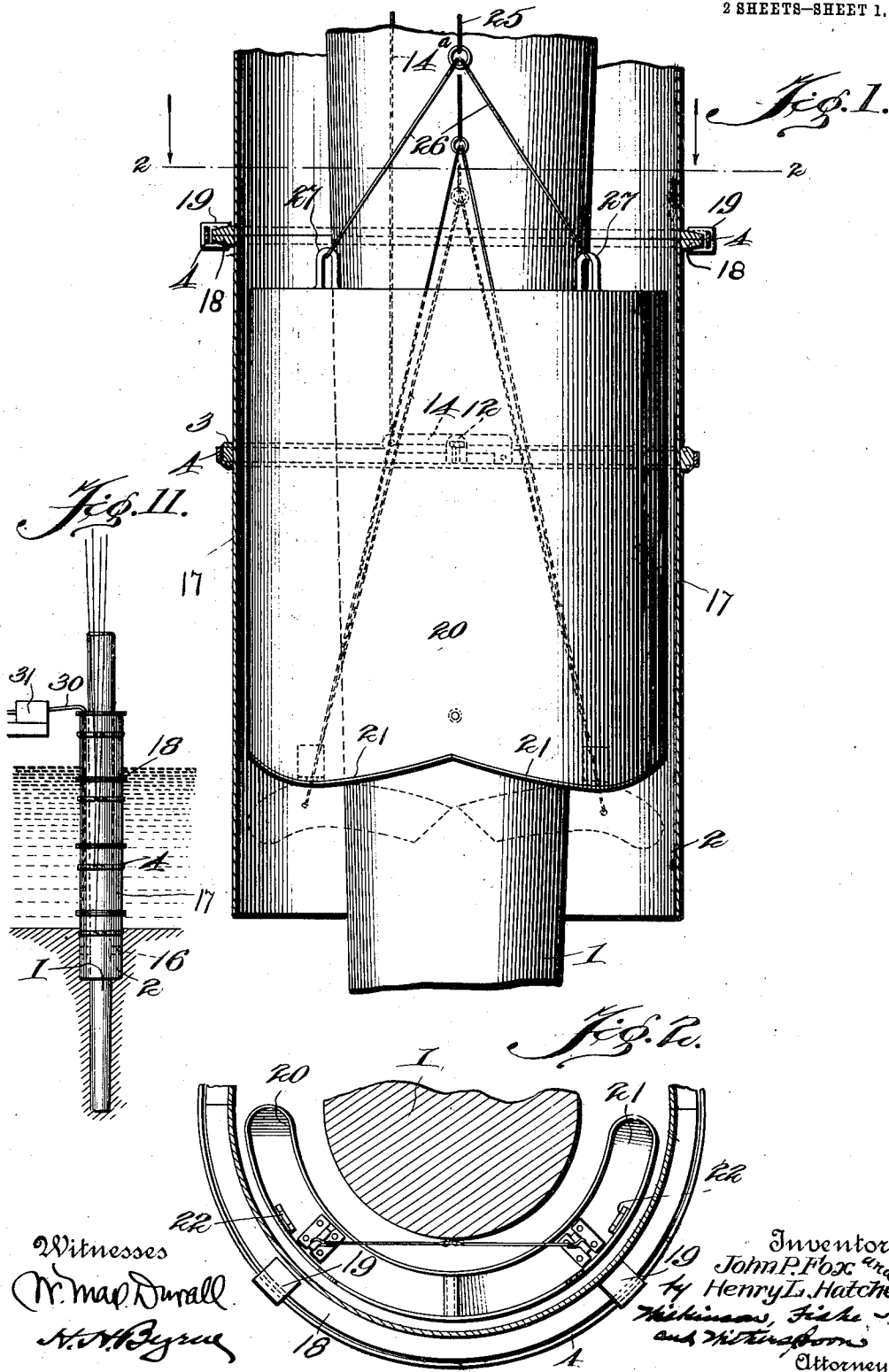


J. P. FOX & H. L. HATCHER.
 METHOD OF AND APPARATUS FOR APPLYING PROTECTING COVERING TO PILES.
 APPLICATION FILED AUG. 9, 1911.

1,013,758.

Patented Jan. 2, 1912.

2 SHEETS—SHEET 1.



Witnesses
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 H. M. Byrne

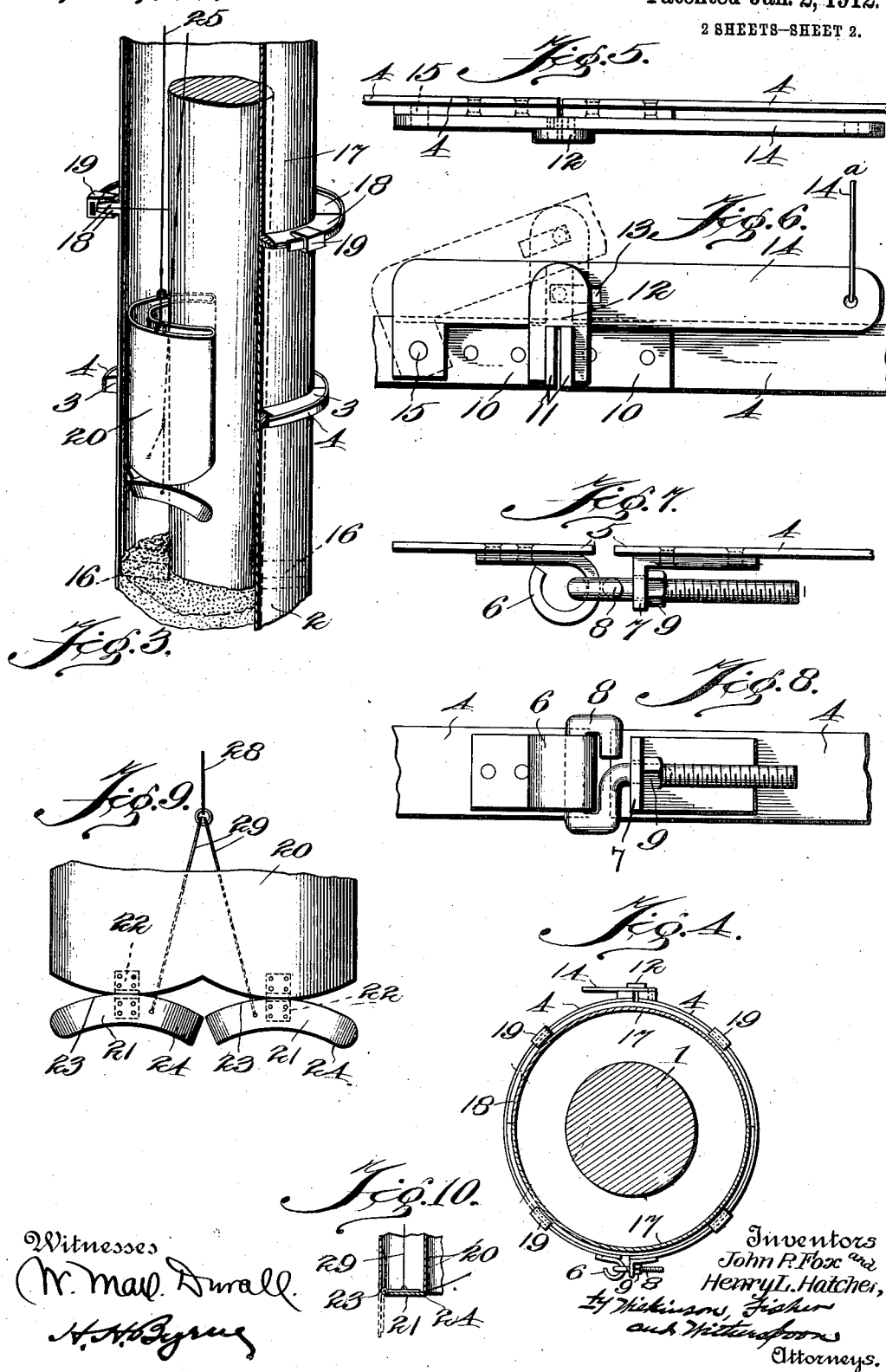
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UNITED STATES PATENT OFFICE.

JOHN P. FOX, OF TAMPA, FLORIDA, AND HENRY L. HATCHER, OF SAVANNAH, GEORGIA;
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METHOD OF AND APPARATUS FOR APPLYING PROTECTING-COVERING TO PILES.

1,013,758.

Specification of Letters Patent.

Patented Jan. 2, 1912.

Application filed August 9, 1911. Serial No. 643,222.

To all whom it may concern:

Be it known that we, JOHN P. FOX and HENRY L. HATCHER, citizens of the United States, residing at Tampa and Savannah, in the counties of Hillsboro and Chatham and States of Florida and Georgia respectively, have invented certain new and useful Improvements in Methods of and Apparatus for Applying Protecting-Coverings to Piles; and we do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

The present invention relates to a method of and apparatus for applying a protecting covering to piles or other sub-aqueous structures subjected to the ravages of teredo infested waters, and has for its purpose to apply such coverings in a manner that will prolong the life of the pile and increase the strength of the covering superior to that of any known or heretofore used method so far as we are aware.

The usual manner of applying the protecting material to piles or the like consists in inclosing a space surrounding the pile, centering the same with respect thereto, then applying the protecting material by dumping the same into the annular space, allowing it to fall by gravity through the water in said space and to settle on the mud bottom; but this method has the disadvantages that this mud bottom is liable in time to wash away and leave the pile exposed; and further the protecting material in passing through the water is widely separated or disintegrated and stratifies when settled. In other words material deposited in this manner does not have the cohesion or strength desired.

To overcome these disadvantages is the especial object of the present invention, and to that end we contemplate removing the mud bottom from within the inclosure and delivering the concrete or other protecting substance in a solid mass to the space thus provided and causing it to be uniformly deposited around the pile.

For carrying the foregoing operation into effect an apparatus is provided that is simple in construction, easily assembled, and which may be used indefinitely.

While the invention is not restricted to the exact details shown and described, still

for the purpose of disclosure reference is had to the accompanying drawings, in which like reference characters designate the same parts, in the several views and in which:—

Figure 1 is a central sectional view of a portion of the apparatus showing the conveyer in elevation. Fig. 2 is a broken top plan view of Fig. 1 taken on the line 2—2. Fig. 3 is a perspective view, partly broken away, showing the apparatus assembled and in applied position. Fig. 4 is a transverse sectional view, partly in elevation and with the conveyer omitted, of Fig. 3. Fig. 5 is a top plan view of the band connection and releasing device. Fig. 6 is a side elevation thereof. Fig. 7 is a top plan view of the permanent and adjustable band connection. Fig. 8 is a side elevation thereof. Fig. 9 is an elevation showing the construction of the conveyer bucket's drop bottom. Fig. 10 is a transverse sectional view of the bottom portion of the conveyer, and; Fig. 11 illustrates the apparatus complete and in position for applying the protecting covering to a pile.

Referring to the construction in detail and with like reference characters indicating corresponding parts in the different figures shown, the apparatus consists in a tubular like structure assembled to inclose an annular space surrounding a pile 1 or other sub-aqueous structure to have a protecting covering applied. Said tubular structure consists of a bottom section 2 formed of a pair of semi-circular wooden forms that are held assembled through the medium of a collar of segmental sections 3 and a band or strap 4. The band 4 is in two parts having the ends 5 thereof united by a permanent coupling which consists in a ring 6, an angular piece 7, and a threaded eye bolt 8. The desired adjustment of the band is secured by the adjusting nut 9. The opposite ends of the band 4 are adapted to be detachably connected whereby said band may be released from the structure and recovered on the completion of the operation. The releasing means comprises a pair of similar angular pieces 10 having the portions 11 thereof disposed in off-standing parallel relation and designed to receive a locking member 12, that is pivotally and slidably mounted in a slot 13 of a lever 14. Said lever is pivotally mounted at 15 to one end of the band 4 as shown in Fig. 6. The locking band 4 is released and recovered through the

medium of a line 14^a secured at one end of the lever 14. The lower section 2 is designed to be driven for a suitable depth into the mud bottom or bed and is thereafter intended to be abandoned, although, of course, the assembling band 4 above referred to may be recovered. The lower section 2 provides the support or foundation for the remaining structure, and for centering this structure with respect to the pile 1 said lower section is designed to be provided with a suitable number of blocks or other spacing members 16. The sections 17 supported by the lower sections 2 are in like manner constructed of wood and are also of semi-circular design in cross section. At their opposite ends the sections 17 are each provided with an integral and angularly disposed beveled collar or flange 18, and the upper edge of the lower section 2 is in like manner constructed. The continuous collar 18 of an upper section is designed to rest upon the upper collar 18 on the adjacent edge of the next lower section, and for holding said sections in super-posed alinement a band 4, also employed here, is provided with a plurality of wedge blocks 19 which are designed complementary to and embrace the beveled collars 18. The wedge blocks 19 are strung upon the band sections 4 and may be readily shifted thereon. By this manner of assembling the super-posed sections there is provided a water-tight joint which may be secured by tightening the bands and in this respect the invention is considered to be novel in that the mud bottom within the inclosed space may be pumped out and the material delivered direct and *en masse* to its foundation, and not allowing it to fall any appreciable depth through the water which as above stated causes it to stratify. It is to be understood, however, that the invention contemplates the idea of also pumping out the water and delivering the material by carrying each load to the point of settlement out of contact with the water.

The apparatus for conveying the material consists in a bucket or carrier 20 which is designed semi-circular in cross section to conform with the space within which the same is designed to travel, and for the further purpose of having the material partially distributed after the form it would otherwise assume when settling. The object of this latter mentioned condition is that the successive loads of concrete or other substances used are deposited in uniformly distributed layers to the end that better adhesion of the resultant solidified structure is obtained.

The bottom of the bucket consists of two arcuate sections 21 secured by hinges 22 to the bucket wall and the inner and outer edges 23 and 24 of said bottom portions have each the same contour as the corre-

sponding edges of the bucket walls. The bucket 20 is designed to be raised and lowered through the medium of a cord 25 having branches 26 that are attached to eye pieces 27 located on the upper edge of said bucket. And the drop bottom sections 21 are designed to be manipulated through the medium of a similar arrangement consisting in a line 28 with branches 29 that are secured to said sections.

In the carrying out of the invention the casing or tubular structure is lowered down over the pile and then driven into the mud for a suitable distance, and is centered by the members 16 and additional means if necessary. A hose 30 is next let down into the space between the casing and the pile and the mud pumped out by a pump 31. The bucket is next lowered filled with the concrete or other material, which material is then released into that space previously occupied by the mud. The material is next filled in solid masses all around the pile up to the required height, and the depositing of the said material in such solid masses around the pile prevents it from being finely separated as above stated, which would be the case if it were lowered through the water by gravity or placed in the space between the casing and the pile by a hose from the top of the casing. The result is the concrete material sets or hardens in masses which are more compact, and are therefore much stronger than would be the case if the concrete material were allowed to settle as mud down through the water. The concrete being thus solidified, forms an exceedingly strong casing or reinforcement for the pile and eventually it furnishes the main strength of the pile. We are thus enabled to use cheaper material for the pile than would otherwise be the case, and at the same time our process provides an exceedingly inexpensive means for making strong and durable piles in place. After the concrete has set, the bands 4 are unlocked in the manner above described, and the casing sections 17 being in the form of half cylinders and preferably well greased, they readily detach themselves and float up to the surface where they may be recovered for using again.

It is obvious that those skilled in the art may vary the details of our invention without departing from the spirit thereof and therefore we do not wish to be limited to the above disclosure except as may be required by the claims.

What we claim is:—

1. The method of applying a protecting covering to piles consisting in inclosing a space surrounding the pile; pumping out the bed of said pile within said space; and delivering loads of the protecting material *en masse* into said space and allowing the same to solidify, substantially as described.

2. The method of applying a protecting covering to piles consisting in inclosing a space surrounding the pile; pumping out the bed of said pile within said space; and
5 lowering loads of the protecting material to the bottom of said space and releasing said loads *en masse* and allowing the same to solidify, substantially as described.

3. The method of applying a protecting covering to piles consisting in inclosing a water-tight space surrounding the pile; pumping out the bed of said pile and water within said space; and lowering loads of the protecting material into said space and re-
10 leasing said loads *en masse* and allowing the same to solidify, substantially as described.

4. In an apparatus for applying protecting coverings to piles, the combination of a sectional casing adapted to surround the
20 pile and be driven into the bed thereof; means for pumping out the bed of the pile within said casing; and means for conveying loads of the protecting material to the bottom of the space within said casing and re-
25 leasing said loads *en masse*, substantially as described.

5. In an apparatus for applying protecting coverings to piles, the combination of a casing adapted to surround the pile com-
30 prising a plurality of superposed sections,

each of said sections provided with beveled collars at the ends thereof; bands having wedge shaped clamps adapted to engage said beveled collars and hold the sections in assembled relation to provide a water-tight
35 space; means for pumping out the bed of the pile within said space; and means for conveying loads of the protecting material to the bottom of the space within said casing and releasing said loads in solid masses, sub-
40 stantially as described.

6. In an apparatus for applying protecting coverings to piles, the combination of a casing adapted to surround the pile compris-
45 ing a plurality of super-posed sections, each having beveled collars at the end thereof; band sections hinged together at one end having wedge shaped clamps adapted to en-
50 gage said collars; a lever provided with locking means at the other end of said sections adapted to lock and unlock said bands; and means for operating said lever from a distance, substantially as described.

In testimony whereof, we affix our signatures, in presence of two witnesses.

JOHN P. FOX.

HENRY L. HATCHER.

Witnesses:

WM. E. McELWAIN,

H. P. COBB.