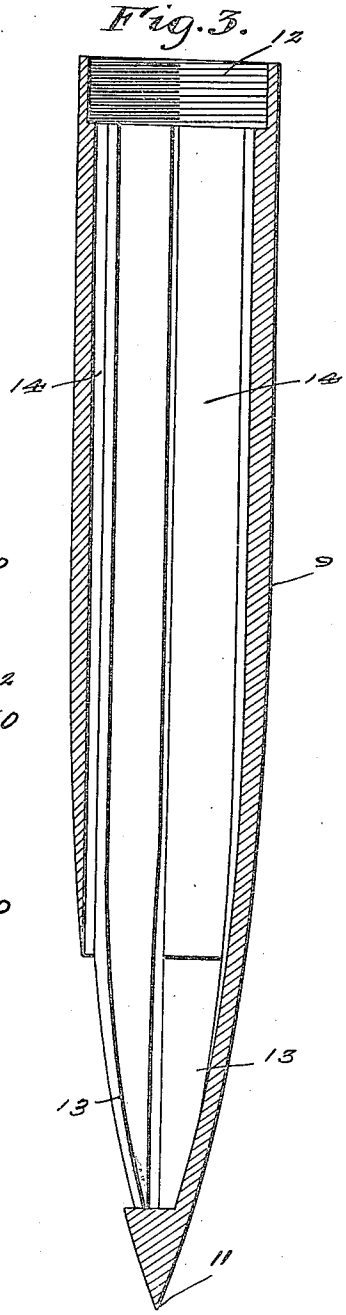


Fig. 3.



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2 SHEETS—SHEET 2.

Fig. 7.

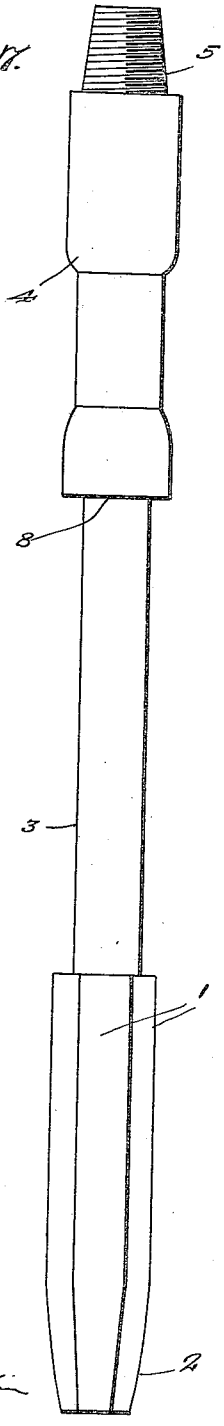
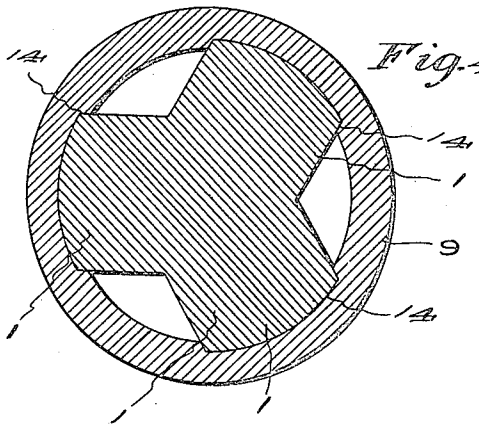


Fig. 4.



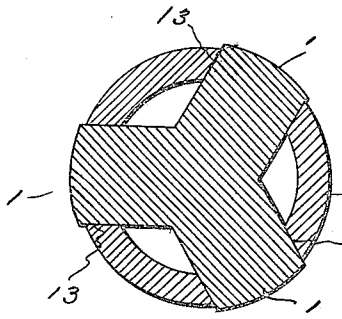
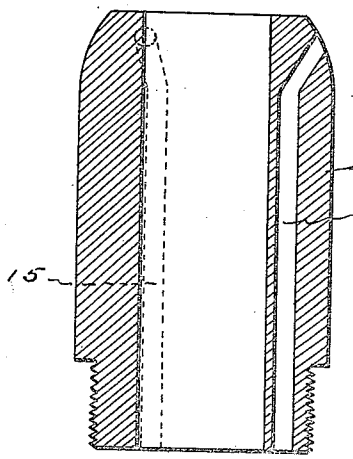


Fig. 5.

Fig 6



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CASING SWAGE.

1,422,762. Specification of Letters Patent. Patented July 11, 1922.

Application filed January 12, 1921. Serial No. 436,763.

To all whom it may concern:

Be it known that I, FLOYD H. HATFIELD, a citizen of the United States, residing at Rawlins, in the county of Carbon and State of Wyoming, have invented new and useful Improvements in Casing Swages, of which the following is a specification.

The object of my present invention is the provision of a simple, efficient and easily operated device for swaging the casings of deep wells—i. e., working the walls of such casings outwardly and restoring them to approximately their original shapes after they have been collapsed or pressed inwardly by the surrounding earth.

To the attainment of the foregoing, the invention consists in the improvement as hereinafter described and definitely claimed.

In the accompanying drawings, forming part hereof:—

Figure 1 is a view showing my novel swage as properly positioned for work in a well casing.

Figure 2 is an enlarged view of a portion of the swage per se, said view being partly in elevation and partly in section and with a portion of one of the webs of the mandrel broken away.

Figure 3 is an enlarged detail section of the sleeve of the swage.

Figures 4 and 5 are enlarged transverse sections taken in the planes indicated by the lines 4—4 and 5—5, respectively, of Figure 2.

Figure 6 is an enlarged diametrical section of the sleeve cap.

Figure 7 is an enlarged elevation of the mandrel per se.

Similar numerals of reference designate corresponding parts in all of the views of the drawings.

Among other elements my novel swage comprises a mandrel best shown in Figure 7. The said mandrel comprises a lower portion having webs 1, tapered at 2. It also comprises a stem 3 integral with the said lower portion 1, and a head 4, preferably shaped as shown and provided at its upper end with a reduced and tapered and threaded portion 5 for the connection of a rod 6, Figure 1 through the medium of which my improvement is designed to be manipulated in a well casing indicated by 7. At this point I would make it clear that in the preferred practice of my invention the web portion 1 is formed integral with the stem 3, and after the other parts hereinafter described are properly assembled the stem 3 is welded or otherwise connected at 8, Figure 7, to the head 4.

In addition to the mandrel characterized as described my novel swage comprises a sleeve 9 and a cap 10. As will be understood by comparison of Figures 3, 4 and 5 the sleeve 9 is tapered to a point 11 at its lower end. The upper end portion of said sleeve 9 is interiorly threaded as indicated by 12. In its lower tapered portion the said sleeve 9 is provided with three openings 13 equidistantly spaced apart. Arranged equidistantly in the inner side of the sleeve 9 are grooves or guideways 14 which extend from the upper ends of the openings 13 to the base of the threaded portion 12 of the sleeve, and are designed to receive and guide the webs 1. It will also be noticed in this connection that the lower end portions of the webs 1 are tapered downwardly—i. e., are gradually reduced in width downwardly so as to work through the openings 13 which are also tapered in width downwardly.

The cap 10 is threaded into the upper end portion 12 of the sleeve 9 and is provided with water vents 15 which as their name imports are adapted to conduct upwardly such water as enters the sleeve 9 through the openings 13, so as to prevent water below the swage from interfering with the operation thereof.

The sleeve 9 and the cap 10 are properly arranged on the lower portions 1 and 3 of the mandrel precedent to the permanent connection of the portion 3 of the mandrel to the lower end of the head 4.

In the practical use of my improvement, the swage is positioned in the casing 7 as shown in Figure 1 and the function of the swage is to press outwardly the wall of the casing when the said wall is collapsed or pressed inwardly as illustrated by the dotted lines 7^x in Figure 1. Incident to its use the swage is reciprocated in the casing 7, and the webs 1 of the mandrel are made to hammer outwardly the collapsed portion of the casing. As the casing is so hammered outwardly the sleeve 9 by gravitational action assumes a position within the hammered out portion so as to hold it against inward movement. The sleeve is also hammered downwardly by the action of the mandrel head 4 against the upper end of the cap 10. This

operation is repeated step by step as the swage is moved downwardly in the casing 7. In the connection just referred to it will be apparent that the mandrel has a limited endwise movement in and with respect to the sleeve 9. In other words the mandrel is capable of endwise movement from the point 50 in Figure 2 to the point 60, and it will also be observed that the lower end of the head 4 of the mandrel serves by bringing up against the upper end of the cap 10 to limit the downward movement of the mandrel relatively to the sleeve 9 so that the lower end of the mandrel is prevented from striking against the back of the forward pointed portion of the sleeve 9. This will be understood by particular reference to Figure 2.

It will be apparent from the foregoing that my novel swage is highly efficient for the purpose stated, and that in all respects it is well adapted to withstand the usage to which devices of corresponding character are ordinarily subjected.

Having described my invention, what I claim and desire to secure by Letters-Patent, is:—

1. In a swage, a mandrel including a lower portion having webs and tapered at its lower end, a stem extending upwardly from said lower portion, and a head on the stem and adapted for the connection of an operating rod or the like, in combination with a sleeve the lower portion of which is tapered and which is provided with openings in its lower tapered portion and with interior guideways extending upwardly from said openings, and an interiorly threaded portion at the upper ends of said guideways, and a cap threaded into the said threaded portion of the sleeve and having vent conduits in communication with the interior of the sleeve and adapted for the escape of water; the said sleeve receiving the lower portion and the stem of the mandrel, and the cap receiving the stem of the mandrel and affording an abutment to the mandrel head.

2. A swage comprising a sleeve having a lower portion apertured at its side and tapered to a point, and a mandrel movable longitudinally in the sleeve and through the apertured tapered portion thereof.

3. A swage comprising a sleeve having a lower apertured portion tapered to a point, and a mandrel movable longitudinally in the sleeve and through the apertured tapered portion thereof; the said mandrel being guided in its rectilinear movements by the sleeve, and both sleeve and mandrel being held against movement about their common axis independently of each other.

4. A swage comprising a sleeve having a lower apertured portion tapered to a point, and a mandrel movable longitudinally in the sleeve and through the apertured tapered portion thereof, in combination with a cap on the sleeve and affording an abutment to a portion of the mandrel.

5. A swage comprising a sleeve having a lower apertured portion tapered to a point, and a mandrel movable longitudinally in the sleeve and through the apertured tapered portion thereof, in combination with a cap on the sleeve and affording an abutment to a portion of the mandrel; the said mandrel having an intermediate reduced stem arranged to work through the cap and also having a lower portion adapted to bring up against the lower end of the cap.

6. A swage comprising a sleeve having a lower tapered and apertured portion, and a mandrel movable longitudinally in the sleeve and through the apertured tapered portion thereof; the sleeve having guideways merged into the apertures thereof, and the mandrel having webs movable in the said guideways and through the apertures of the sleeve.

7. A casing swage having a pointed penetrating sleeve to open a collapsed casing wall and hold the same against inward movement, said sleeve apertured at its side and also having means arranged to work through the said apertured sleeve to hammer a casing wall outwardly.

8. A casing swage having a pointed penetrating sleeve to open a collapsed casing wall and hold the same against inward movement, and also having means arranged to work through the said sleeve to hammer a casing wall outwardly, the said working means being also opposed to the upper end of the sleeve and arranged to hammer the sleeve downwardly.

In testimony whereof I affix my signature.

FLOYD H. HATFIELD.