No. 763,212. PATENTED JUNE 21, 1904.

F. SHUMAN.

PREPARATORY PILE FOR USE IN FORMING CONCRETE PILING.

APPLICATION FILED FEB. 5, 1904.

NO MODEL. 2 SHEETS—SHEET 1.

Fig. 1.

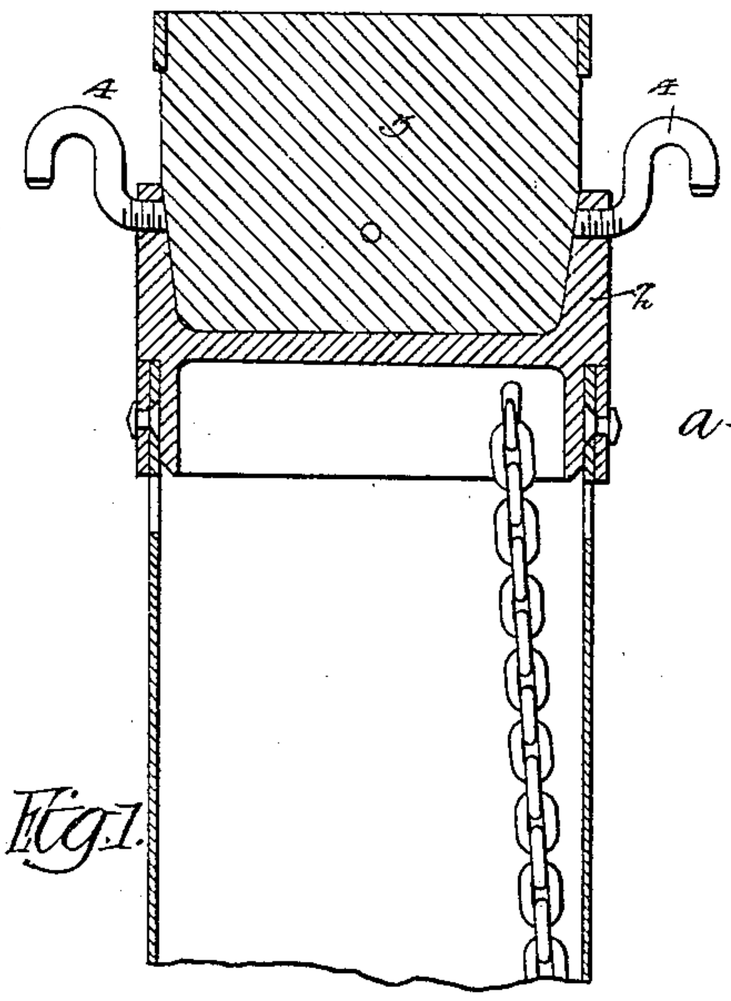


Fig. 4.

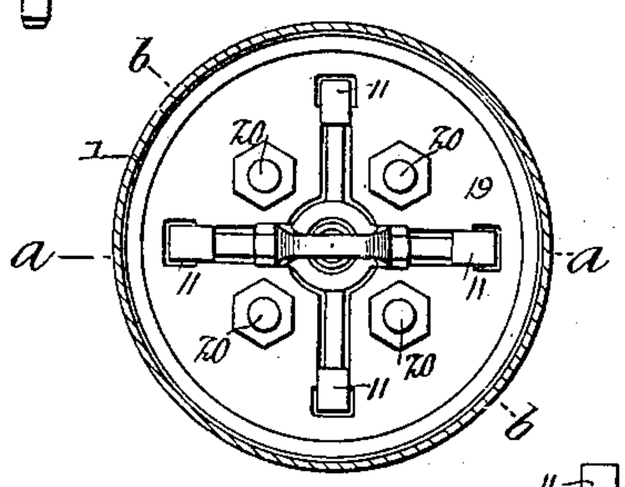


Fig. 5.

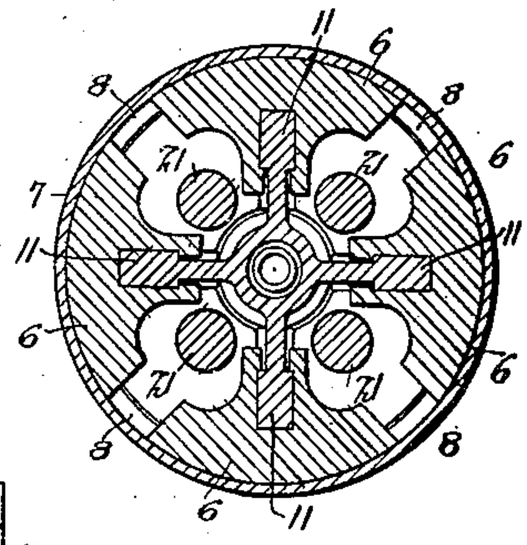


Fig. 6.

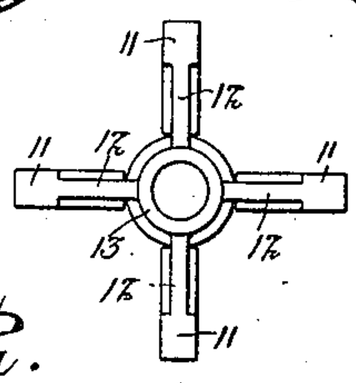


Fig. 2.

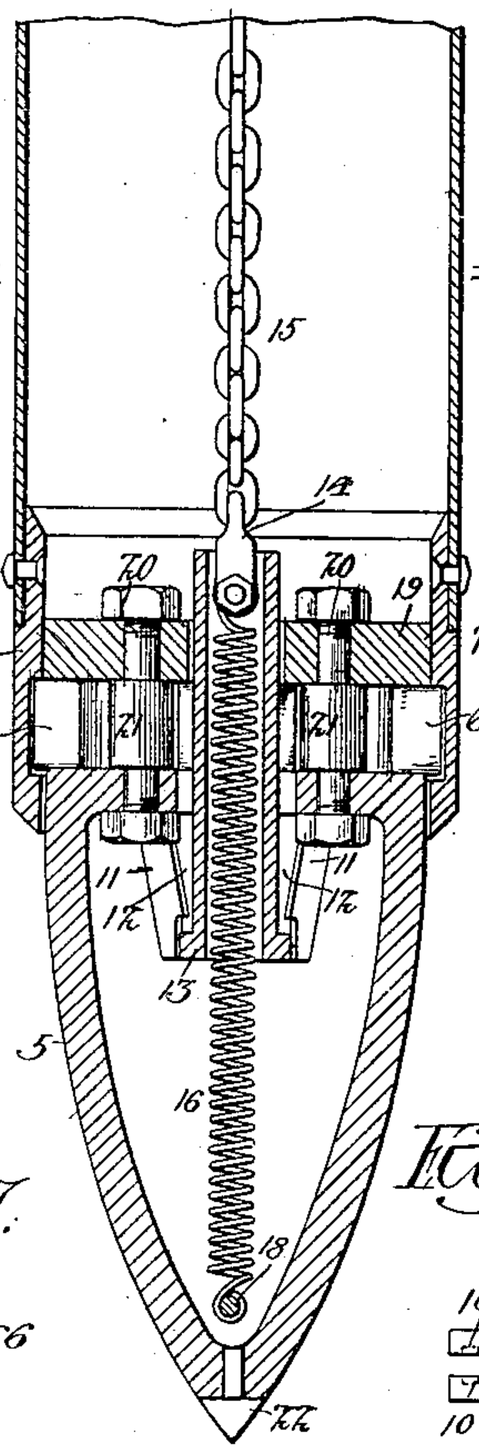


Fig. 3.

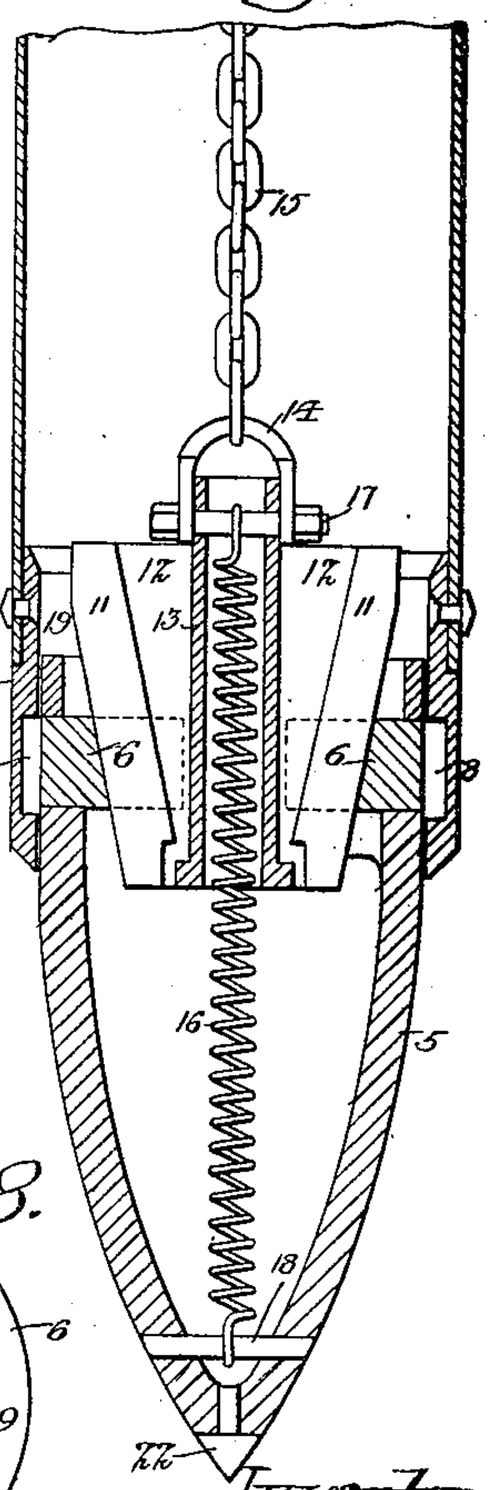
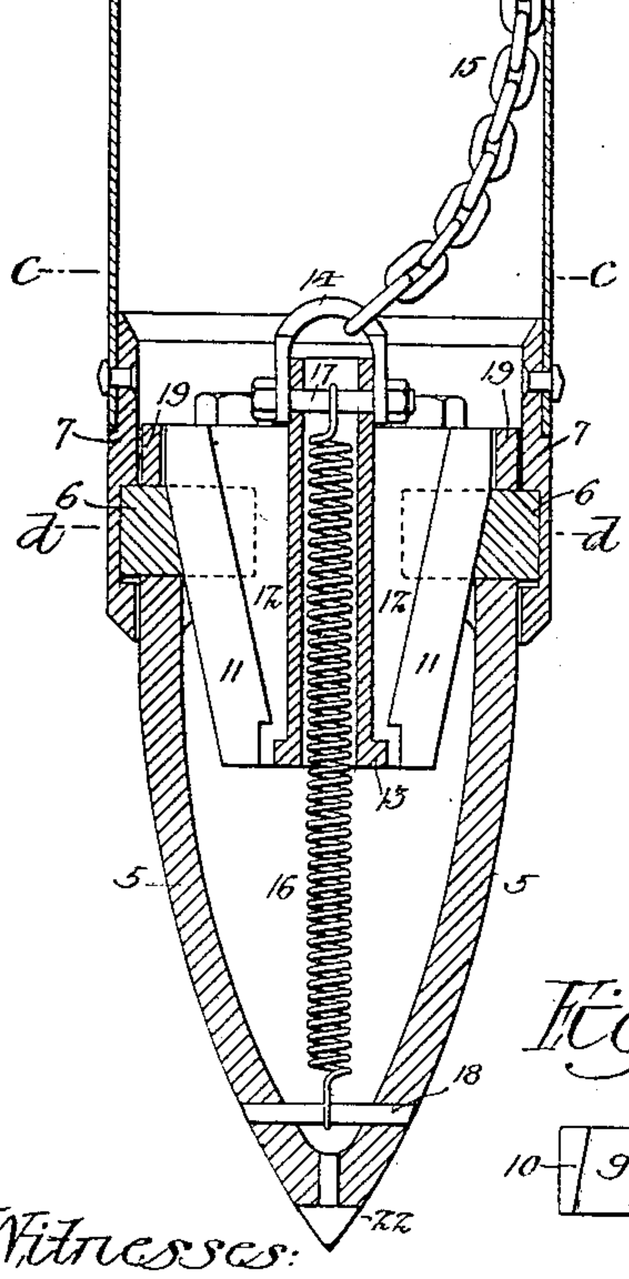


Fig. 7.



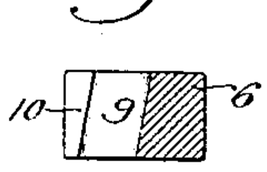
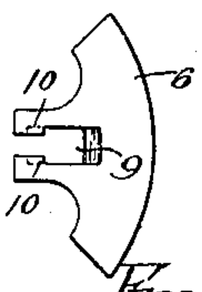


Fig. 8.



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No. 763,212. PATENTED JUNE 21, 1904.

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PREPARATORY PILE FOR USE IN FORMING CONCRETE PILING.

APPLICATION FILED FEB. 5, 1904.

NO MODEL. 2 SHEETS—SHEET 2.

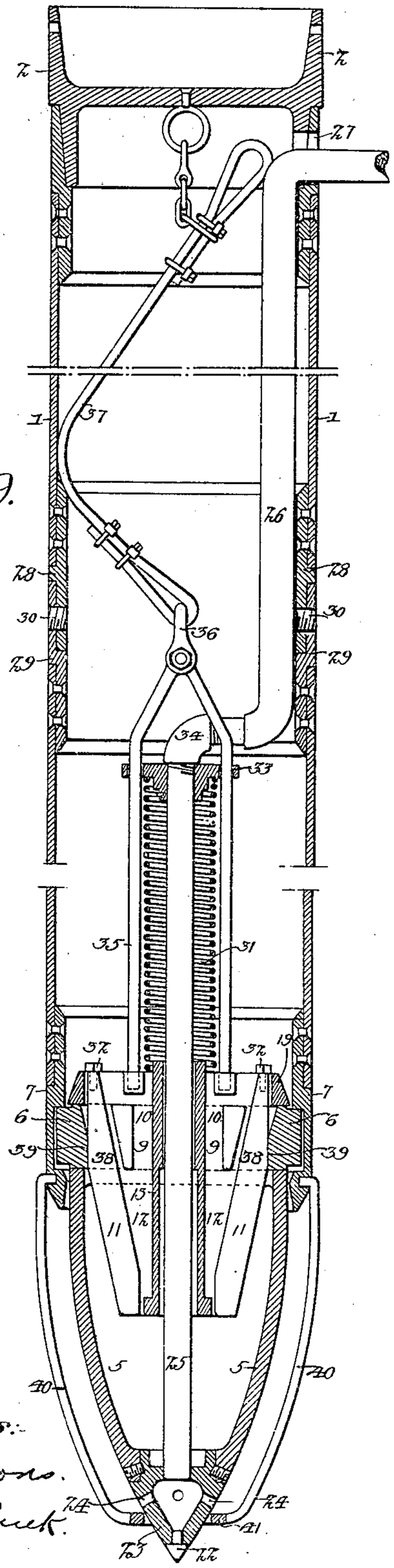

Fig. 9.

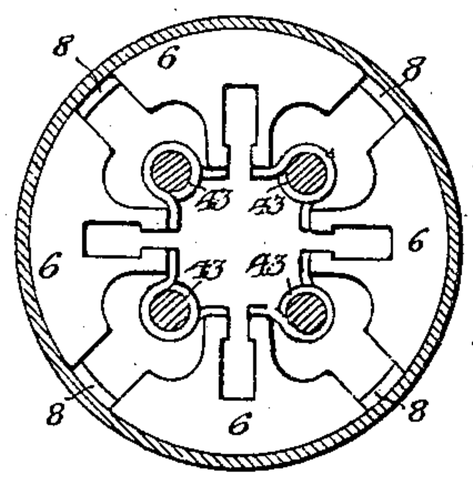

Fig. 11.

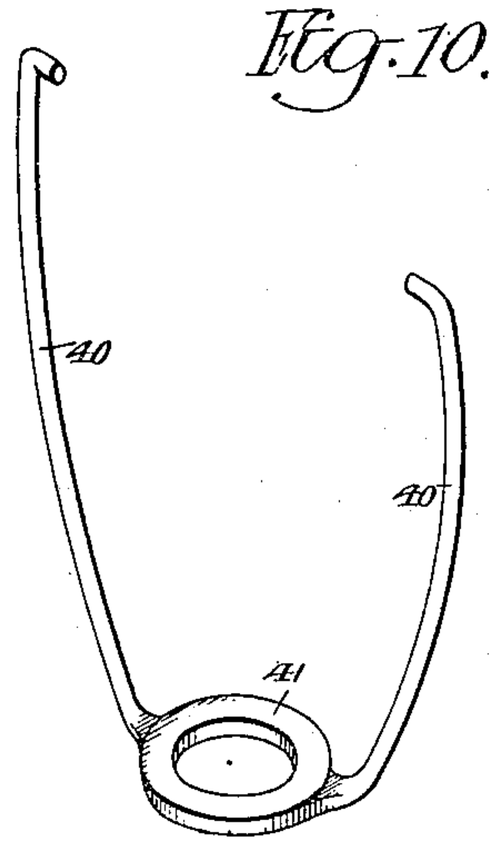

Fig. 10.

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No. 763,212. Patented June 21, 1904.

UNITED STATES PATENT OFFICE.

FRANK SHUMAN, OF PHILADELPHIA, PENNSYLVANIA.

PREPARATORY PILE FOR USE IN FORMING CONCRETE PILING.

SPECIFICATION forming part of Letters Patent No. 763,212, dated June 21, 1904.

Application filed February 5, 1904. Serial No. 192,154. (No model.)

To all whom it may concern:

Be it known that I, FRANK SHUMAN, a citizen of the United States, residing in Philadelphia, Pennsylvania, have invented certain Improvements in Preparatory Piles for Use in Forming Concrete Piling, of which the following is a specification.

My invention relates to a preparatory pile such as is used for forming an opening in the ground for the subsequent reception of a mass of concrete or cement, of which the permanent pile is to be composed, the object of my invention being to provide such a preparatory pile with a removable or detachable point, which can be withdrawn in advance of the withdrawal of the pile, so that the plastic concrete or cement compound can be introduced through the pile into the opening in the ground as the pile is being withdrawn therefrom.

In the accompanying drawings, Figure 1 is a longitudinal section of a pile with detachable point constructed in accordance with my invention, the section being taken on the line *a a*, Fig. 4. Fig. 2 is a sectional view of the lower portion of the pile, taken on the line *b b*, Fig. 4. Fig. 3 is a section of the lower portion of the pile on the same line as Fig. 1, but with some of the parts in a different position from that indicated therein. Fig. 4 is a sectional plan view of the pile on the line *c c*, Fig. 1. Fig. 5 is a sectional plan view on the line *d d*, Fig. 1. Figs. 6, 7, and 8 are views of different elements of the pile-point. Fig. 9 is a view similar to Fig. 1, but illustrating a pile embodying certain special features of my invention in addition to those shown in said Fig. 1. Fig. 10 is a perspective view of an element of the pile shown in Fig. 9, and Fig. 11 is a sectional plan view illustrating a modification of my invention.

The pile shown in Figs. 1 to 8 consists of a circular shell-metal casing 1, closed at the upper end by means of a driving-head, which consists of a ring 2, resting upon the top of the pile and carrying a plug 3, preferably of wood, for receiving the blow of the hammer whereby the pile is driven, this driving-head being preferably provided with hooked bolts 4 for the reception of tackle whereby it can be lifted from the pile when desired. The lower end of the pile has a detachable point consisting of a hollow tapering metal shell 5, provided near its upper end with radially-sliding bolts 6, which are adapted to engage with a ring 7, secured to the lower end of the hollow pile 1, said ring having an annular groove or channel 8, into which the bolts are projected in order to lock the point to the pile and from which the bolts are withdrawn when it is desired to release the point from connection with the pile. These bolts have formed in them inclined recesses 9, shouldered, as at 10, to engage with correspondingly-inclined ribs 11, which are formed upon the radial arms 12 of a centrally-located bolt-operating device having a hollow hub 13, as shown in Figs. 5 and 6, said hub having at the upper end a shackle 14, which is connected to the lower end of a chain 15, the upper end of the latter being secured to the driving-head 2 of the pile or connected to some other available support adjacent to the upper end of the pile. The hub 13 and its ribbed arms 12 are normally depressed by the action of a coiled spring 16, connected at its upper end to the pivot-pin 17 of the shackle 14 and at its lower end to a transverse pin 18 near the lower end of the hollow shell 5, so that the bolts 6 are normally projected by the action of the inclined ribs 11, as shown in Fig. 1, and thus by their engagement with the ring 7 securely lock the point to the pile. When, however, the hub 13 is raised by pulling upon the chain 15, said inclined ribs 11 serve to retract the bolts 6, as shown in Fig. 3, and thus permit of the withdrawal of the point through the hollow pile. The locking-bolts 6 are contained in guideways formed between the top of the shell 5 and a cap-plate 19, secured thereto by means of bolts 20, these bolts having enlarged portions or sleeves 21, which serve to properly separate the cap 19 from the shell 5 and permit free play of the locking-bolts 6 between the two. In the lower end of the shell 5 is an opening normally closed by a removable valve 22, which

leaves the opening as the point of the pile is withdrawn, and thus permits flow of air through the point to prevent the formation of the partial vacuum which would otherwise result and which would retard or prevent the ready withdrawal of said point.

The pile shown in Fig. 9 is intended to be sunk by water-jets instead of by driving, the shell 5 having at the point a chambered and detachable nose 23, which has lateral outlets 24 and is supplied with water under pressure through a pipe 25 and hose 26, the pipe passing through the hollow hub 13 and the hose being led out through lateral openings 27, formed in the casing 1 and cap 2. The casing of this pile is composed of sections with interlocking bell 28 and socket 29, which are secured together by transverse screws 30, and the bolt-operating structure is normally depressed by a coiled spring 31, interposed between the arms 12 and a washer 33, the latter bearing against the elbow 34 at the top of the pipe 25, and suitable stop-bolts 32 serving by contact with the top ring 19 to limit the extent of depression of the arms 12. The bolt-operating structure is raised by a yoke 35, connected to the arms 12 and having a shackle 36, with wire rope or other suitable connection 37, leading to the upper end of the pile.

The inclined ribs 11 are less in width than the recesses 9 of the bolt 6, so that when the bolts have been projected slight vertical movements of the ribs, such as might be caused by the jarring of the pile, will not effect any withdrawal of the bolts, this result being assisted by providing the ribs with vertical portions 38 and the recesses with corresponding vertical portions 39, which vertical portions are in engagement with each other when the bolts are projected, as shown, and serve as an effectual lock against inward movement of the bolts until the ribs 11 are intentionally raised to a higher position than they are likely to reach because of accidental movement.

In order to properly position the point in respect to the pile—that is to say, to arrest its further movement when the bolts 6 are in register with the groove 8 of the ring 7—the said ring has mounted upon it by means of elastic arms 40 a stop-ring 41, with which the nose of the point comes into contact when said point has reached its proper position. The arms 40 have bent upper ends adapted to notches or recesses in the ring 7, so that the stop-ring 41 can be readily applied to or removed from the pile. Suitable packing may be introduced between the shell 5 and the lower portion of the ring 7, so as to provide a waterproof joint at that point.

If desired, the vertically-movable structure which acts upon the locking-bolts may only retract the same, suitable springs—such, for instance, as shown at 43 in Fig. 11—being used to project them, or, on the other hand, the springs may be used to retract the bolts and the vertically-movable structure may be used to project them.

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

1. A hollow pile having a detachable point removable as a unit through said hollow pile, substantially as described.

2. A hollow pile having a detachable point with locking-bolts, and means for projecting the same, for engagement with the pile, and retracting them, so as to release the point from engagement with the pile, substantially as described.

3. The combination of a hollow pile with a detachable point having locking-bolts for securing the same to the pile, and a structure movable in a plane transverse to the plane of movement of the bolts, for projecting or retracting the latter, substantially as specified.

4. The combination of a hollow pile with a detachable point, having locking-bolts for securing the same to the pile, and a structure movable in a plane transverse to the plane of movement of the bolts, and serving both to project and retract them, substantially as specified.

5. The combination of a hollow pile with a detachable point, having locking-bolts for securing the same to the pile, a structure for projecting or retracting said bolts, a spring acting upon said structure to move it in one direction and a connection leading through the pile for moving said structure in the opposite direction, substantially as specified.

6. The combination of a hollow pile with a detachable point having bolts whereby it can be locked to the pile, a structure for projecting and retracting said bolts, a spring serving to move said structure into position for projecting the bolts and a connection leading through the pile whereby said structure can be moved so as to retract the bolts, substantially as specified.

7. The combination of a hollow pile having a recessed ring at its lower end, with a detachable point having bolts for engaging said recessed ring and means for advancing and retracting said bolts, substantially as specified.

8. The combination of a hollow pile having a detachable point with bolts for engaging said pile, and a structure having inclined ribs for engaging with inclined recesses in said bolts, whereby radial movement of the bolts is effected by movement of the engaging structure in line with the axis of the pile, substantially as specified.

9. The combination of a hollow pile with a detachable point having sliding bolts for engaging with the pile, and an operating device for said bolts, comprising a central hub hav-

ing arms with inclined ribs at their outer ends for engaging with correspondingly-inclined recesses in the bolts, substantially as specified.

10. The combination of a hollow pile with a detachable point having a cap secured thereto by bolts having enlargements or other separators thereon, locking-bolts sliding between said point and its cap, and means for advancing and retracting said bolts, substantially as specified.

11. The combination of a removable hollow pile with a hollow point, having jet-openings therein, and means for supplying water under pressure to said point, substantially as specified.

12. The combination of a hollow pile with a detachable point having jet-openings therein, and means for supplying water under pressure to said point, substantially as specified.

13. The combination of a hollow pile, with a point having jet-openings therein, means for supplying water under pressure to said point, locking-bolts for securing the point to the pile, and means for operating said bolts to release the point from the pile, substantially as specified.

14. The combination of a hollow pile with a point having bolts for locking the same to the pile, and means for retracting said bolts, having lost motion in respect thereto, substantially as specified.

15. The combination of a hollow pile with a point having bolts for locking the same to the pile, and means for projecting or retracting said bolts, said means having locking-surfaces for retaining the bolts in projected position, substantially as specified.

16. The combination of a hollow pile with a point having bolts for locking the same to the pile, and means for projecting or retracting said bolts said means having acting-surfaces partly straight and partly inclined, substantially as specified.

17. The combination of a hollow pile with a point having bolts for locking the same to the pile, and means for projecting and retracting said bolts, said means having lost motion in respect to the bolts and having acting-surfaces partly straight and partly inclined, substantially as specified.

18. The combination of a hollow pile, a point having bolts for locking the same to the pile, and an external stop for properly positioning the point in respect to the pile, substantially as specified.

19. The combination of a hollow pile, a point having bolts for locking the same to the pile, and a removable stop for properly positioning the point in respect to the pile, substantially as specified.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

FRANK SHUMAN.

Witnesses:
JAMES MCMORRIS,
JOS. H. KLEIN.