

Dec. 3, 1929.

R. CRAMER
UNDERREAMER

1,737,960

Filed April 11, 1928

3 Sheets-Sheet 1

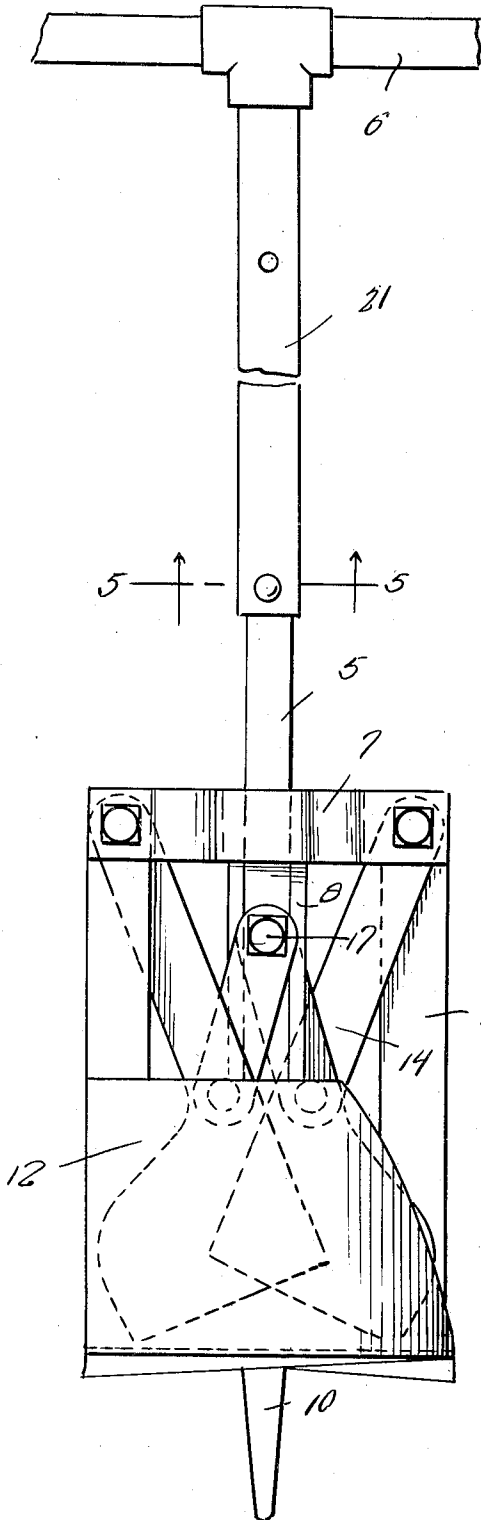
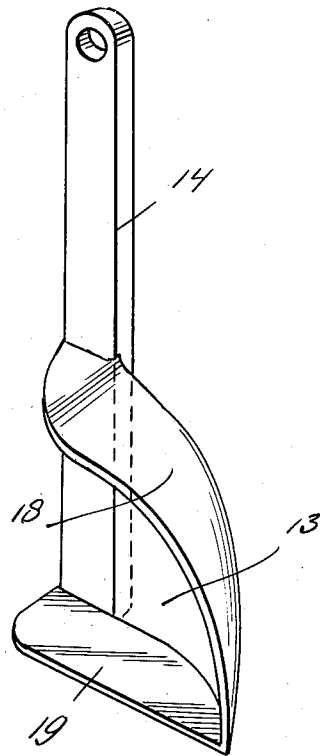


Fig. 1.

Fig. 4.



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3 Sheets-Sheet 2

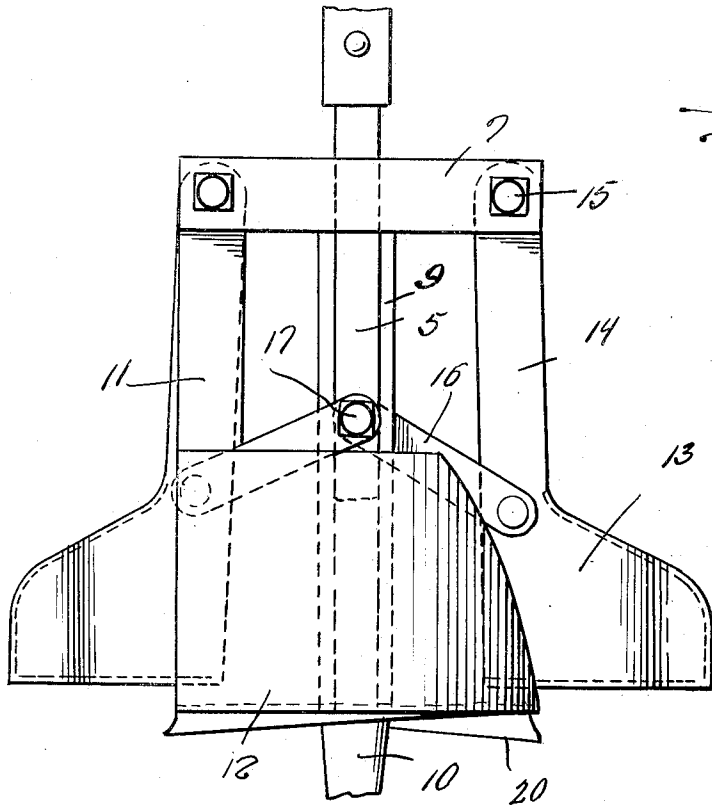


Fig. 2.

Fig. 3.

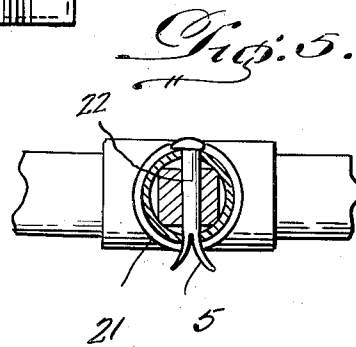
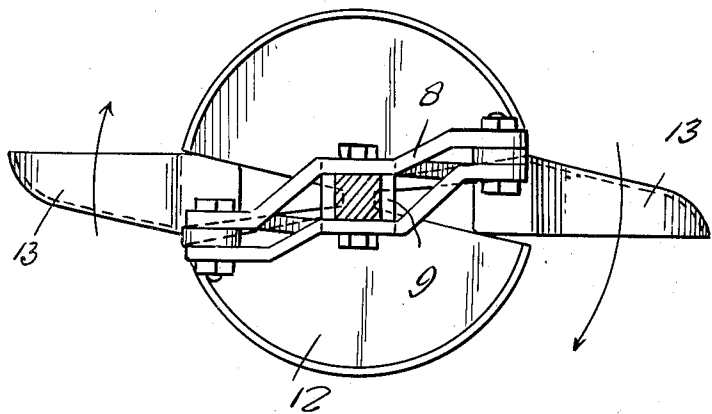


Fig. 5.

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3 Sheets-Sheet 3

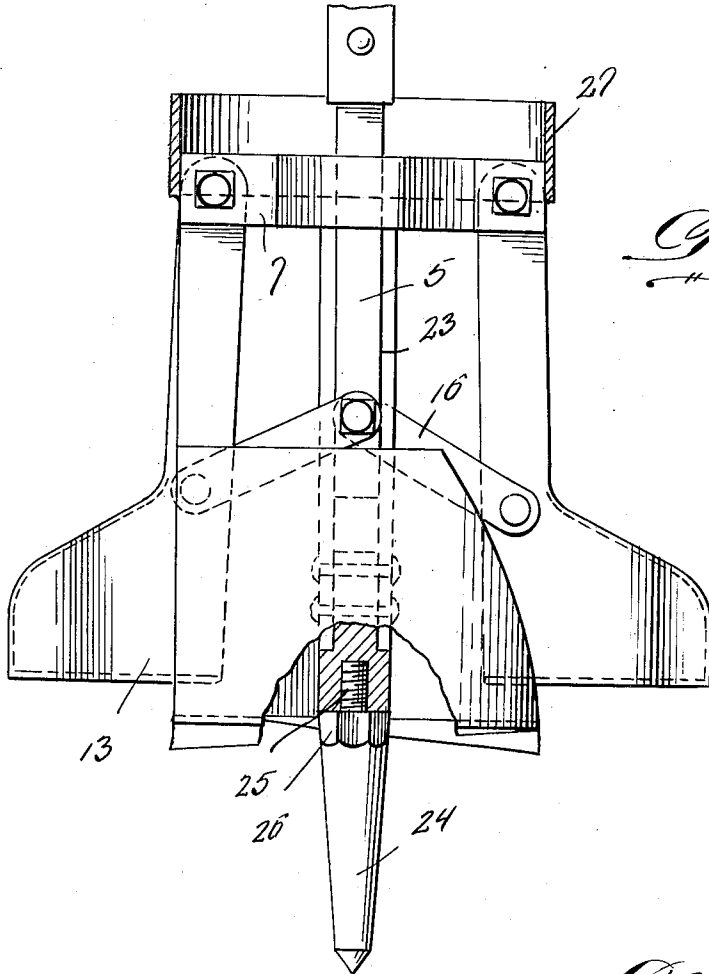


Fig. 6.

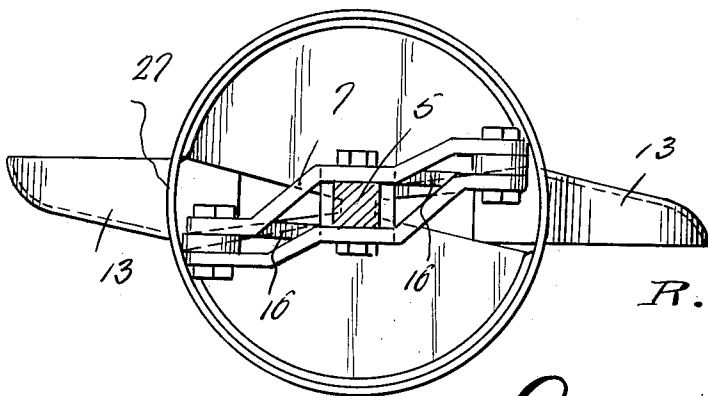


Fig. 7.

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UNITED STATES PATENT OFFICE

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UNDERREAMER

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The present invention relates to under-reamers of a manually operable type and has for its principal object to provide a tool of this character adapted to increase the diameter at the bottom of a post or pier hole and provided with cutting means adapted to cut a flat bottom in the hole and to cut the sides at the bottom of the hole in an upward and inward slanting angle, substantially of a bell shaped formation, thus making an improved foundation at the bottom of the hole.

The invention further embodies the provision of a scoop or bucket adapted to provide for the removal of the dirt from the hole when removing the tool therefrom.

A still further object of the invention is to provide a pair of pivotally mounted cutting blades at the base of the tool adapted for spreading movement upon the warping of the tool in a downward direction and arranged for inward movement for shifting the tool out of the hole whereby to permit the removal of the blade through the upper portion of the hole of a relatively smaller diameter.

A still further object is to provide a tool of this character of a simple and practical construction, which is strong and durable, efficient and reliable in its performance, relatively inexpensive to manufacture, and otherwise well adapted to the purpose for which the same is intended.

Other objects and advantages reside in the special construction and combination of the various elements comprising the invention, reference being had to the accompanying drawings, forming a part hereof, wherein:

Figure 1 is a view in side elevation with the movable cutting blade shown in a contracted position.

Figure 2 is a similar view of the cutting or lower ends of the tool with the blades in extended position.

Figure 3 is a top plan view showing the tool blade in position as shown in Figure 2.

Figure 4 is a perspective view of one of the under reamer blades, and

Figure 5 is a transverse sectional view

through the handle taken along the line 5—5 of Figure 1.

Figure 6 is a view in elevation with parts broken away and shown in section, of a modified form of under reamer provided with a removal spike, and

Figure 7 is a top plan view thereof.

Referring now to the drawing in detail, the invention comprises a hand operated under reamer composed of a post 5 having a handle 6 arranged at its upper end and its lower end of a square shaped formation in cross section and slidably carried in a bucket and blade supporting frame indicated generally at 7. The frame 7 is composed of a pair of horizontally disposed frame members 8, arranged at opposite sides of the square shaped lower end of the post, the members 8 being disposed in spaced, substantially parallel relation, intermediate the ends of which and between which spaced members is arranged the upper bifurcated end 9 of a spike 10. The bifurcated section of the spike 10 form a guide for the opposite end of the squared lower end of the post 5, permitting the vertical sliding movement of the post therein.

Suspended from the upper ends of each of the horizontal members 7 is a hanger 11, at the lower end of which is formed a bucket segment 12, the segments of the pair of hangers 11 combining to form a substantially cylindrical shaped bucket with the spike 10 extending concentrically through the bottom portions thereof. The side edges of the bucket segments are spaced slightly from each other, whereby to form an opening in the wall of the bucket extending vertically thereof, whereby to provide means for the outward swinging movement of a pair of under reamer blades 13 also suspended from a hanger 14 by bolts 15 disposed at the opposite ends of the horizontal members 7. Intermediate the upper and lower ends of the blades 13 is also pivotally attached a link 16, extending in a direction toward the post and pivotally attached to a pin 17 carried adjacent the lower end of said post. It will thus be apparent that upon the vertical movement of the post in the bifurcated end of

the spike, the under reamer blades 13 will be moved inwardly or outwardly with respect to the bucket segments 12.

As is clearly illustrated in Figure 1 of the drawings, the bucket segments are adapted to have the blades entirely disposed therein, so that upon the placing or removal of the tool into or out of a post hole opening, the blade will not engage or interfere with the walls thereof.

The construction of the underreamer blades 13 is clearly illustrated in Figure 4 of the drawings and has its outer edge curved upwardly and inwardly whereby to form a substantially bell shaped under cut at the bottom of the post hole. The cutting edge of the underreamer blades 13, indicated at 18, extends in a direction toward which the tool is rotated, as shown by the arrows in Figure 3 of the drawing and the bottom edge of the blade is formed with a horizontal shelf 19 upon which the material may be deposited during the cutting operation.

The lower forwardly disposed edges of the bucket segments 12 are inclined slightly downwardly as shown at 20, with the inclination of the respective segments being reversed whereby to permit one edge of each of the segments to protrude downwardly beyond the edge of the adjacent segment so as to form a cutting blade and also to scoop up the loose dirt into the bucket.

In the operation of the device, it will be apparent that upon the encountering of the bottom of the hole with the spike 10 and pressing downwardly upon the handle 6, the blades 13 will be forced outwardly upon the rotation of the tool in a proper direction and the blades will operate to form an undercut at the bottom of the hole. Upon the upward movement of the handle, the blade 13 will be moved inwardly within the area of the bucket segment 12 and the tool may then be easily removed from the hole to permit a removal of a loose dirt collected in the blade and in the bucket segments.

As shown in Figure 5 of the drawing, the post 5 may be formed in sections and providing a sleeve 21 for fitting over the post whereby to form an extension therefor, the parts being secured together by means of a pin or other fastening device 22.

The modified form of the invention shown in Figures 6 and 7 provided for the removal of the spike upon the striking of rock during the digging operation, for this purpose the spike being formed into sectional portions comprising an upper section 23 and a lower section 24, the upper section being bifurcated to form a guide for the lower end of the post 5, as heretofore explained and having a threaded opening in its lower end for threadedly receiving the threaded stud 25, formed on the upper end of the lower section. The sides of the upper portion of the

spike section 24 is flattened as shown at 26 to receive a wrench for attaching or removing the same. With the construction is also provided a centering ring 27 arranged at the ends of the horizontal member 7 and of a diameter substantially equal to the diameter of the hole being dug, the ring thus serving to maintain the tool in the center of the hole.

It is obvious that the invention is susceptible of various changes and modifications, without departing from the spirit or scope of the invention or sacrificing any of its advantages and I accordingly claim all such forms of the device to which I am entitled.

Having thus described my invention, what I claim as new is:

1. An under reamer of the class described comprising a post, a spike arranged at the lower end of the post and having a bifurcated upper end forming a guide for slidably receiving the lower end of the post, a supporting frame attached to the bifurcated ends of said spike, a bucket having vertically split walls, a plurality of under reamer blades normally disposed within the bucket, hangers carried by said buckets and said blades for suspending the same from said frame, and means for connecting the lower end of the post with said blades for moving the blades horizontally outwardly of the walls of the bucket upon the relative vertical movement between the post and said spike.

2. An under reamer of the class described comprising a post, a spike arranged at the lower end thereof and having a bifurcated upper end forming a guide for slidably receiving the lower end of the post, a pair of horizontal frame members attached at the upper end of said spike and an under reamer blade and a bucket segment suspended from the outer end of said horizontal member, said bucket segments combining to form the opposite sides of a receptacle with the adjacent edges spaced apart whereby to provide for the movement of the under reamer blades inwardly and outwardly with respect thereto, and means connecting said blades with the lower end of said post for the horizontal movement of the blades upon the vertical movement of the post.

3. An under reamer comprising a post, a sectional spike having its upper section formed into a guide for slidably receiving the post and with its lower section detachably secured thereto, a pair of spaced substantially parallel horizontal members secured at the upper end of the upper of said spike sections, a guide ring carried by said members and a bucket segment, and an under reamer blade suspended at the ends of said members.

In testimony whereof I affix my signature.

ROY CRAMER.