H. HARRIS.

TUBE-CUTTER FOR OIL-WELLS.

No. 194,149. Patented Aug. 14. 1877.

Fig. 1.

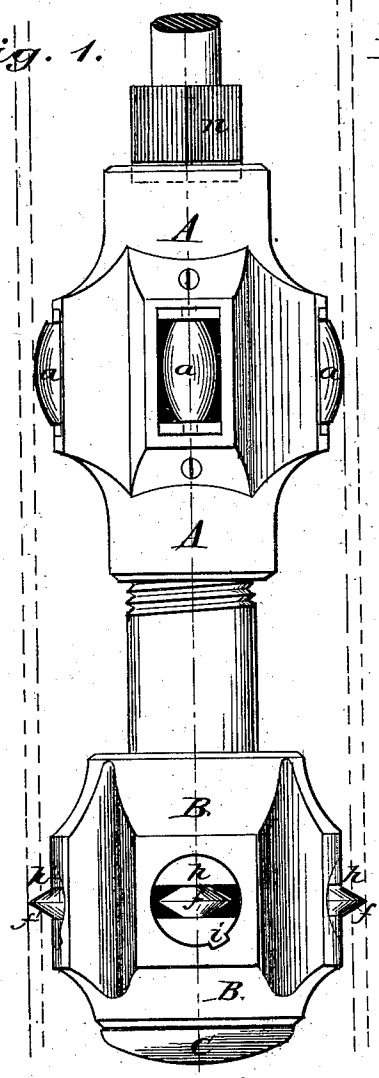


Fig. 2.

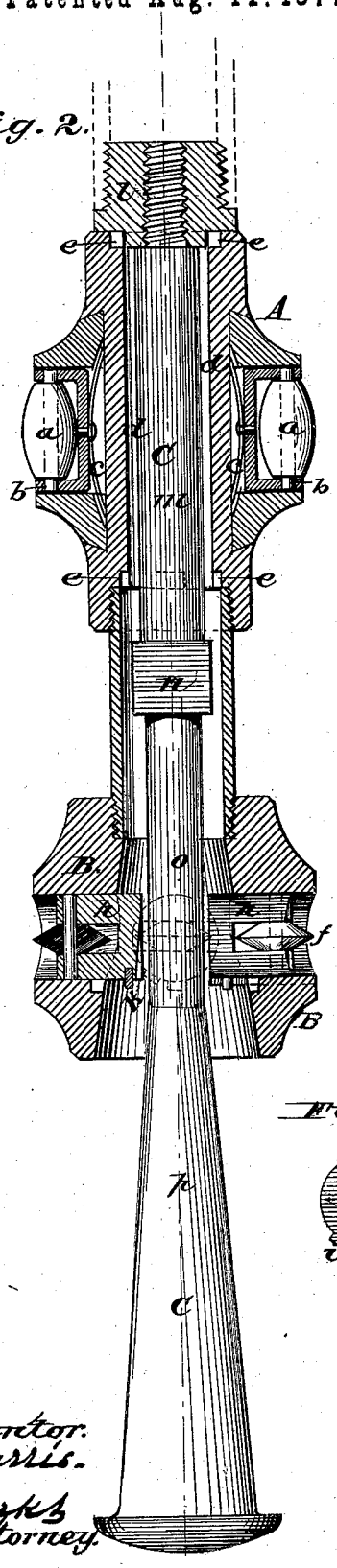


Fig. 3.

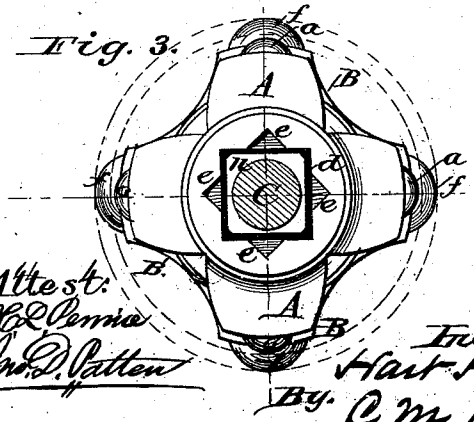
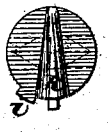


Fig. 4.



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HART HARRIS, OF PETROLIA, PENNSYLVANIA.

IMPROVEMENT IN TUBE-CUTTERS FOR OIL-WELLS.

Specification forming part of Letters Patent No. **194,149**, dated August 14, 1877; application filed June 20, 1877.

To all whom it may concern:

Be it known that I, HART HARRIS, of Petrolia, Butler county, Pennsylvania, have invented an Improvement in Tools for Cutting Casings in Oil or Artesian Wells; and I do hereby declare the following to be a full and correct description of the same, reference being had to the accompanying drawings, in which—

Figure 1 is a vertical elevation, and Fig. 2 a vertical section; Fig. 3, a top view, and Fig. 4 a view showing the bottom of one of the cutter-carriages.

My invention relates to that class of tools used in cutting the casings in Artesian or oil wells, so that said casings may the more readily be drawn from the base when it may be necessary to repair or remove them.

My invention consists in providing a cutting apparatus with a partly square and partly tapering mandrel, by which the cutters may be revolved within the casing and forced out so as to sever the casing at any desired point, the whole apparatus being held in position by a centering-head provided with friction pressure-rollers.

In the drawings, A is a friction centering-head, carrying four or more friction-rollers, *a a a a*, within sockets upon its sides. The rollers are preferably elliptical in form, and revolve in bearings in sliding carriages *b b*, forced outward by the springs *c c*. The friction centering-head A is perforated longitudinally by a square hole, *d*, and has at each end of square hole *d* notches *e e e e*, also forming a square depression concentric with the square hole. B is a cutter-head, carrying four or more hardened cutters, *f f f f*, within sockets upon its sides. The cutters are round and sharpened to a blunt edge, and are journaled in sliding carriages *h h h h*, traveling loosely in the sockets, and kept in a horizontal position by a spline, *i*. Upon the inside face of the carriages *h* is a conical groove, *k*, Fig. 4, hereinafter referred to. The cutter-head B is perforated by a longitudinal hole of tapering shape, the side diverging downward. The friction centering-head A and cutter B are secured together by a piece of metal tubing.

C is a mandrel, coupled to a rod or tube at its upper end by a coupling, as at *l*. The length of the mandrel C is divided into four sections, *m n o p*. The first section, *m*, is round and small enough to pass through the square hole *d* of the friction centering-head A, and longer than said hole *d*. The second section, *n*, is square, and of a size to easily pass through the square hole *d*, and readily drop into the notches *e e e e* at either end of the friction centering-head A. The third section is again round, similar to section *m*, and about the same length. Section *p* is conical in shape, increasing in size toward the lower end, where it terminates in a head or collar.

The operation of my device is as follows: The mandrel C being dropped to its lowest position, as in Fig. 2, and the upper portion of the square section *n* drawn within the notches *e e*, the apparatus is ready to be lowered into the casing until the knives *f* reach the place to be cut. The mandrel C, after having been lowered sufficiently to be released from the notches *e*, is turned one-eighth of a revolution, when the square section *n* can be raised through the square hole *d*, drawing the conical section *p* through the conical grooves *k* in the backs of the cutter-carriages *h*, forcing the cutters against the inner surface of the casing. As the mandrel is raised it may be revolved, carrying the friction centering-head and cutter-head with it, the cutters *f* being forced into the casing. When the square section *n* has passed through the square hole *d*, it may receive one-eighth of a revolution again, and be dropped in the notches *e*, as seen in Fig. 1. When it is necessary to remove the tool from the casing, or to cut another part of it, the mandrel C is raised a little, and, after receiving one-eighth of a revolution, may be dropped through the square hole *d*. The cutters having receded, the tool may be withdrawn from the casing.

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

1. The cutter-head B, the knives of which are operated by a conical mandrel, C, in combination with a separate friction centering-head, substantially as described.

2. A cutter-head and conical mandrel, said mandrel having a square section upon its shank, in combination with a friction center-

ing-head having a rectangular bore, substantially as described.

3. The square section *n* of the mandrel C, in combination with the friction-head A, having notches *e e e e* at either end, substantially as described.

4. The friction centering-head A, provided with yielding friction-rollers, in combination with a cutter-head, substantially as described.

The above specification of my said invention signed and witnessed at Petrolia, this 22d day of May, A. D. 1877.

HART HARRIS.

Witnesses:
C. M. VOORHIES,
THOMAS DALTON.