

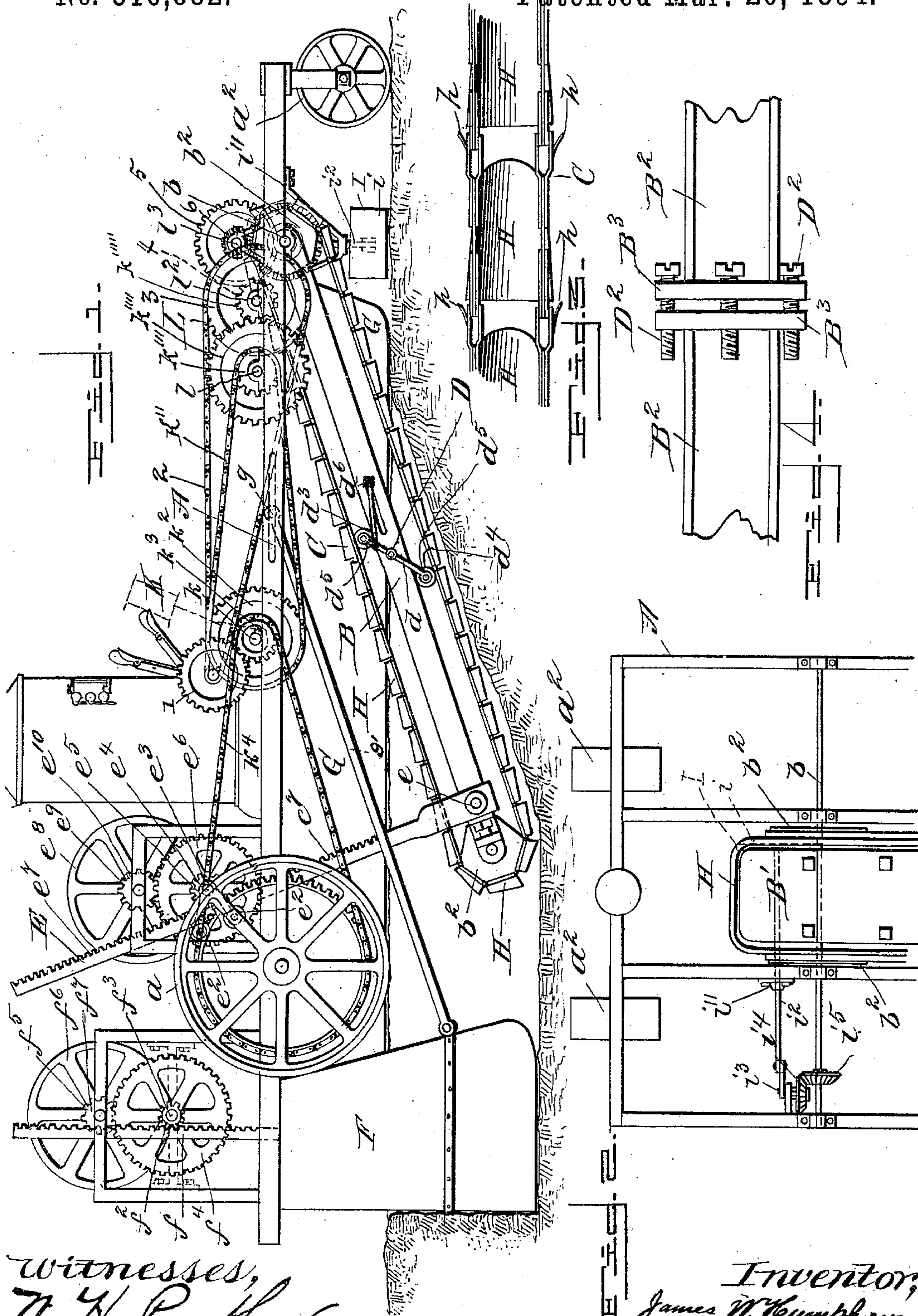
(No Model.)

2 Sheets—Sheet 1.

J. W. HUMPHREYS.
DITCHING MACHINE.

No. 516,682.

Patented Mar. 20, 1894.



witnesses,
J. W. Humphreys.
John Freeman

by

Inventor,
James W. Humphreys
Watson & Co.
his Attorneys,

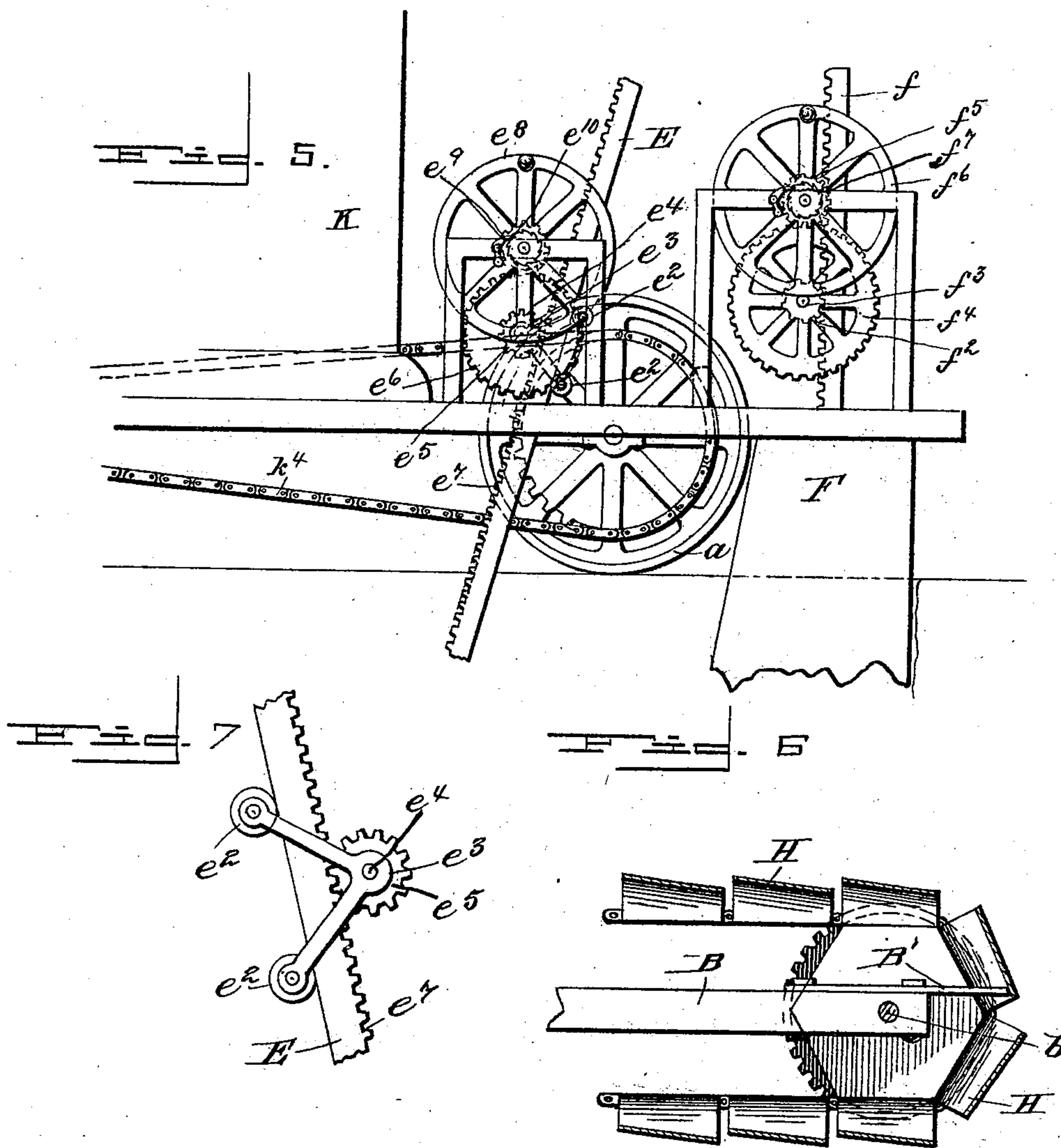
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Witnesses
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Inventor
James W. Humphreys
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Attorneys

UNITED STATES PATENT OFFICE.

JAMES W. HUMPHREYS, OF IROQUOIS, ILLINOIS.

DITCHING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 516,682, dated March 20, 1894.

Application filed March 6, 1893. Serial No. 464,797. (No model.)

To all whom it may concern:

Be it known that I, JAMES W. HUMPHREYS, a citizen of the United States, residing at Iroquois, in the county of Iroquois and State of Illinois, have invented certain new and useful Improvements in Ditching-Machines; and I 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.

This invention relates to certain improvements on my former patent for "ditching machines" granted September 9, 1890, No. 436,241.

The object of the invention resides in the provision of a novel and improved construction, comprising, mechanism for digging a trench and varying the depth of the same; furthermore, for conveying the earth from the interior of the trench to the surface and depositing it at the sides thereof in a comparatively compact mound; furthermore, for supporting the walls of the trench during the operation of the machine; furthermore, for advancing the machine simultaneously with the operation thereof and regulating the speed of such advancement, and finally the invention embraces certain novel features, combinations, and arrangement of parts, to be hereinafter more fully set forth and claimed.

In describing the invention in detail, reference is had to the accompanying drawings forming part of this specification wherein like letters indicate corresponding parts in the several views, in which—

Figure 1:— is a view in side elevation of one form of machine embodying my improvements and showing the same operating in a ditch with one of the guard plates removed. Fig. 2:— is a top plan view of the forward portion of the machine, showing the scraper in position. Fig. 3:— is a view in detail of a portion of the conveyer chain, showing the scoops, and cutters thereon. Fig. 4:— is a view in detail illustrating a modification. Fig. 5:— is a view in elevation of the rear portion of the machine and showing the gearing for operating the regulator bar and the curbing. Fig. 6:— is a detail sectional view of the upper end of the conveyer carrying beam, with the scraper attached thereto and shown operating upon the scoops. Fig. 7:— is a detail view showing the regulator bar and its supporting bracket.

In the drawings: A— indicates the main frame supported at or near the rear end upon the wheels —a— —a— and having at the opposite end thereof steering wheels —a²—a²— which latter may be controlled and operated in any well known manner.

Journalled on a shaft —b— mounted transversely of frame —A— is a swinging beam —B— carrying at each end thereof sprocket pulleys —b²—b²— adapted for working in and driving a conveyer chain —C— and centrally of this beam, a chain tensioning device —D— is arranged, comprising the pivotally secured bars —d— —d— adjustably held by the arms —d³— and having suitable bearings —d⁴— formed therein to receive the tension rollers —d⁵—. Thus, to effect a tightening of the chain in taking up for wear, &c., the bolt —d⁶— is loosened and by means of the adjusting arms the inclination of the bars —d— —d— may be varied to assume a position approximately at right angles to the beam, if desired. To further provide for the proper adjustment of this chain, the beam B may be constructed in sections B² as shown in Fig. 4, wherein the adjoining ends of the sections are flanged as at B³ and held together by threaded bolts —D²— being passed through coincident openings of said flanges.

To vary the depth of the "cut" a regulator bar —E— is provided, having its lower end pivotally secured to the beam, as at —e— and its upper end guided on anti-friction rollers —e²—e²— carried in the bracket —e³— which is loosely mounted on shaft —e⁴—. This shaft has also mounted thereon, a pinion —e⁵— and gear —e⁶—, the former engaging the toothed face —e⁷— of the regulator bar and the latter being controlled and operated by a hand wheel —e⁸— through the intermeshing pinion —e⁹— and the pawl and ratchet —e¹⁰—. Thus as the hand wheel is rotated, power will be transmitted to the regulator bar to effect a raising or lowering of the beam to any position desired where it may be retained by means of the pawl and ratchet.

At the rear end of the frame A— a vertically adjustable curbing —F— is secured by braces or stays g' which latter may be pivotally connected in sliding bearings —g— (Fig. 1), and extending upwardly from this curbing is a rack-bar —f— engaging a pinion —f²— on shaft —f³—. This shaft also carries a gear —f⁴— which is driven by pinion —f⁵—

controlled and operated through the hand wheel — f^6 — and ratchet and pawl — f^7 —, as is best shown in Fig. 5.

The provision of this device affords numerous and important advantages. First, the trench may be refilled directly in the rear of the machine, as the latter advances, without disturbing or inconveniencing the workmen engaged therein. Second, the walls are effectually braced against caving, crumbling, &c. As a further protection and to prevent falling particles, &c., the longitudinally disposed guard plates — $G-G$ — are provided at each side of the trench and being secured to the frame, move with it, as will be readily apparent.

The conveyer scoops — H —, are approximately semi-circular in cross-section and slightly tapered (see Fig. 3), being provided with cutters — h — at the sides thereof for the purpose of widening the "cut" sufficiently to allow for a free and unobstructed passage of the scoops, thus obviating all tendency toward binding or wear on the hinges.

At the upper end of the beam — B — a plate or cleaner — B' — is secured by bolts (see Figs. 2 and 6) and projects within the scoops for the purpose of removing all adhering particles of earth therefrom.

To properly distribute and bank the earth after it leaves the scoops, an oscillating plunger — I — is provided, comprising a vertically arranged head — i — and a plunger rod — i^2 — mounted in suitable bearings — i'' — and connecting the head with a crank shaft — i^3 —, which latter carries a bevel gear — i^4 — working in and receiving motion from a similar gear — i^5 — on the transverse shaft — b . Thus as the crank shaft revolves, the plunger will be given an oscillatory motion which tends to remove the deposited earth from the path of the cutters and banks the same at each side of the "cut" in a compact mound.

An important feature of this invention consists in providing suitable gearing, by which the machine may be advanced, at any desired speed, and simultaneously with the cutting operation. As shown, the drive shaft — k — of the engine — K — carries a gear — k^2 — and pinion — k^3 — the latter connecting with one of the frame supporting wheels — a — of a sprocket wheel on the axle by means of a sprocket chain — k^4 — and to obtain different speeds of advancement, any suitable reducing gear may be employed as will be readily understood. Transversely of the frame — A — are mounted the shafts — $l-l^2-l^3$ — carrying a train of gearing — L — for transmitting power from the drive shaft — k — to the conveyer pulley — b^2 . As this gearing forms no part of the present invention, in that it is of common construction and in a manner well known in the art, a detailed description is deemed unnecessary, it suffices to say, as shown in Fig. 1, different speeds may be obtained. By one train of gearing, power may

be transmitted from engine shaft — K' — to conveyer pulley, through gear — K^2 —, chain — K'' —, pinion — K''' —, gear — K'''' —, and pinion — K''''' —, or with the other train, from engineshaft — K' — through pinion — K^3 —, gear — 1 —, chain — 2 —, gear — 3 —, pinion — 4 —, gear — 5 —, and pinion — 6 —.

The operation is as follows: After the machine has been properly placed, which may be accomplished by hand or power, the conveyer is adjusted and thrown into operation by a controlling lever and as the cut increases in depth, the curbing is lowered or driven downwardly to brace the side and end walls of the trench. The earth on leaving the scoops falls directly in the line of the "cut" where it is engaged by the oscillating plunger, and forced outwardly beyond the sides of the trench, forming a comparatively compact mound, small particles being prevented from re-entering by the guard plates.

It will be particularly noted that various changes may be made in the detail construction of the machine without materially departing from the general idea involved.

Having fully described my invention, what I claim, and desire to secure by Letters Patent, is—

1. In a ditching machine, the carrying frame — A —, the beam — B — journaled therein at its forward end and provided with terminal bearings, the sprocket pulleys mounted in the bearings, the endless conveyer supported thereon, suitable gearing for transmitting power to the pulleys, and an oscillating plunger adapted for automatically banking the earth deposited by the conveyers at each side of the trench, as specified.

2. In a ditching machine, the pivotally swung and vertically adjustable beam — B — the traveling conveyer supported thereon comprising an endless belt, a series of scoops suitably secured thereto and provided with cutters, and the projecting cleaner plate of the beam entering said scoops, as specified.

3. In a ditching machine, the supporting frame the traveling conveyer having one end journaled therein and means for vertically adjusting the opposite end thereof, suitable gearing for driving the conveyer, an oscillating plunger adapted for banking the deposited earth and a scraper plate, as specified.

4. In a ditching machine, the combination with the supporting frame, of the pivotally swung beam, the endless conveyer thereon, the guard plates adjacent the conveyers, the oscillating plunger, and suitable gearing for driving the conveyer and simultaneously advancing the machine, as specified.

In testimony whereof I affix my signature in presence of two witnesses.

JAMES W. HUMPHREYS.

Witnesses:

F. L. HOLLOWAY,
A. H. DENTON.