E. PROBST.

COLLAPSIBLE SHOE.

APPLICATION FILED JULY 3, 1909.

958,534.

Patented May 17, 1910.

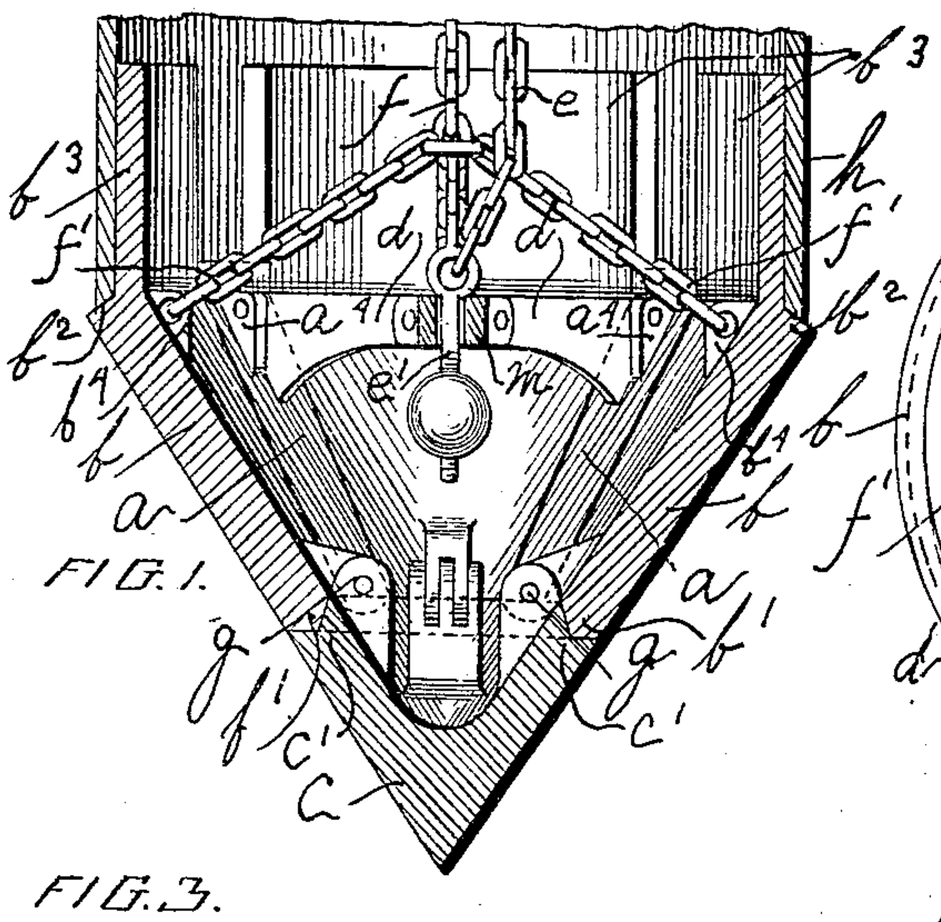


FIG. 1.

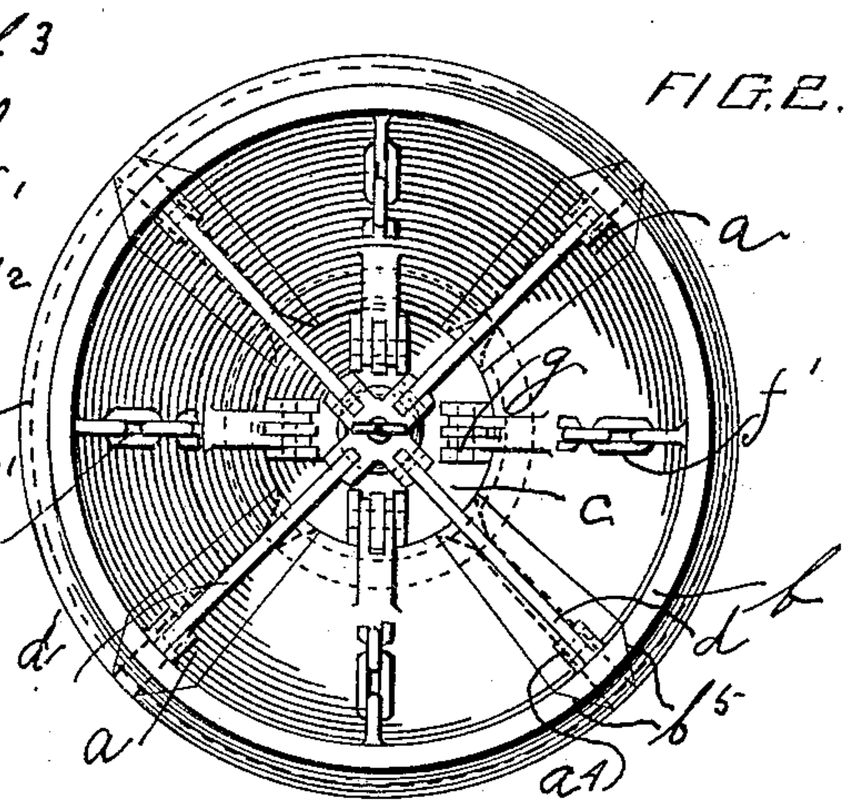
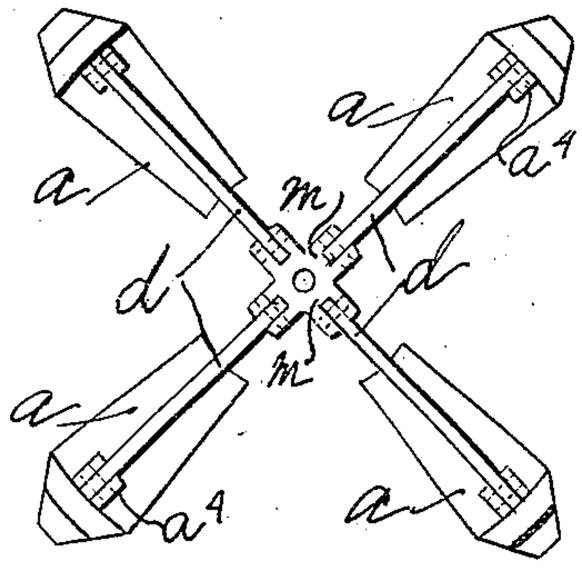


FIG. 2.

FIG. 3.



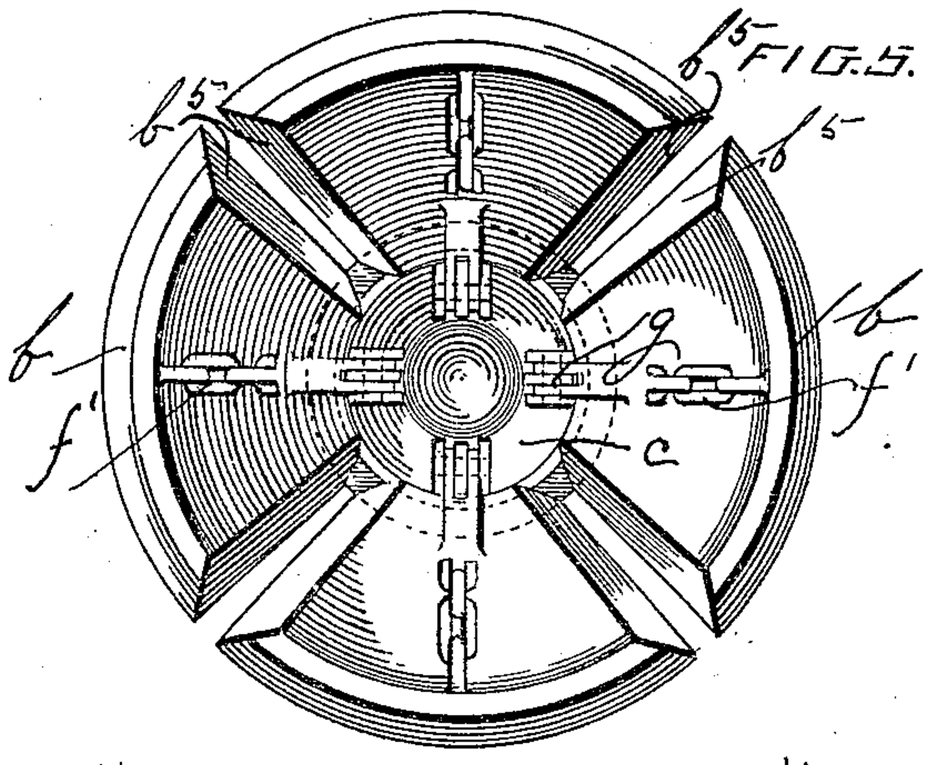
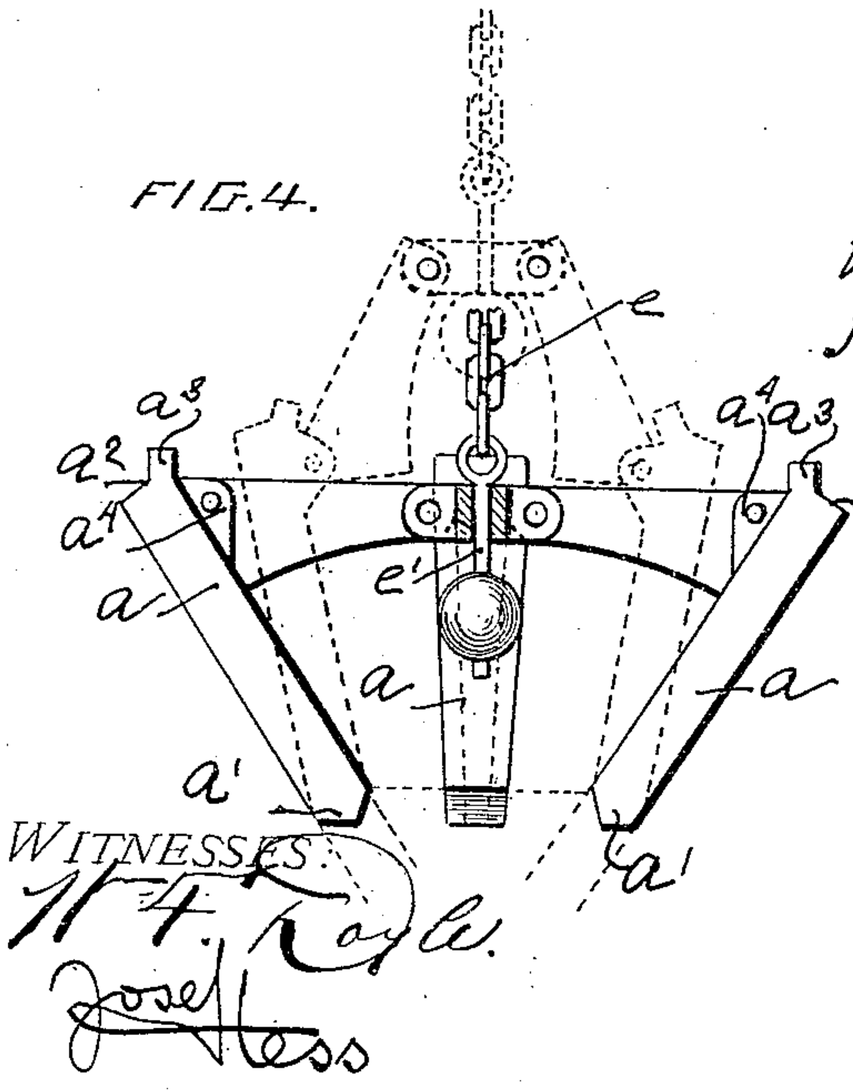


FIG. 5.

FIG. 4.



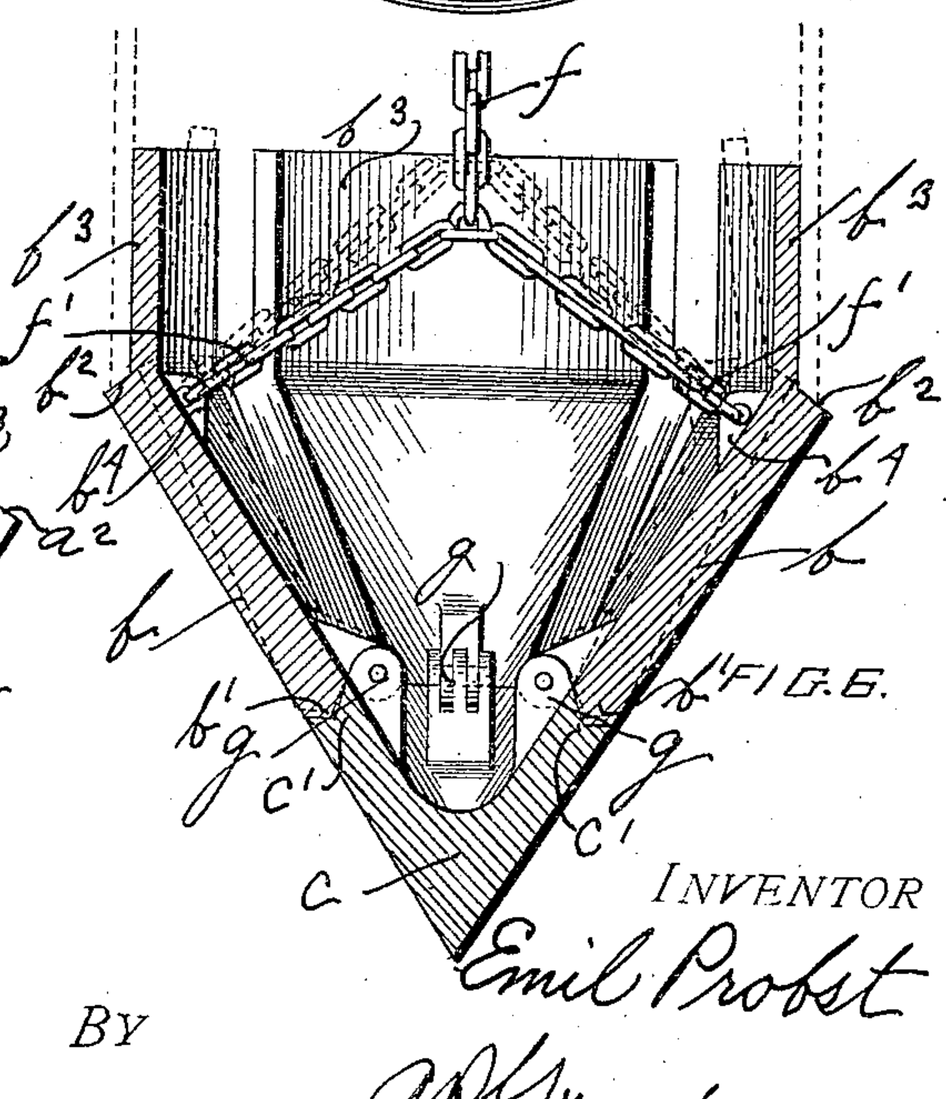


FIG. 6.

WITNESSES:

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EMIL PROBST, OF BERLIN, GERMANY.

COLLAPSIBLE SHOE.

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To all whom it may concern:

Be it known that I, EMIL PROBST, a citizen of Germany, residing at Berlin, Germany, have invented certain new and useful Improvements in Collapsible Shoes, of which the following is a description, reference being had to the accompanying drawings, forming a part hereof.

My invention relates to shoes for the lower ends of tubes to be driven or forced into the ground, and is particularly intended for use in connection with tubes which are driven into the ground to form an opening into which concrete may be introduced to form a concrete pile. Such shoes have been heretofore constructed to be capable of being opened to permit the tube with the shoe to be withdrawn after the concrete has been introduced, but as heretofore constructed they have been so secured to the lower end of the tube as to be capable of withdrawal only with the tube.

It is the object of my present invention to provide a collapsible shoe for the lower end of a tube which may readily be withdrawn through the tube independently of the tube thus permitting stones or other obstructions to be broken up by suitable tools or drilled through to permit the tube to pass by or through them.

With this object in view my invention consists in the collapsible shoe having the features of construction hereinafter described and particularly pointed out in the claims.

In the accompanying drawings: Figure 1 is a vertical sectional view of the shoe in place upon the tube, the same being taken upon a plane passing through the axis of the tube. Fig. 2 is a plan view of the shoe, the locking sections being shown in the position they occupy in the complete device. Fig. 3 is a plan view illustrating the locking sections of my device. Fig. 4 is a view showing in elevation the locking sections of my device, the full lines illustrating its normal condition and the dotted lines its collapsed condition. Fig. 5 is a plan view of segments forming a part of my device, the locking sections being omitted. Fig. 6 is a vertical sectional view similar to Fig. 1, the locking sections being omitted in this view and the dotted lines thereof illustrating the segments collapsed.

Referring to the drawings, the collapsible shoe is conical in form and is adapted to be carried at the lower end of the tube h. The shoe is made up of main sections or segments b, locking sections a, and a driving point c. The sections or segments b are hinged at g to the driving point c and have their lower ends made wedge shaped as shown at b' to fit corresponding wedge shaped recesses c' in the upper edge of the driving point c. At their upper ends the section or segments b are formed with inclined shoulders b^2 adapted to fit the lower end of the tube h and are also provided with extensions b^3 adapted to fit within the lower end of the tube h. Near their upper ends the sections or segments b are provided with lugs b^4 to which are secured the ends of chains f' which are connected at their other ends to a vertical chain f which extends upward through the tube h.

The sections or segments b are so constructed that when collapsed they will have their greatest diameter slightly less than the interior diameter of the tube h, and, when expanded, will be separated slightly from each other. The adjoining sides of the sections or segments b are beveled as shown at b^5.

The locking sections a are adapted to fit into the spaces between the sections or segments b to hold them in expanded position. These locking sections have their lower ends made wedge shaped as shown at a' to fit the wedge shaped recess c' in the upper edge of the driving point c and at their upper ends are provided with shoulders a^2 adapted to fit the lower end of the tube h and also have short lugs a^3 adapted to fit within the lower end of the tube. The locking sections are provided near their upper ends with lugs a^4 to which are pivoted the outer ends of locking arms d the inner ends of which are pivoted to a spider m through the center of which extends a weighted rod e' which is secured to a chain e which passes upward through the tube h.

When the device is to be used the locking sections a are inserted between the main sections or segments b the locking sections being in expanded position, and the extensions b^3 and the lugs a^3 are slipped into the end of the tube h, the shoe being held from collapsing by the arms d. The tube is then ready to be driven.

When the tube has been driven to the desired depth or when for any reason it is desired to remove the shoe a strong upward

pull on the chain *e* will draw the spider *m* upward causing the arms *d* to fold as shown in Fig. 4 drawing the locking sections *a* inward releasing the main sections *b* so that by an upward pull on chain *f* their upper ends will be drawn inward so as to be drawn upward through the tube.

The shoulders a^2 and b^2 extend outward beyond the outer periphery of the tube *h* so that the hole formed by the shoe as it is driven downward will be slightly larger than the tube.

It should be understood that while the device is particularly adapted for use in connection with the preparatory tubes for concrete piles it may be used in connection with tubes to be driven for wells or for any other purpose.

Having thus described my invention what I claim is:—

1. A collapsible shoe for tubes to be driven comprising a plurality of segments capable of being collapsed so as to pass through the tube, and of being expanded beneath the tube so as to engage the lower end thereof; and means for holding said segments in expanded position, said means being adapted to fit between adjacent edges of said segments to thereby hold them in their expanded position.

2. A collapsible shoe for tubes to be driven comprising a plurality of segments capable of being collapsed so as to pass through the tube, and of being expanded beneath the tube so as to engage the lower end thereof; and means for holding said segments in expanded position, said means comprising blocks located between adjacent edges of and filling the entire space between adjacent segments to thereby hold them in their expanded position and provide a shoe having a peripheral surface without openings leading to the interior of the tube.

3. A collapsible shoe for tubes to be driven comprising a driving point, segments hinged to the driving point and adapted to engage the lower end of a tube, and locking sections between the segments to hold them in expanded position, said locking sections being adapted to engage the lower end of the tube.

4. A collapsible shoe for tubes to be driven comprising a driving point having a recess in its upper edge, segments hinged to the driving point and adapted to engage the lower end of a tube, and locking sections adapted to fit between the segments to hold them in expanded position, said locking sections being adapted to engage the recess in the edge of the driving point and means for holding the locking sections in expanded position.

5. A collapsible shoe for tubes to be driven comprising a driving point, segments hinged near their lower ends to the driving point, means for locking the segments in expanded position and connections between the upper ends of the segments and a central chain by which the upper ends of the segments may be drawn inward toward the center.

This specification signed and witnessed this 14th day of June A. D. 1909.

EMIL PROBST.

In the presence of—
WOLDEMAR HAUPT,
HENRY HASPER.