

(No Model.)

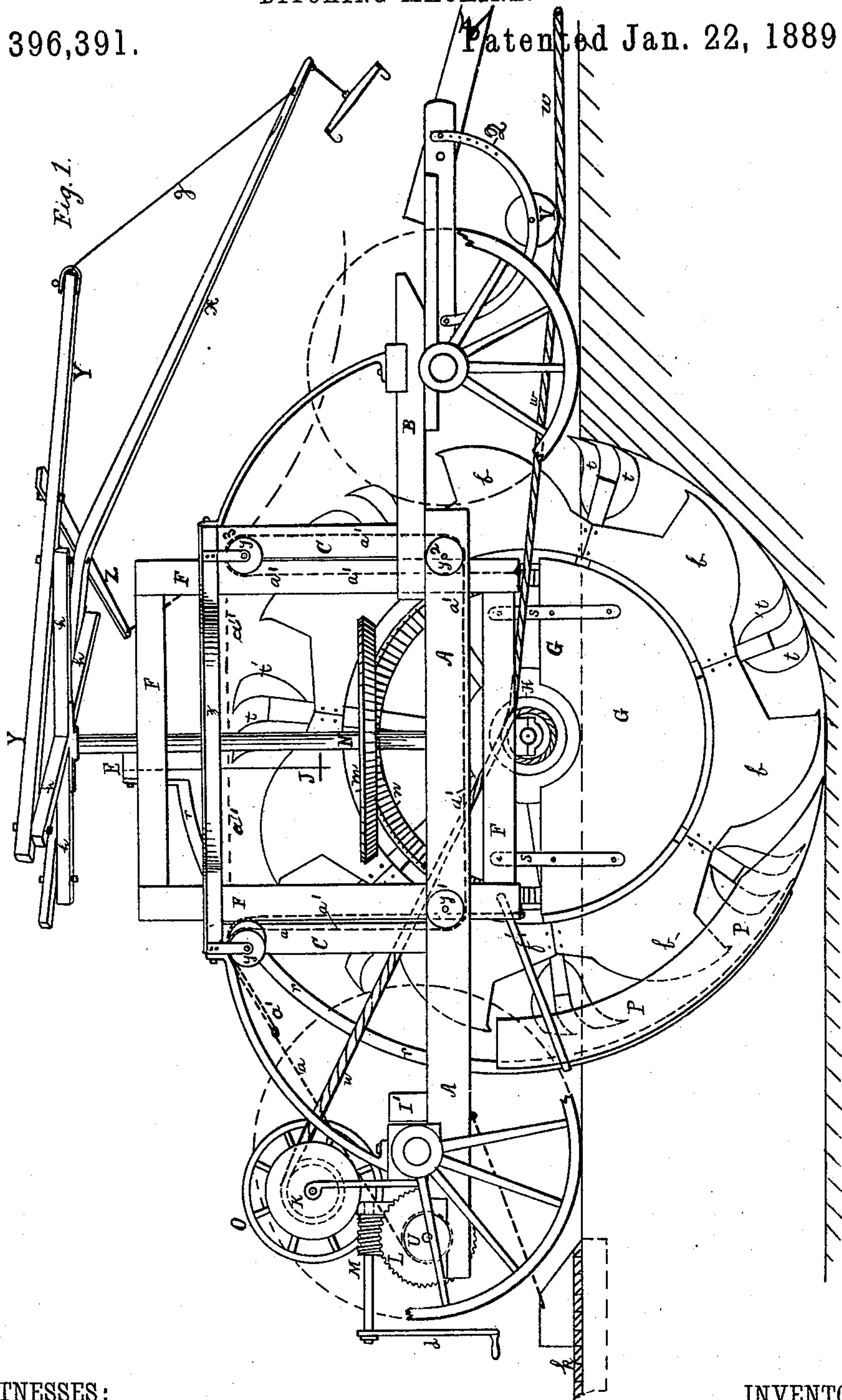
2 Sheets—Sheet 1.

U. BLICKENSDEFFER.

DITCHING MACHINE.

No. 396,391.

Patented Jan. 22, 1889.



WITNESSES:

Albert H. Adams.
Harry T. Jones.

INVENTOR

Urbic Blickensderfer

BY

Wm. H. Bond

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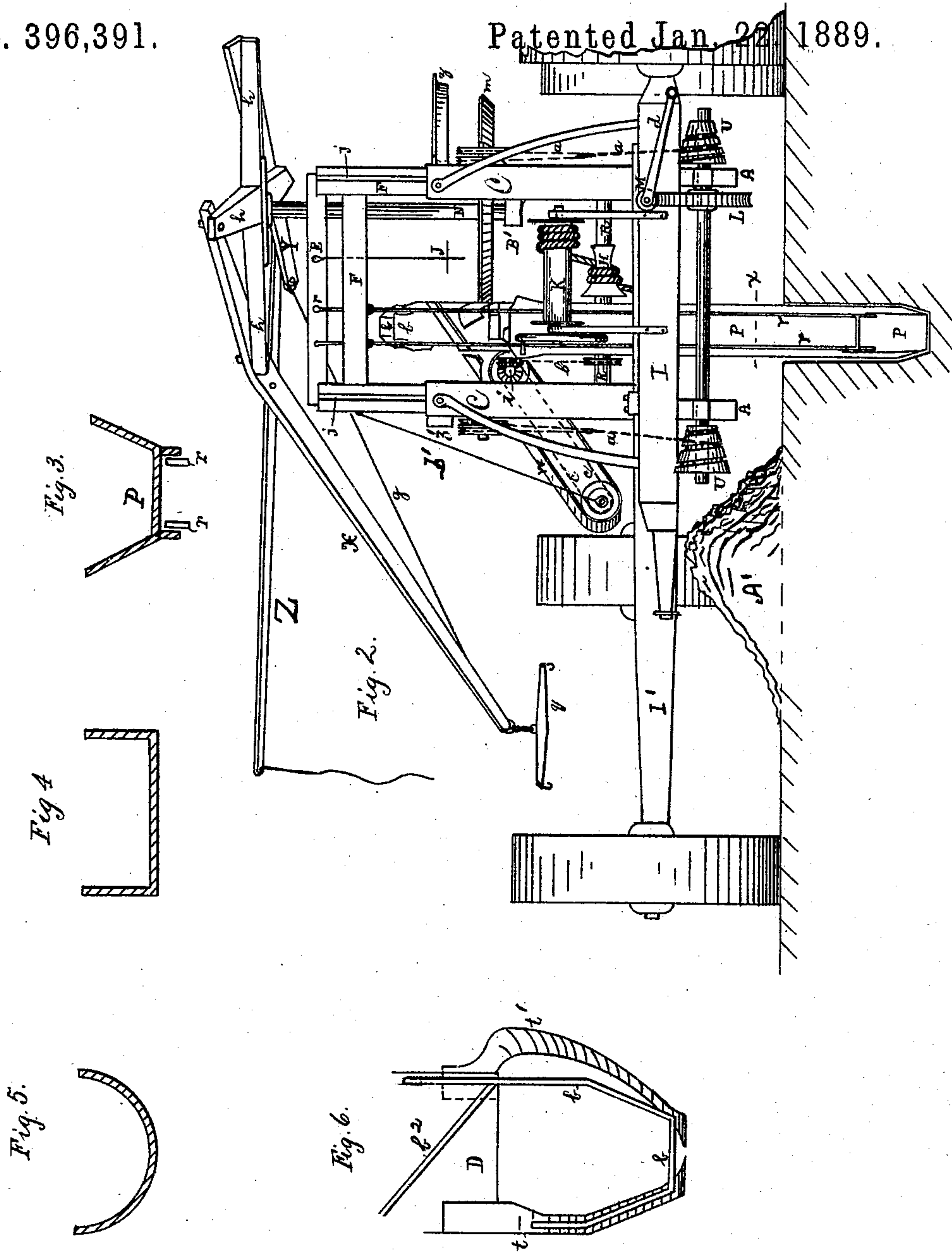
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UNITED STATES PATENT OFFICE.

ULRIC BLICKENSDEKFER, OF CHICAGO, ILLINOIS.

DITCHING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 396,391, dated January 22, 1889.

Application filed August 25, 1884. Serial No. 141,450. (No model.)

To all whom it may concern:

Be it known that I, ULRIC BLICKENSDEKFER, residing at Chicago, in the county of Cook and State of Illinois, and a citizen of the United States, have invented certain new and useful Improvements in Ditching-Machines, of which the following is a full description, reference being had to the accompanying drawings, in which—

Figure 1 is a side elevation. Fig. 2 is a rear elevation. Fig. 3 is a cross-section of the hood at line *x* of Fig. 2. Figs. 4 and 5 are modified forms of the hood. Fig. 6 is a front view of one of the buckets with a projecting tooth or cutter in the rear of the bucket.

Letters Patent of the United States No. 106,653 were granted to me August 23, 1870. Letters Patent No. 227,209, dated May 4, 1880, were also granted to me; also Patent No. 239,707, dated April 5, 1881.

My present invention relates to improvements upon the ditching-machines of the class shown in said patents.

The leading objects of my invention are to provide improved devices for raising and lowering the secondary frame which carries the excavating-wheel, to provide a suspended shield or guard over the cog-gearing upon the excavating-wheel to prevent dirt from getting into the cogs, to provide a curved chute or hood over a portion of the buckets of the excavating-wheel to catch the earth which may be carried over by the buckets or which may fall into the trench, to provide a running apron to carry away the earth and deposit it at the side of the machine, and to improve the construction of the picks or cutters between the excavating-buckets.

My invention also relates to some other features of construction, and those things which I claim to be new will be specifically pointed out in the claims.

In the drawings, *b* are buckets upon an excavating-wheel, and *t t'* are picks or cutters located between the buckets. This excavating-wheel is mounted upon a shaft, *R*, supported in bearings at the lower end of a secondary adjustable frame, somewhat as shown in my Patent No. 106,653.

A A are two pieces of the main frame. *B* are bars which extend forward from the bed-pieces *A*.

C are four posts firmly fastened to and supported by the bed-pieces *A*. The upper ends of the posts are suitably braced.

z is a curved side bar extending from one side post *C* to the other. This bar *z* is curved outward far enough to permit the wheel *m* to pass.

z' is a straight connecting-piece on the other side. Inside of the posts *C* is a secondary vertically-movable frame composed, principally, of the vertical and horizontal pieces *F*. The vertical pieces *F* are provided with grooves *j*, into which tongues upon the posts *C* fit. This vertically-movable secondary frame carries with it up or down the excavating-wheel, together with the cog-wheel *n*, which is upon the shaft which carries the excavating-wheel, and also the driving-wheel *m* and the shaft *N*, to which such driving-wheel is secured, and also the sweep *X*, which is supported upon the upper end of the shaft *N*. The lower end of the shaft *N* is supported upon a cross-bar, *B'*, which is secured to the movable frame, and its upper end is supported in a suitable bearing attached to the cross-bar *E*, which is secured to the upper end of the movable frame.

G is a shield or cover for the lower part of the gear-wheel *n*. It is supported by two straps, *s*, secured to a cross-piece of the movable frame, so that this shield *G* will move up and down with the frame and with the wheel *n*. Its object is to protect the gear-wheel *n* from dirt, which is liable to get into the cogs and interfere with its operation.

P is a curved chute, trough, or hood, which partly covers the outer ends of the buckets *b* at the lower rear part of the excavator-wheel, and it is supported upon the curved supports *r*, the upper ends of which are secured to the cross-bar *E* or other suitable part of the movable frame. They are also supported by the side stays, *f'*. These curved supports *r* do not go quite to the bottom of the trench; but the chute extends beyond them a little, and does go to the bottom of the trench. The object of the chute is to catch and carry forward and deliver within reach of the buckets any loose excavated earth which may be carried over by the buckets or which may fall into the trench just behind the excavating-wheel. When the machine is first started, the chute

must be raised up out of the way, and this can be done, by reason of its connection with the movable frame, by the curved supports *r r*. The chute may be of various forms, as may be required by the form of the buckets. Three forms are shown in cross-section in the drawings.

II is a spool-shaped drum located upon the shaft R.

w is the towing-line, one end of which is suitably secured at some point forward of the machine. This towing-line passes around the spool II, then is carried back to a roller, K, which is provided with flanges and with a hand-wheel, O, by which it is revolved.

V is a roller under which the tow-line passes, so that the line will be kept away from the axle. This roller V is supported in the circular irons Q, which irons are provided with holes, so that the height of the roller V can be adjusted.

The bevel-wheels *m n* engage with each other, and the movement of the sweep X and rotation of the shaft N, with its bevel-wheel *m*, gives motion to the excavating-wheel, and at the same time, by the winding of the towing-line *w* around the drum II on the shaft R, a forward motion will be given to the machine.

U are drums, which are driven by a worm-wheel gear, M L. These drums may be cone-shaped, as shown in Fig. 2, or they may be straight. I prefer the conical form.

a is a lifting-chain, one end of which is connected with one of the drums U. This chain passes over the pulley *y*, down to the lower end of one of the posts F', where it is secured.

a' is another chain, one end of which is attached to the chain *a*. This chain also passes over the pulley *y*, then down and around the pulley *y'*, then to and around the pulley *y''*, then up and over the pulley *y'''*, then down to the lower end of another post F', where it is secured. On the other side of the machine there is a chain corresponding to *a* and a chain, *a''*, corresponding to *a'*, except that this chain *a''* passes directly across the machine, as indicated by dotted lines, and then over a pulley and down to the lower end of the corner-post of the secondary frame, to which it is secured. The chain *a'* is carried around the pulleys *y' y''*, and then up to *y'''* to get it out of the way of the wheel *m*, which can be moved vertically a distance of four or five feet.

As shown in my Patent No. 106,653, the lifting-chains were wound around an axle and moved too slowly, and only lifted from the lower ends of the two rear posts of the movable frame; and in practice their operation was quite defective, and I found it necessary to devise means for lifting the secondary frame by means of four chains—one connected with each corner-post of the frame. The devices for lifting the secondary frame shown in my said former patent did not give sufficient power, which I am able now to obtain by means of the drums U and worm-wheel gear

M L. This construction also has the advantage that the winch *d* may be released and left in any desired position, and the parts will be held in their proper place without the use of any stop or holding device. The worm-gear can be operated almost instantly at any time by the operator, who stands on the platform *k*; and this is important, in order to maintain a uniform grade at the bottom of the ditch while the machine may be passing over uneven ground.

In my former patent I provided for the use of a "sight;" but I find that it is very important that this sight should be so located and connected with the machine that it will always maintain the same position relatively to the center of the excavating-wheel, and this can be accomplished by locating the sight J perpendicularly over the center of the driving-wheel; or, if the sight itself be not located over the center of such wheel, it must be mounted upon a rod or support secured as near as possible to the center of such excavating-wheel, so that the sight will rise and fall as the center of the excavating-wheel varies vertically.

X is the sweep, which is necessarily curved or inclined downward.

h are cross-bars attached to the top of the shaft N. The sweep X is secured to the two ends of these bars upon one side of the shaft N.

Y is a stiff stick secured at the other ends of the said cross-pieces *h*. This piece Y extends forward some distance, and from its forward end a rod, *g*, extends down to the forward end of the sweep. The forward end of Y is some distance to one side of and some distance back of the forward end of the sweep and also far above it, and the rod *g*, in connection with the stick Y, serves as a strong support for the sweep, holding it firmly against both downward and lateral strain, caused by the action of the team.

Z is a lead-stick to guide the horses.

It is desirable to cut ditches of various widths, and if it were necessary to change the buckets of the excavating-wheel for each varying width great expense would be incurred. I am able to do this by providing teeth or cutters *t'*, with an extension upon one side, as shown in Fig. 6. These picks or teeth are secured in place by means of bolts, so that teeth or picks of different forms may be readily used. They have a mold-board shape, and the dirt which they cut from the side of the ditch will be thrown toward and into the buckets.

I is one of the axles upon which the riding-wheels are mounted when the machine is being moved from place to place.

When the machine is in operation, the dirt which is thrown to one side of the ditch falls in front of one of the rear wheels, as shown at A', Fig. 2, and it becomes important to provide means by which such wheel can run outside of such deposited earth; and this I accom-

plish by providing a secondary removable axle, I', which carries such wheel when the machine is in operation; but when moving from place to place this wheel is placed upon the axle I, and the axle I' is removed and loaded upon the machine.

In my former machine I provided a fixed apron or inclined surface to deliver the excavated earth to the side of the machine. If sticky, the earth is liable to clog upon such fixed apron, and to obviate this difficulty I have provided a running apron, W, the outer end of which is supported by rods or chains b', secured at or near the upper end of the movable frame, while its inner end is connected with the perpendicular posts of such movable frame. The running apron is driven by means of a sprocket-wheel on the shaft R, and an endless chain-belt, l, bevel-gears i, and chain-belt c, revolving the rollers at the ends of the apron, and around which rollers the apron passes.

The spool-shaped drum H is important, and is much better in operation than a spool of uniform size. With the spool-shaped form the towing-line can be wound up continually, as it constantly slips back or down the incline of the spool, and the speed can be varied as the operator causes the towing-line to be wound upon the smaller or larger portion of the spool.

The operator stands upon the platform k, and the same person can raise and lower the secondary frame from time to time, as may be necessary, while the machine is passing over irregular ground. He can also take in the slack of the towing-line and arrange its running upon different parts of the spool H.

The buckets are open upon one side and are provided with an incline, b², on the inside, and when the buckets are at the top of the wheel the earth contained therein is discharged, as described in my former patent.

What I claim as new, and desire to secure by Letters Patent, is—

1. In a ditching-machine, the combination of the shield or guard G, the straps s, and the movable frame with the gear-wheel n and the excavating-wheel, substantially as described.

2. In a ditching-machine, the combination, with the vertically-adjustable frame and the excavating-wheel, of the curved chute P, trough-shaped in cross-section and secured to the adjustable frame and supported by the curved supports r and stays f', substantially as shown and described.

3. In a ditching-machine, the combination of an excavating-wheel, a spool-shaped drum, H, mounted on the shaft which carries the excavating-wheel, and an adjustable roller, V, substantially as set forth.

4. In a ditching-machine, the combination of the movable frame, the excavating-wheel mounted therein, the axle I, adapted to support two riding-wheels, and the removable axle I', adapted to receive one of the riding-wheels, substantially as described.

5. In a ditching-machine, an excavating-wheel provided with buckets b, in combination with projecting mold-board-shaped picks or teeth t', substantially as and for the purpose set forth.

6. In a ditching-machine, the combination of an excavating-wheel, a spool-shaped drum, H, mounted on the shaft which carries the excavating-wheel, and a roller, K, to receive the tow-line, substantially as set forth.

7. In a ditching-machine, a vertical driving-shaft, N, in combination with cross-bars h, secured to said shaft N, a curved or inclined sweep secured to the said cross-bars h at one end thereof, a projecting bar, Y, secured at the other end of said cross-bars h, and a rod or chain, g, substantially as and for the purpose specified.

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Witnesses:

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