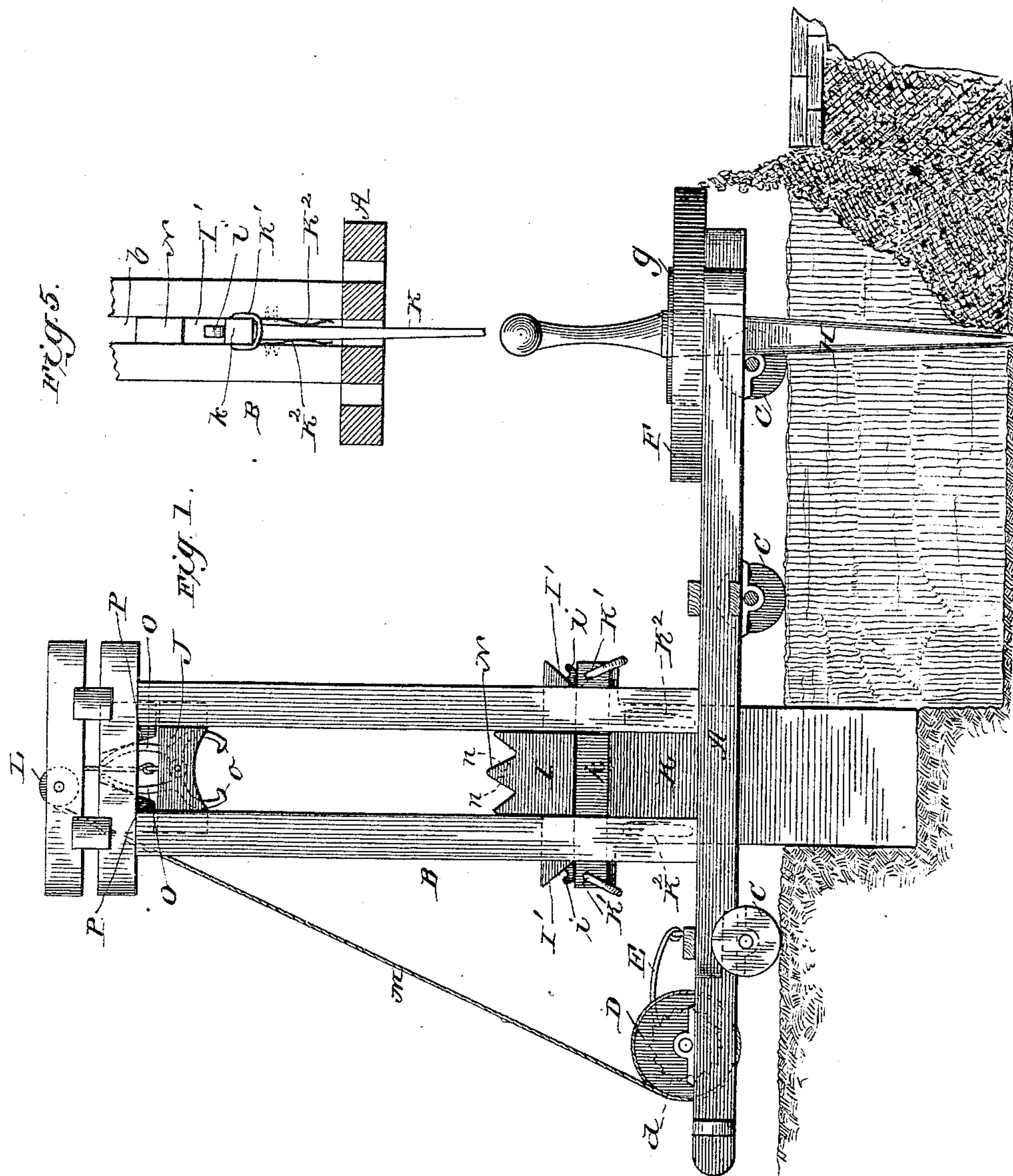


2 Sheets—Sheet 1.

No. 445,028.

Patented Jan. 20, 1891.



WITNESSES:

Jos. A. Ryan
P.B. Turpin.

INVENTOR:

A. Q. Withers.

BY

Mann 12

ATTORNEYS

(No Model.)

2 Sheets—Sheet 2.

A. Q. WITHERS.
APPARATUS FOR STRENGTHENING DIKES.

No. 445,028.

Patented Jan. 20, 1891.

ATTORNEYS

UNITED STATES PATENT OFFICE.

ALBERT Q. WITHERS, OF VICTORIA, MISSISSIPPI.

APPARATUS FOR STRENGTHENING DIKES.

SPECIFICATION forming part of Letters Patent No. 445,028, dated January 20, 1891.

Application filed September 5, 1890. Serial No. 364,079. (No model.)

To all whom it may concern:

Be it known that I, ALBERT Q. WITHERS, of Victoria, in the county of Marshall and State of Mississippi, have invented a new and useful Improvement in Apparatus for Use in Strengthening Dikes, &c., of which the following is a specification.

My invention is an apparatus for use in strengthening dikes, levees, and the like, having for an object to provide a simple efficient construction by which to form in the levee or dike a vertical channel, and to fill such channel with a suitable grout, such as a cement mortar, to form in the dike a vertical plate or wall of solid cement.

The invention consists in certain novel constructions and combinations of parts, as will be hereinafter described, and pointed out in the claims.

In the drawings, Figure 1 is a side view of my improved apparatus as in use. Fig. 2 is a top plan view thereof, part in section; and Figs. 3, 4, and 5 are detail views.

The apparatus comprises the base-frame A and the upright frame B, the frame B being mounted on the frame A, as shown. I support the base-frame on wheels C, preferably three pairs, one of the wheels of each pair being fixed to its axle and the other free thereon, enabling the convenient turning of the apparatus. At its forward end the base-frame is provided with bearings for the drum D, which is provided with a ratchet-wheel *d*, engaged by the pawl E.

If the apparatus is to be moved and operated by horses, a hook or other suitable construction may be provided at the front end of the base frame or carriage. If steam is used, the front end of the frame may be toggle-jointed or otherwise suitably constructed for connection with the traction-engine, and manifestly in the use of steam or horses the power may be suitably geared or connected with the drum D to operate the same.

On the rear end of the frame A, I form or support the mixing-box F, made preferably with an outlet or discharge opening at its rear end or side. An opening G is provided through the mixing-box for the passage of the filling-piece H, presently described, a guard *g* surrounding the opening G, as shown.

The upright frame B is provided with

guideways *b* for the cutter K, the hammer I, and the grapple block or connection J, and at its upper end with a guide-pulley L for the rope M, which is secured to the drum, passes up over the pulley L and then down, and is secured to the connection or block J, which slides at its ends in the guides *b*. The hammer I also slides at its ends in the guides *b* and is provided at its ends with hooks *i* and with inclined surfaces *I'* above the hooks *i*. The blade or cutter K is formed sharp at its lower end and tapers gradually increasing in thickness toward its upper end, where it is formed or provided with a head or portion *k*, which is formed at its ends to slide in the guides *b*. Links or loops *K'* are connected with the upper end or head of the cutter and may be turned up to engage the hooks *i* of hammer I, so that the cutters may be raised and then permitted to fall with the hammer. As the hammer descends with the cutter its inclined surfaces *I'* will push the links *K'* off the eyes *i* at the end of the fall, so that the hammer may be raised alone as the operation proceeds. To steady the movements of the cutter when raised and as it falls, I provide springs *K²*, which bear lightly against the cutter and steady its movements without impeding its fall. On the upper side of the hammer is formed an inverted-V-shaped projection N, which has seats at *n* for engagement by the points *o* on the lower arms of the grapples O, such grapples being pivoted between their ends to the grapple block or connection J and arranged at their lower ends to catch and hold the hammer when the grapple-block is lowered upon said hammer, and having their upper ends arranged to engage the cams or inclines P in the top of the upright frame when the grapple-block is lifted to such point in order to automatically release the hammer to permit the same to drop of its gravity onto the cutter.

In operation the hammer is raised and dropped upon the cutter until the latter has been driven the desired depth into the ground. The cutter is then connected by its links with the hammer and raised out of the ground. The apparatus is then moved along a distance equal to the width of the cutter, and the latter is again driven into the ground, and so on, forming a cut in the top of the dike or levee

at or near the center of same, the form of the cutter being such that it will compress the walls of the cut. As the cutting proceeds, the cement grout is being mixed in the trough or box and poured or packed down in the cut made by the cutter, so as to form a web or plate of cement centrally in and extending lengthwise the dike or levee. Where the cement is thin or watery, the stop-sward or filling-piece H may be driven down to prevent the cement from flowing forward in the open channel to the cutter. If water is flowing into the cut, the cement may be mixed very thick and placed and rammed in the cut. The cement when hardened forms a solid cement core impervious to muskrats, crawfish, seeps, &c., and imparts great strength to the levee. In case a break should occur at any point the cement core at the opposite ends or sides facilitates repairing, as piles may be driven at such point and facilitate the repair of the break. On both sides of the core, from a few inches below its top, bricks can be laid up to the top of the levee and core and then tied by bricks laid in cement upon the core, and where desired bricks can be laid from the top of the core outward to the edges of the levee, thus saving any additional earth-work to raise at any time the dike or levee and at much less cost. At the same time the said construction forms a solid top to the levee, and the cement core adhering to the compressed earth on both sides below said top makes a solid core and top impervious to seeps, rain, or river-water saturation.

In effecting a connection between the frame A and the engine-frame Q it may be preferred to employ the connecting-rod R, (shown in Fig. 2,) said rod being broken away centrally in the said figure and being provided at its ends with eyes or knuckles *r r*, journaled to the frames Q and A, preferably by fitting them on cross rods or shafts S S', supported, respectively, on the frames Q and A, as shown. This connection between the engine-frame and frame A permits the said frames to accommodate themselves to any inequality in the top of the levee, as will be readily understood, and it will be readily seen that the form of rod R and the manner of connecting it with the engine and main frame may be varied without departing from some of the broad principles of my invention.

Having thus described my invention, what I claim as new is—

1. An apparatus, substantially as described, comprising the framing, the cutter, the hammer adapted to drop upon the said cutter, and automatically-detachable connections between the said hammer and cutter, such connections being constructed and arranged to automatically disengage at the end of the stroke when the hammer and cutter are dropped together, all substantially as described, where-

by the cutter may be raised with the hammer and the latter be dropped with, automatically detached from, and then lifted and dropped independently of the cutter, substantially as set forth.

2. The combination of the framing, the cutter having links K', and the hammer having hooks *i* and inclines I', all substantially as and for the purposes set forth.

3. The combination, substantially as described, of the cutter tapering and increasing in thickness toward its upper end and provided at such end with a head and with links K', the hammer having hooks *i* and inclines I', and the grappling-block having grapples by which to engage the hammer, all substantially as and for the purposes set forth.

4. In an apparatus, substantially as described, the combination of the cutter provided at its upper end with a head adapted to receive the stroke of the hammer, the hammer adapted to drop upon the said headed end of the cutter, means for connecting the hammer and cutter, whereby the latter may at will be lifted with the hammer, and devices by which to elevate and release the hammer, all substantially as and for the purposes set forth.

5. An apparatus, substantially as described, comprising the framing, the cutter, and the filling-piece adapted to form a closure in the cut made by the cutter in rear of the said cutter, all substantially as set forth.

6. The improved apparatus, substantially as described, comprising the framing, the cutter, the mixing-box supported in rear of the said cutter, and the filling-piece located between the said cutter and the rear end or discharge of the box and adapted to form a closure in the cut between the said cutter and box, all substantially as and for the purposes set forth.

7. The combination of the mixing box or trough having an opening G and a guard surrounding the same and the filling-piece fitted to the said opening, all substantially as and for the purposes set forth.

8. The apparatus for strengthening dikes, substantially as described, consisting of the framing, the cutter, the hammer, detachable connections between said hammer and cutter, devices whereby to elevate and release the said hammer, the mixing-box supported on the framing in rear of the cutter and having a central opening G and a shield *g* surrounding the same, and the filling-piece driven through the opening G and adapted to prevent the grout from passing forward to the cutter, all substantially as and for the purposes set forth.

ALBERT Q. WITHERS.

Witnesses:

C. H. BERKLEY,
S. A. FORD.