(No Model.)

D. W. McELROY.

PILE.

No. 506,856. Patented Oct. 17, 1893.

Fig. 1

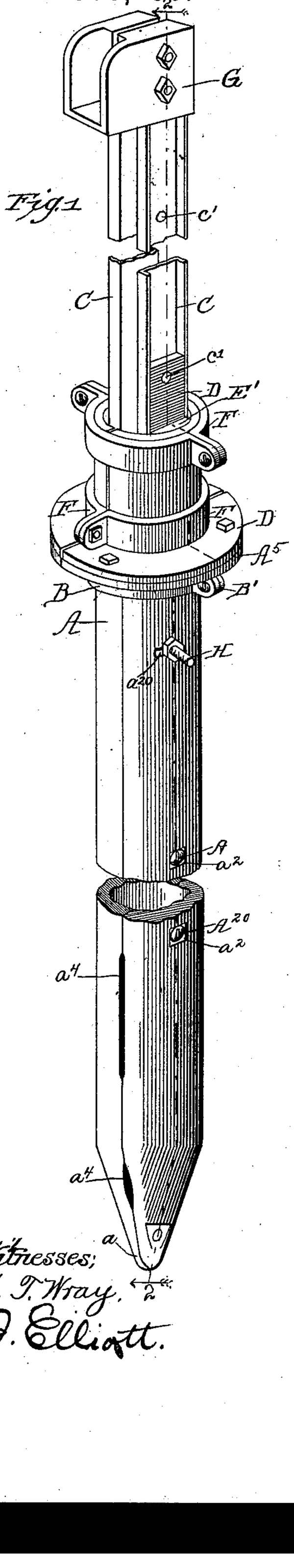


Fig. 5

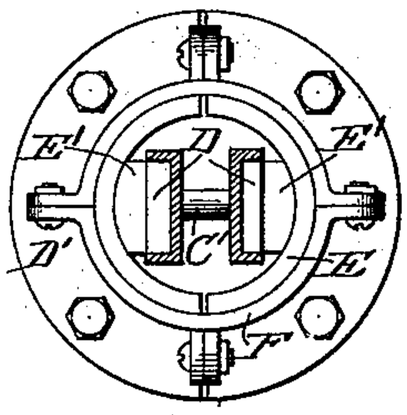


Fig. 4.

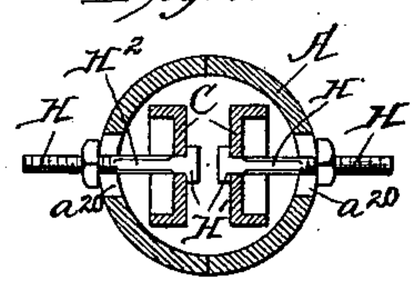
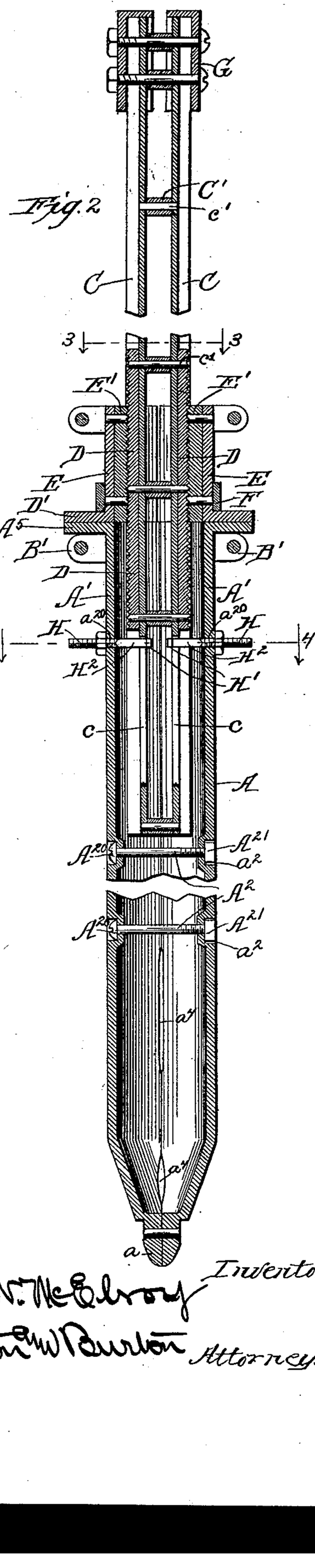


Fig. 2



Witnesses;
E. T. Wray.
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UNITED STATES PATENT OFFICE.

DAVID W. McELROY, OF KEOKUK, IOWA.

PILE.

SPECIFICATION forming part of Letters Patent No. 506,856, dated October 17, 1893.

Application filed January 31, 1893. Serial No. 460,374. (No model.)

To all whom it may concern:

Be it known that I, DAVID W. McELROY, a citizen of the United States, residing at Keokuk, county of Lee, and State of Iowa, have invented certain new and useful Improvements in Piles, which are fully set forth in the following specification, reference being had to the accompanying drawings, forming a part thereof.

In the drawings:—Figure 1 is a perspective of my improved pile. Fig. 2 is a vertical section at the line 2—2 on Fig. 1. Fig. 3 is a horizontal section at the line 3—3 on Fig. 2. Fig. 4 is a horizontal section at the line 4—4 on the same figure.

The lower portion A of my improved pile is designed to be made of cast metal cylindrical in outline except the lower end which tapers to a point at *a*, and hollow throughout the cylindrical portion and made in two halves A′ A′, divided at a vertical diametric plane, and bound together by bolts A^2 A^2, of which the heads A^{20} at one end, and the securing nuts A^{21} at the other end, lodge in depressions a^2 in the outer surface of the semi-cylindrical halves A′ A′, which are cast with these depressions and corresponding protrusions at the inner side for the purpose of affording such lodgment to the screw heads and nuts, so that there may be no material protruded beyond the cylindrical outline of this lower portion of the pile, which is the portion designed to be driven into the soil.

It is well understood that the requisites of a suitable pile for driving in most soils are, that the weight should be as little as possible consistent with the necessary strength and stiffness to insure driving, because, if the pile is heavy, the inertia of so much material can only be overcome by an excessively heavy blow, and the penetrating power of the pile is not improved in proportion to the increase of weight and power required in the driver. For this reason, when such metal has been used for the pile, it has always been considered desirable to cut away as much as possible without destroying its stiffness; and either a hollow cylindrical form or a cross-webbed form is the result. The cylindrical form would be uniformly preferable but for the fact that, filling with water or soil highly saturated, it is liable to burst by freezing. I aim to overcome this defect, and at the same time, to obtain the benefit of the hollow cylindrical form,—viz: lightness and stiffness, and adaptation to an upper telescoping beam,—by making this portion of the pile in two semi-cylindrical halves, and to prevent the cavity formed within them from being water-tight I cut away the edges slightly, as at a^4 a^4, so that decided crevices are left at the junction plane of the two halves, through which water may escape, and by securing the two halves together by wrought metal bolts, I provide for the halves separating by the stretching of the bolts as much as will be necessary to prevent the bursting of the pile if the liquid contents should be frozen. The upper end of this portion of the pile has the horizontal flange A^5, immediately below which I prefer to bind the two halves of the pile together by a two-part ring B, the halves of which are secured together by bolts at the lugs B′ B′, &c. This clamp ring being also made of wrought metal affords the same facility for slight separation of the half cylinders under the expansion of freezing of the contents as is afforded by the bolts which bind the parts together lower down. The reason for dispensing with the bolts at the upper part, and substituting an exterior device, such as the clamp described, is that I design this tubular base of my pile to receive a super-structure adapted to telescope within it to such an extent as may be necessary to permit the maximum vertical adjustment needed to accommodate the bridge or other structure supported on the pile in process of erection or subsequent use, for all purposes for which such adjustment may be required, and particularly, in order that it may not be necessary to postpone the manufacture of the super-structure of the pile until the driving of the lower or penetrating portion of the pile is completed and the depth to which it may be driven is known, as would be the case if no adjustment of the super-structure to the base were provided for. The range of adjustment by the means hereinafter specified will be such as to cover the ordinary range of uncertainty as to the depth to which it will be necessary to drive piles in a certain situation, and to cover the range of variation of the depth to which different piles in the same structure may

actually be driven in order to obtain requisite firmness of support.

The upper or telescoping portion of my improved pile I prefer to make substantially in the form of an I-beam made up of two channel-bars C C, back to back, with interposed spreading blocks C′ C′, of metal, through which extend the binding rivets or bolts *c′ c′*, which make the entire I-beam as rigid as if it were a single piece of metal, and substantially as strong, while being much lighter, than if it were solid with the same exterior dimensions. In the channels of the channel-bars C C, which face outwardly, I place or form the plates D D, which are serrated or corrugated upon their exterior faces, and which are made rigid and practically integral with the I-beam by some of the bolts or rivets *c′* which secure the channel-bars together, said bolts or rivets passing also through the plates D D. I do not limit myself to making these plates in separate pieces and so securing them to the I-beam, though I deem this the better method of construction merely because it is the cheaper method, since it enables me to use commercial channel-bar for the I-beam. The purpose of these corrugated or serrated plates D D is to effect engagement between the I-beam, of which they are made a part, and a two-part sleeve E, adapted to encompass the I-beam, and having, at its lower end, a flange D′ corresponding to and adapted to seat downwardly upon the flange A^5 which terminates at the top the driven cast portion of the pile. This two-part sleeve is secured together about the I-beam by means of two-part clamping collars F F, of the same construction as the clamping collar B, which bind the driven portion A of the pile at the upper end, one such clamp being applied at the upper end of the sleeve and another at the lower portion immediately above the flange. At the middle of each half of the sleeve, it is provided with a serrated or corrugated block or inwardly protruding rib, E′, preferably integral with the half of the collar to which it pertains, and adapted to engage at its serrated or corrugated face, the similarly formed plate D on the proximate face of the I-beam. The two half collars being applied about the I-beam with their serrated ribs engaging the serrated faces in the two channels of the I-beam respectively, and the clamps being applied, the sleeve is rigidly fixed to the I-beam at whatever position it is thus applied. The length of the serrated or corrugated plates D D is designed to be equal to the entire range of adjustability necessary, and to adapt the upper member of the pile which is thus provided, to be telescoped to any necessary depth within the lower tubular portion A, and positively stopped at any desired limit by the downwardly facing flange of the sleeve resting upon the upwardly facing flange which terminates the portion A. With this construction, it becomes an easy matter to adjust the upper portions of the several piles of one structure to level their upper ends, notwithstanding wide variation in the depths to which the different bases A may be driven. To the upper end of the I-beam, there may be secured any suitable form of seat block G, for the bridge timbers or irons.

For the purpose of securing the base or lower portion of the pile to the upper telescoping portion, the flange of the sleeve may be bolted to the flange of the base, or, in lieu thereof or in addition thereto, the lower end of the beam telescoped within the base may be secured by bolts H H, which, however, are specially intended to afford means for "justifying" the upper member of the pile; that is, rendering and securing it accurately vertical. For the purpose of adapting the beam to be secured by these bolts at whatever height it may be necessary to adjust the beam, I provide both channel-bars of the beam with longitudinal slots *c c*, and the bolts H have oblong rectangular heads H′, whose narrower dimension adapts them to be passed through the slots while the longer dimension adapts them to extend across the slots and bear upon both sides;—that is to say, the bolt is of a T-form. Immediately below the oblong head the bolt has a square shoulder H^2, each dimension of which is substantially equal to the width of the slot, or, at least, such that the shoulder cannot turn in the slot. Below the shoulder, the bolt is circular with a diameter equal to the dimension of the shoulder,—that is, that of a circle which can be inscribed within the square which defines the shoulder. At a short distance below the terminal flange of the base, I form, in each half, a slot or transversely elongated opening a^{20}, adapted to admit the oblong head of the bolt. The two parts of the pile being suitably adjusted according to the requirements of the situation, so that they are ready to be secured together, the head of the bolt is inserted through the slot a^{20}, then turned a quarter way around and passed through the slot *c*, and on into the space between the two channel-bars of the I-beam until the square shoulder is clear of the web of the channel-bar, when the bolt may be turned again quarter way in either direction, bringing the T-head cross-wise of the slot *c*. The bolt being now drawn back so that its shoulder stands in the slot *c*, it is prevented from rotating, and both the bolts being thus inserted, their respective nuts being tightened more or less as the case requires, one of the bolts may be made to draw the end of the beam toward the shell of the tubular member of the pile until the I-beam is accurately adjusted to a vertical position, and thereupon the nut upon the other bolt being tightened the two bolts together will hold the I-beam in such position; and corrections of the adjustment in this respect may be made as occasion requires.

I claim—

1. A pile of cylindrical exterior form made of cast metal in two semi-cylindrical portions

inclosing an interior cavity when placed face to face, and bound together by cross-bolts, the said halves being provided with recesses in their exterior surfaces to receive the heads and nuts of said cross bolts depressed below the cylindrical surface: substantially as set forth.

2. In a pile, in combination with a base having a longitudinal cavity and adapted to be driven, an upper portion consisting of a beam having opposite faces serrated or corrugated transversely, and a two-part sleeve having interior faces correspondingly corrugated or serrated, and suitable means for clamping the two-part sleeve about the beam with the serrations of the one engaging those of the other; whereby the sleeve forms an adjustable stop on the beam to limit the telescoping of the beam in the base portion: substantially as set forth.

3. In combination with the lower portion of a pile provided with a longitudinal cavity and an upper terminal horizontal flange, and adapted to be driven, an upper portion consisting of a beam having serrated opposite faces and adapted to telescope within the lower portion, and a two-part sleeve flanged horizontally at the lower end provided with interior projecting ribs serrated at their inner faces to correspond with the serrated faces of the beam, and suitable means for clamping the two parts of said sleeve about the beam, with the serrations of the beam and sleeve engaging each other: substantially as set forth.

4. In combination with the lower tubular member of the pile the upper member adapted to telescope within it, and bolts engaging the inserted end of the upper member and protruding through the shell of the lower member and provided with exterior nuts whereby upon tightening the inserted end of said upper member it may be drawn one way or the other to justify said member, substantially as set forth.

5. In combination with a base having a longitudinal cavity, and the upper beam adapted to telescope within the same, the base having the transversely elongated apertures a^{20}, and the beam having longitudinal slots *c*, the bolt H having the square shoulder and the round body below the shoulder, and the oblong cross-head adapted to be inserted through said slots to bind the parts together: substantially as set forth.

In testimony whereof I have hereunto set my hand, in the presence of two witnesses, at Keokuk, Iowa, this 25th day of January, 1893.

DAVID W. McELROY.

Witnesses:
A. J. MATHIAS,
BEN. B. JEWELL.