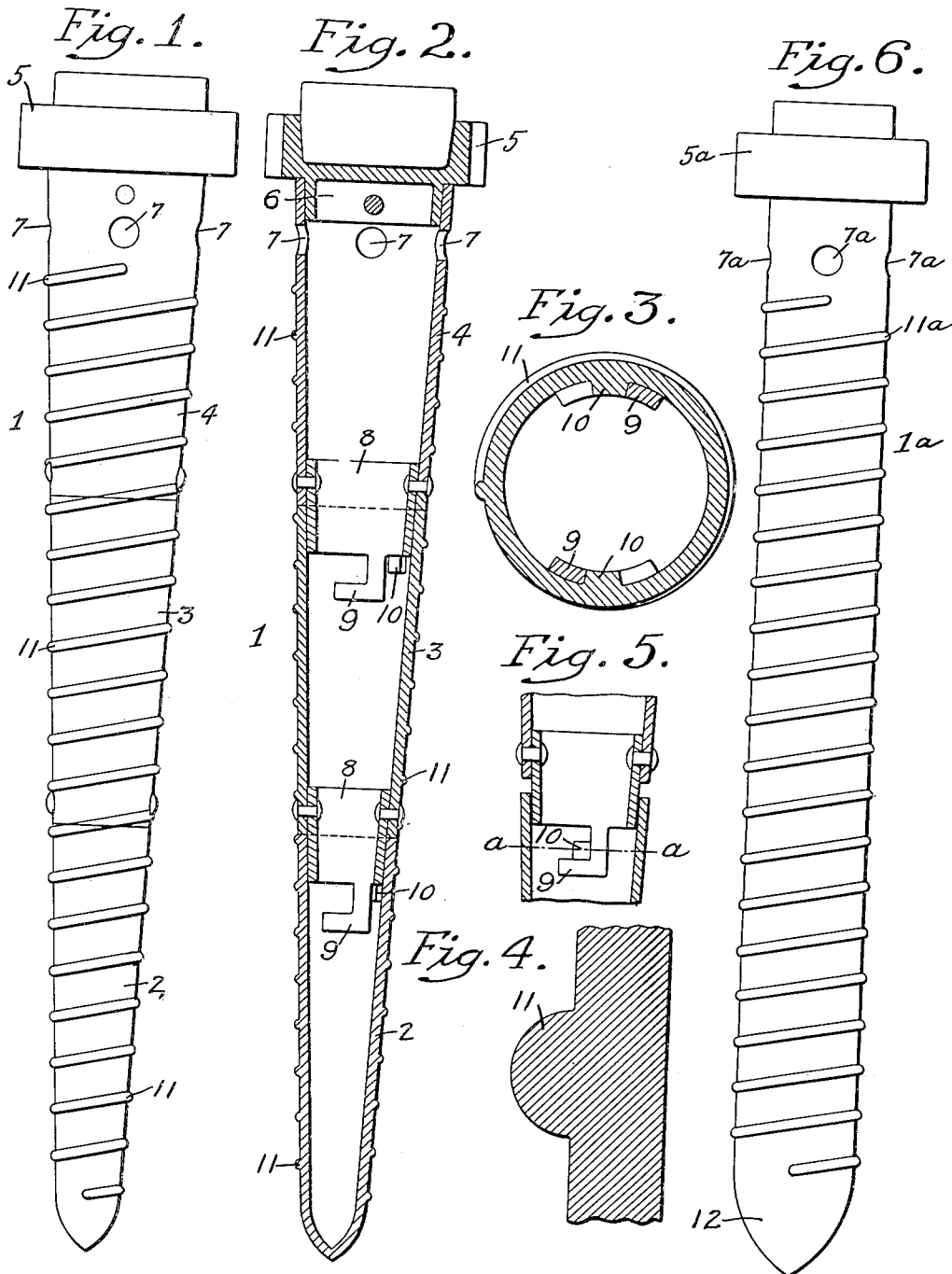


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 PILE FORM AND METHOD OF DRIVING THE SAME.
 APPLICATION FILED OCT. 2, 1915.

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 2 SHEETS—SHEET 1.



Inventor:
 Frank Shuman
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Fig. 7.

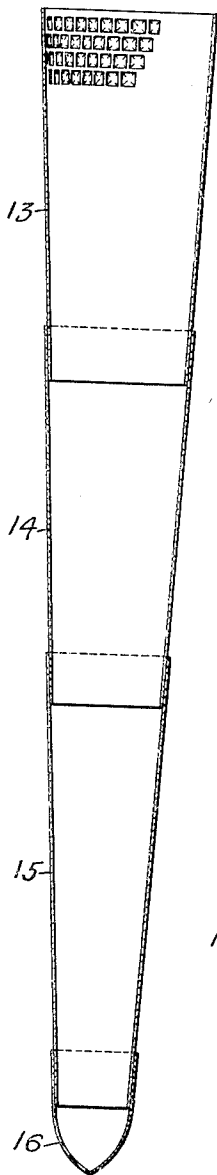


Fig. 8.

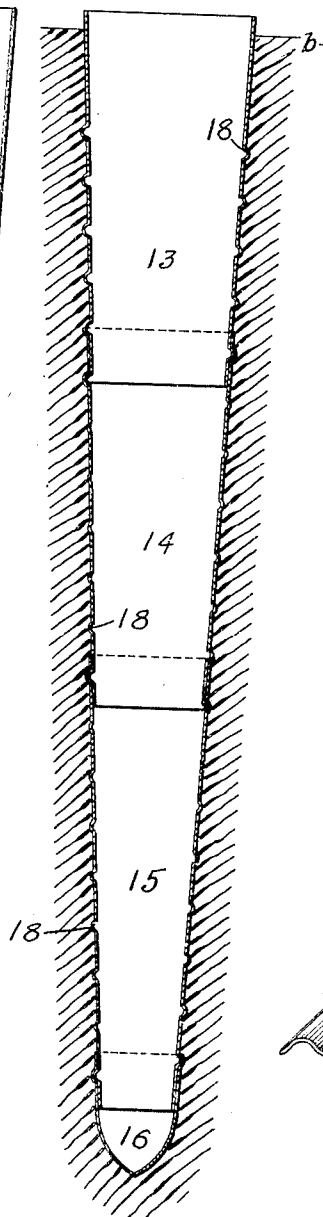


Fig. 9.

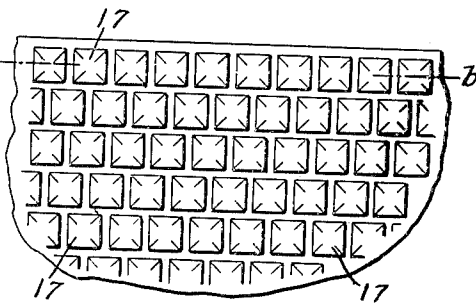
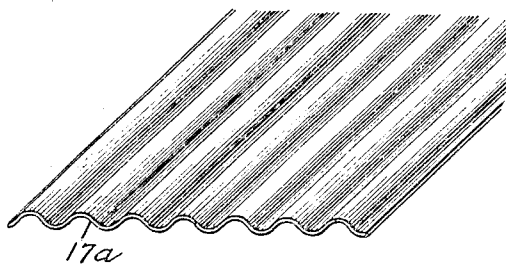


Fig. 10.



Fig. 11.



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UNITED STATES PATENT OFFICE.

FRANK SHUMAN, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR TO THE SIMPLEX CONCRETE PILING COMPANY, OF WASHINGTON, DISTRICT OF COLUMBIA, A CORPORATION OF THE DISTRICT OF COLUMBIA.

PILE-FORM AND METHOD OF DRIVING THE SAME.

1,258,482.

Specification of Letters Patent.

Patented Mar. 5, 1918.

Application filed October 2, 1915. Serial No. 53,731.

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 Pile-Forms and Methods of Driving the Same, of which the following is a specification.

My invention relates to certain improvements in the forms for making holes or molds in the ground to receive concrete which, when hardened, becomes a pile.

One object of my invention is to construct the pile form so that it can be driven in the ordinary manner to any depth desired and can be removed by turning the form.

A further object of the invention is to make the form in sections so that, while it is driven as a single unit, it can be released by turning one section after another and removed.

A still further object of the invention is to drive a casing for the opening which will accommodate itself to the spiral ribs of the pile form and which will remain in the ground after the pile form is withdrawn.

In the accompanying drawings:

Figure 1 is a view of the tapered pile form in elevation and illustrating my invention;

Fig. 2 is a longitudinal sectional view of the pile form;

Fig. 3 is a transverse sectional view on the line *a-a*, Fig. 5;

Fig. 4 is an enlarged view illustrating the shape of the spiral ribs on the pile form;

Fig. 5 is a sectional view illustrating the position of the coupling of the sections of the pile form, when one section is turned independently of another section;

Fig. 6 is a view in elevation illustrating my invention in connection with a pile of an even diameter throughout;

Fig. 7 is a view of the casing which can be used in connection with the pile shown in Fig. 1;

Fig. 8 is a view showing the casing embedded in the ground after being driven by the pile form shown in Fig. 1, and after the pile form has been removed;

Fig. 9 is an enlarged side view of the pressed sheet from which the casing illustrated in Fig. 6 is made, and formed so as to allow the sheet to accommodate itself to the spiral ribs of the pile form;

Fig. 10 is an enlarged sectional view on the line *b-b*, Fig. 9, and

Fig. 11 is a perspective view of a corrugated sheet which may be used in making the casing illustrated in Fig. 7.

Referring to Figs. 1 to 5 inclusive, 1 is a conical pile form made, in the present instance, in three sections 2, 3 and 4, coupled together by any suitable detachable fastenings. 5 is the driving head of the pile having a flange 6 which extends into the upper end of the upper section 4 of the pile. 7, 7 are openings for the reception of a turning bar. The sections, in the present instance, are coupled together by sleeves 8. One sleeve is riveted, or otherwise secured, to the lower end of the upper section and extends into the upper end of the intermediate section and has hooks thereon which engage lugs 10 on the intermediate section. The other sleeve 8 is secured to the lower end of the intermediate section and has hooks which engage lugs 10 on the lower section. When the pile is driven in the ground the lugs are at the back of the hook, as shown in Fig. 2, but when the section is turned to screw the section out of the ground, then the hook engages the lug 10, as illustrated in Fig. 5, so that each section has but a limited amount of movement independently of the next lower section, when its hook engages the said section and turns said lower section, and by these hooks the entire pile form can be removed from the ground.

On the exterior surface of each of the pile sections is a spiral rib 11, preferably formed as shown in Fig. 4. The rib projects a sufficient distance from the exterior surface of the pile so that it will grip the earth and when the pile section is turned the section will be lifted a certain distance and freed from the frictional contact of the earth, after which it can be readily removed from the opening. The spiral is preferably continuous throughout the length of the pile when the sections are coupled, as in Fig. 1.

It will be seen that when the pile form is driven by the usual method of striking a blow on the end of the driving head the form enters the ground as a unit. It can be turned, after being driven, in some instances, so as to force it farther into the ground, but, in practice, a pile can usually be driven to the depth desired. After the pile is driven the turning bar is placed in one of the holes 8 and the upper pile section is turned and raised a half turn or until the hook engages the lug on the section below it. This will relieve the pressure on the first section so that the friction will be greatly reduced and, on the continued movement, the second section is turned and raised until its hook engages the lug on the lower section. This reduces the friction on the second section so that, on the continued turning of the sections, the last section is turned and raised and, on continuing the turning movement, the sections will be raised sufficiently to release them from the ground in order that they may be bodily raised by any suitable lifting mechanism.

While I have shown, in Fig. 3, two hooks and two lugs, so that each section has an independent half turn of about one-half a revolution, a single lug and hook may be used in some instances where it is desired to prolong the independent movement of one section.

The above description refers particularly to a tapered pile of the type illustrated in Fig. 1, but the invention can be used in connection with a pile of an even diameter throughout, as illustrated in Fig. 6. This pile form 1^a may be made in a single piece and may have a spiral rib 11^a formed on its exterior surface throughout its length, the pile form terminating at a point 12. This pile form has a driving head 5^a and holes 7^a for the turning bar. The pile form is driven in the ordinary manner to the depth desired and is turned by a turning bar which is placed in one of the openings 7^a and in this instance the pile form will have to be turned until it is entirely removed from the opening, owing to the fact that it is of an even diameter throughout.

In some localities, it is necessary to provide a lining or casing for the hole which will support the earth after the hole is made and prior to the insertion of the concrete which forms the permanent pile. This casing is preferably made, as shown in Figs. 7 and 8, to conform to the shape of the pile. The casing shown in Fig. 7 is applied to the pile form illustrated in Fig. 1, and is made, in the present instance, in three sections 13, 14 and 15 and is provided with a point 16. The end of an upper section extends into the section below it, as shown clearly in the drawings. When the pile form is driven the spiral ribs 11, on the pile form, make like

projections 18 on the casing, as shown in Fig. 8, which illustrates the casing in the opening in the ground ready to receive the concrete and, in order to form the corrugations on the casing, I make the casing from sheets which are undulated in any suitable manner so that when pressure is applied, the ribs will take up a certain amount of the undulations as it is impossible to draw these ribs from a plain sheet with the pressure applied and while the sheet is cold.

In Figs. 9 and 10, I have illustrated a sheet having a series of projections 17 formed by rolling, or pressure, while the plate is hot, and while these projections are slightly elevated above the line of the plate they do not interfere with the application of the casing to the pile form and, when the pile form is driven, the extra metal needed to form the ribs is drawn from these projections.

In Fig. 11, I have illustrated a plate having corrugations 17^a, which, when the plate is applied, will run substantially parallel with the spiral thread of the driving form and will answer the same purpose as the projections 17 on the plate illustrated in Fig. 9. The corrugations 17^a and the projections 17 are small as compared with the spiral thread of the driving form.

It will be seen that when the concrete is placed in the opening formed by the driving form illustrated in Fig. 1, or that illustrated in Fig. 6, that the concrete will flow into the spiral grooves in the walls and thus greatly add to the frictional value of the pile. The undulations also tend to hold the shell in the ground as the form is being turned.

While I have shown the sections of the casing independent of each other, the lower end of one section extending into the upper end of another section, these sections may be held together by rivets, or other fastenings, if found desirable.

I claim:

1. The combination in a pile driving form, of a series of sections having interlocking couplings by which they are detachably connected, each section having a spiral rib on its exterior surface so that the pile driving form is driven as a unit and, after the pile form is driven, the sections can be turned to release the sections in rotation.

2. The combination in a tapered pile form, made in a series of sections, each section having a spiral rib thereon; interlocking couplings between the sections, each interlocking coupling consisting of a hook on one section and a lug on the other section, the opening in the hook being greater than the width of the lug, so that when the upper section is turned it will be raised, due to the spiral, a given distance prior to its coupling engagement with the next lower section and

this last mentioned section can be turned and raised prior to its engagement with the next lower section.

5 3. The process herein described, of forming openings in the ground for piles by mounting a casing on a form having a spiral rib on its exterior surface, driving the

form, with the casing in the ground, the rib forcing the metal of the casing to conform to its shape, turning the pile to release it 10 from the casing, withdrawing the pile form, and filling the casing with concrete.

FRANK SHUMAN.