(No Model.)

A. J. BRAMLETTE.

PIPE SLITTER AND PERFORATOR.

No. 602,301. Patented Apr. 12, 1898.

Fig. 1.

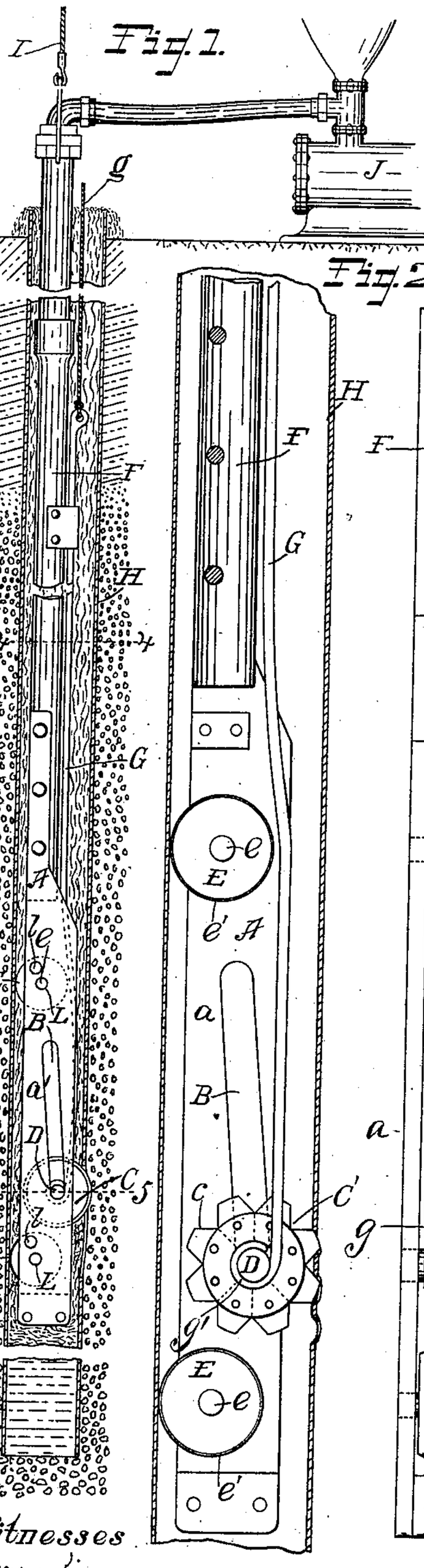


Fig. 2.

Fig. 3.

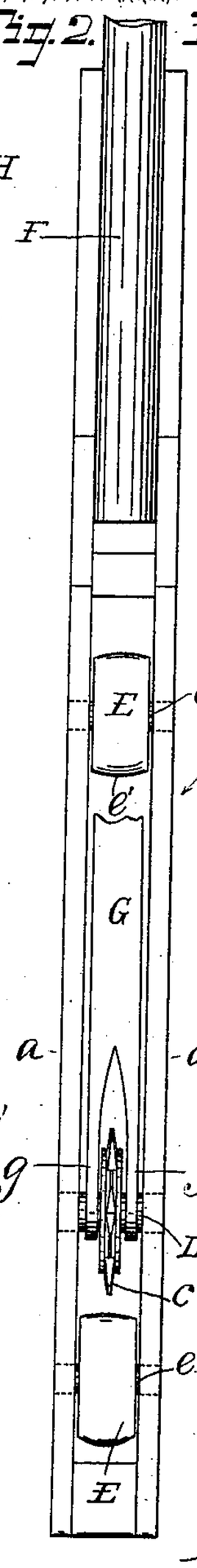


Fig. 4.

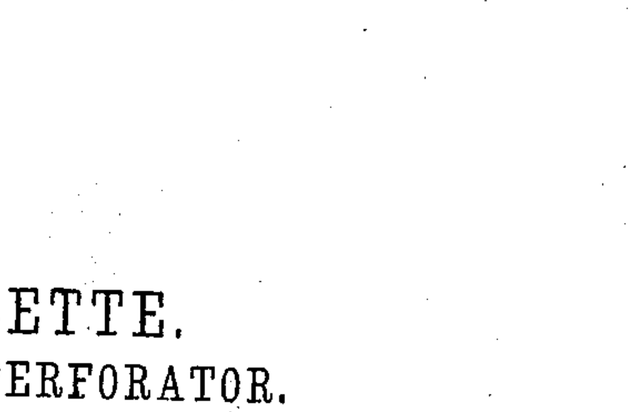


Fig. 5.

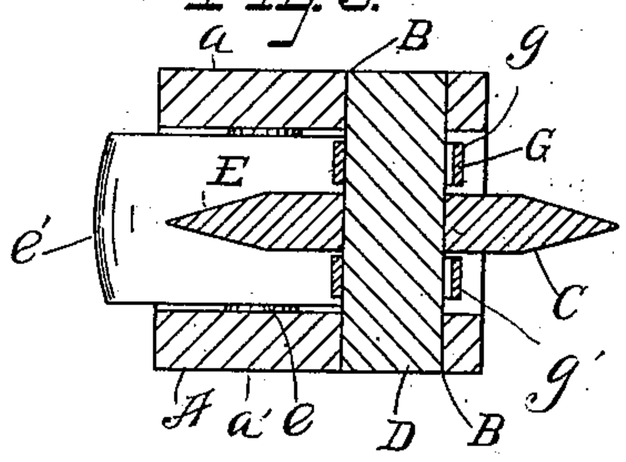


Fig. 6.

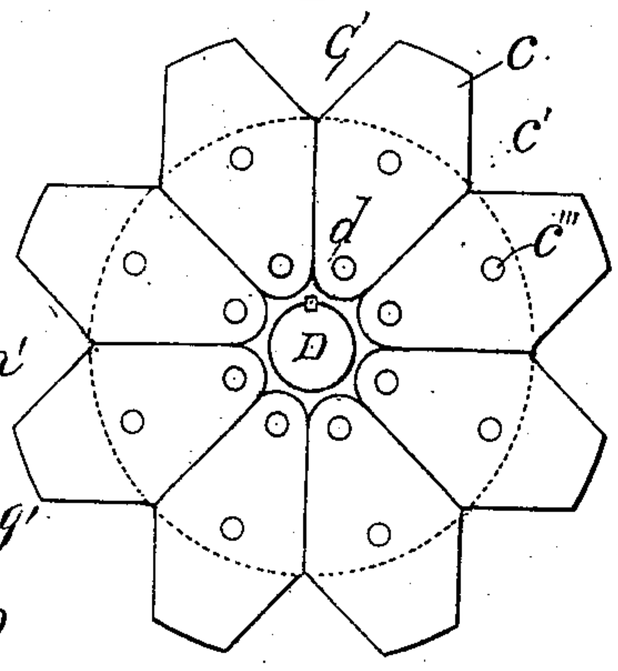
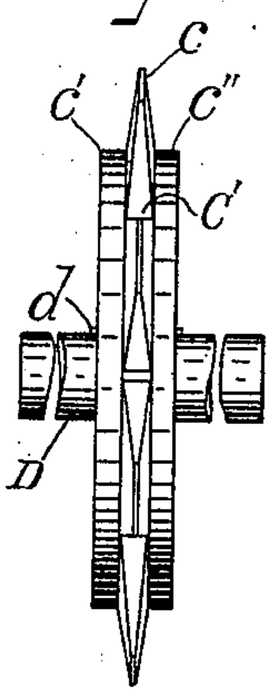


Fig. 7.



Witnesses
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UNITED STATES PATENT OFFICE.

ANDREW J. BRAMLETTE, OF DOWNEY, CALIFORNIA.

PIPE SLITTER AND PERFORATOR.

SPECIFICATION forming part of Letters Patent No. 602,301, dated April 12, 1898.

Application filed July 1, 1896. Serial No. 597,734. (No model.)

To all whom it may concern:

Be it known that I, ANDREW J. BRAMLETTE, a citizen of the United States, residing at Downey, in the county of Los Angeles and State of California, have invented a new and useful Pipe Slitter and Perforator, of which the following is a specification.

My invention relates to that class of machines which are used for making openings in pipes which form the tubes of driven or bored wells.

One object of my invention is to produce a powerful machine of this character which can be made so compact that it can be easily and effectively used in pipes of small diameter. My invention is also applicable for slitting or perforating pipes of large diameter. I am able to easily and quickly perforate or slit a gas-pipe from two inches in diameter up to two feet in diameter. Different sizes of machines are made for different sizes of pipe.

An object of my invention is to provide superior antifriction means for doing the work.

My invention employs a cutting-roller to engage one side of the pipe and antifriction-rollers to engage the opposite side of the pipe; and one object of my invention is to make provision for antifriction-rollers having a maximum breadth of bearing-face to support the thrust of the cutting-roller, thus to avoid any danger of the bearing-rollers indenting the pipe.

Another object is to provide for perforating the pipe as distinguished from splitting it; and in this relation my invention embraces a peculiar and superior construction of sectional cutter by means of which at very slight expense I produce a perforated cutter of maximum strength which can be easily and quickly repaired at slight cost if one or more of the teeth or points become broken.

I also use a hydraulic stream to assist in the work. This may be used or omitted at the pleasure of the operator.

An important feature of my newly-invented pipe slitter and perforator which notably distinguishes it from tools of the same class heretofore known is that I journal both the antifriction-rollers and the roller-cutter in the stock of the tool, the axle of the cutter being journaled in slots in the stock and means independent of the stock being provided to raise and lower the cutter with relation to the stock. I am thus able to provide a comparatively light tool, and I do away with the necessity of screws for moving the cutter-roller.

I journal both the antifriction-rollers and the roller-cutter in a space between the two plates which form the sides of the stock, and the handle for raising the cutter-roller is journaled to the axle of the cutter-roller between the cutter-roller and the plates on the opposite sides of such roller, and I am thus able to make the antifriction-rollers of much greater width compared to the necessary thickness of the cutter than is possible with the forms of construction heretofore known.

The accompanying drawings illustrate my invention.

Figure 1 is a fragmental vertical section of a well, showing my newly-invented machine in use. Fig. 2 is a fragmental view showing the knife with one plate removed. My sectional cutter is shown in this view. Fig. 3 is a fragmental elevation showing the knife, looking toward the edge of the cutter from the right of Fig. 2. Fig. 4 is a plan of the knife on line 4 4, Fig. 1. Fig. 5 is a plan section on line 5 5, Fig. 1. Fig. 6 is a detail of the sectional cutter or perforator shown in Fig. 2, one plate being removed. Fig. 7 is an edge view of the sectional cutter.

A indicates the stock of the knife, provided with oblique axle-guideway B for the axle of a rolling cutter C C′. D indicates said axle mounted in said guideway, the cutter being of such diameter that when the axle is in one portion of the guideway, as shown in Fig. 1, the outer edge of the cutter will project beyond the edge of the stock.

E indicates antifriction-rollers journaled in the stock and projecting from that edge thereof which is opposite the edge from which the cutter C or C′ projects.

F indicates suitable means for raising and lowering the stock in the well-tube, and G indicates means for moving the cutter-axle along the oblique guideway. This means, as shown, comprises a rod bifurcated at the lower end, with the arms *g g′* of the bifurcations respectively bent around the axle D of the cutter on opposite sides of the cutter and

between the cutter and the sides *a a'* of the stock, respectively.

The means for moving the stock in the well-tube H preferably comprises the pipe F, to which the stock A is fastened, and any suitable appliance for raising and lowering the stock F. I indicates a rope for this purpose leading to a derrick. (Not shown.)

J indicates a hydraulic pump affording means for forcing water under pressure into the well-tube and into the space around the cutter, thereby to assist the cutter when it is making an opening through the pipe and also to carry away through the well-tube any sand or gravel or other debris that may come in through the slit or perforation made in the tube while the same is being perforated or slit. The pipe F forms the handle to the stock A and is arranged to discharge water downward into the open space in the stock in which the cutter is mounted.

The rolling cutter may be a disk of steel, as indicated in Figs. 1 and 4, fastened on the axle D, or it may be provided with projecting points, as indicated in Figs. 2, 3, 6, and 7. In the perforating form of cutter which has projecting points, as illustrated in Figs. 2, 3, 6, and 7, it is desirable to construct the cutter in sections in order that the several points can be taken out when broken or worn and replaced by new. These sections (marked *c*) are placed between steel plates *c' c''*, with edges fitted together to support each other, and are fastened by rivets *c'''*, which pass through the plates and fasten all the parts of the perforating-cutter together. In the drawings the perforating rolling cutter is marked C'. The rolling cutter may be fastened to the axle in any approved manner. I have shown it keyed thereon by a key *d*.

The inner and outer faces of the steel plates *c c'* are flat and plain, and the several pointed segmental sections *c* are fitted to form a circle between the plates, so that no careful fitting or expensive work upon the plates is necessary. The segmental sections are easily made all of exactly one size and shape, and the rivets hold the sections against displacement, the pressure exerted upon any one section being borne by all the rivets.

The rims of the antifriction-rollers E are preferably curved across their faces in an arc corresponding to the interior of the pipe to be cut, so that the rollers will each have a large bearing-surface against the inside of the wall of such pipe to resist the thrust when the rolling cutter is brought into action.

While it is desirable that the curved rim *e'* fit the pipe, this is not absolutely necessary, and I provide for adjusting the implement to pipes of different diameters. With this end in view I provide two sets of holes in which to journal the axles *e* of the antifriction-rollers. L indicates the holes of one set and *l* the holes of another set, the latter set being placed closer to the edge of the stock than the holes of the other set.

The implement may be adapted for different-sized pipes by other suitable means—such, for instance, as by increasing the diameter of the rolling cutter or of the antifriction-rollers, or both.

In practical operation where hydraulic power is used the cutter, with pipe F, is lowered into the tube H of the well and brought to the lowest level at which it is desired to slit or perforate the well-tube, the handle G, which carries the axle D of the cutter, being drawn upward to bring the axle into the upper inner end of the guideway B, thus withdrawing the cutter from its projecting position, as shown in dotted lines, Fig. 1. When the cutter C or C' has been brought to the lowest level at which the slitting or perforating is to be done, the pipe F, and consequently the stock and cutter, is drawn upward, the handle G being at the same time released, thus allowing the cutter C (or C', as the case may be) to impinge against the inside of the wall of the tube, and it rolls against this, thus rolling the axle D down along the guideway B as the stock rises, and the cutter is thereby forced outward until the wall of the tube is punctured, and as the stock is drawn upward the cutter acts to slit or, in case of cutter C', to perforate the well-tube. In the operation of slitting the tube when the stock has been drawn up far enough to make a slit of the required length the stock is lowered again, the operator holding the handle by means of the rope or cord *g*, so that as the implement drops back the axle D will move along the inclined guideway B, and thereby be withdrawn from the wall of the tube. When the implement has been lowered to its former position, it is turned part way around and again drawn up to cut another slit, and this operation is repeated until the pipe is slit as much as is desired at that level. Then the implement is brought to a higher level and the operation repeated.

In order to facilitate the ease of cutting through the pipe and at the same time carry off any sand or other debris which may enter the tube through the slits or perforations as they are made, I introduce through pipe F water under pressure and allow it to flow out at the top of the well-tube with greater or less freedom, as may be desired. The hydraulic pressure thus produced within the tube presses outward upon the tube and on the cutter and assists in the work of forcing the cutter outward, and as it flows up through the tube H carries away the debris.

In case it is desired to perforate the tube with numerous perforations the sectional cutter C' is used in the way just described, excepting that as it rolls up along the wall of the tube the points stick through the tube and perforate the tube at intervals. Care is taken in mounting the cutter for a given diameter of pipe that the spurs or teeth will cut through the pipe at intervals. But little power is required for the operation of the cut-

ter in slitting or perforating gas-pipe well-tubing, and the implement can be operated by one man at the windlass.

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

1. The machine for slitting or perforating the tubes of bored or driven wells comprising a stock provided with an oblique guideway for the axle of a rolling cutter; a rolling cutter provided with an axle mounted in said guideway, the cutter being of such diameter that when the axle is in one portion of the guideway, the outer edge of the cutter will project beyond the edge of the stock; antifriction-rollers journaled in the stock and projecting from that edge thereof which is opposite the edge from which the cutter projects; means for forcing water into the well-tube under pressure; means for raising and lowering the stock; and means for moving the cutter-axle along the guideway.

2. The machine for slitting or perforating the tubes of bored or driven wells comprising a stock provided with an oblique guideway for the axle of a rolling cutter; a rolling cutter provided with an axle mounted in said guideway; the cutter being of such diameter that when the axle is in one portion of the guideway, the outer edge of the cutter will project beyond the edge of the stock; antifriction-rollers journaled in the stock and projecting from that edge thereof which is opposite the edge from which the cutter projects; a pipe fastened to the stock to carry the same and arranged to discharge water into the space around the cutter; means for forcing water through the pipe; means for raising and lowering the pipe and stock; and means for moving the cutter-axle along the guideway.

3. The stock with oblique guideway and with antifriction-rollers journaled in the stock and projecting at one edge of the shank, the rolling cutter with axle in the oblique guideway, and adapted to project from that edge of the stock opposite the antifriction-rollers, and means independent of the stock for moving the axle along the guideway.

4. In a pipe slitter or perforator, the combination of two plates, each provided with an oblique slot and being fastened to each other, with an open space between them; two antifriction-rollers between the plates and journaled in the plates and projecting beyond one edge thereof; a rolling cutter arranged between the plates and having an axle journaled in the oblique slots in the plates; and the handle journaled to the axle between the cutter and the plates for moving the axle along the slots.

5. The sectional rolling cutter comprising two plates the inner faces of which are flat; pointed segmental sections between the plates arranged with their edges fitted together to support each other, the several segments forming a circle between said plates; an axle extending through the plates and projecting on each side thereof; and means for fastening the plates and pointed segmental sections together.

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Witnesses:
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