

117235

Ditching Machine.

PATENTED JUL 18 1871

Figure 1.

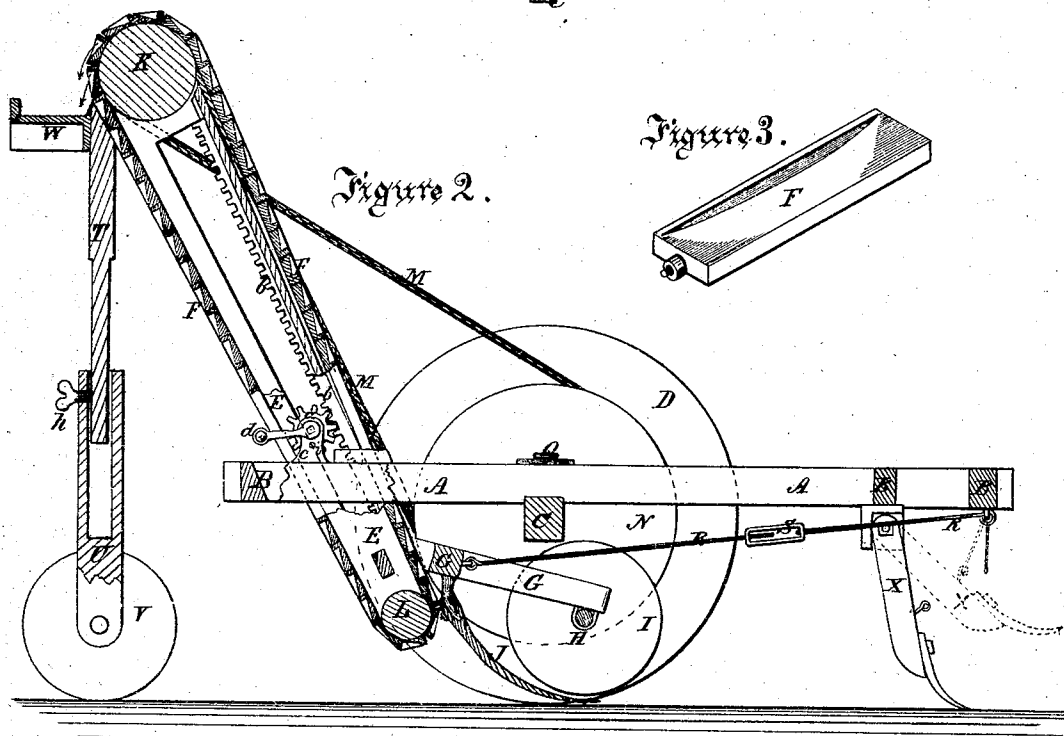
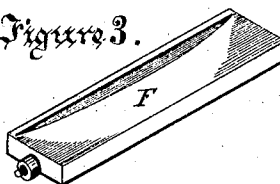


Figure 3.



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IMPROVEMENT IN DITCHING-MACHINES.

Specification forming part of Letters Patent No. 117,235, dated July 18, 1871.

To all whom it may concern:

Be it known that I, BENJAMIN RHETT, M. D., of Abbeville, in the county of Abbeville and State of South Carolina, have invented certain new and useful Improvements in Ditching-Machines; and I do hereby declare that the following is a full, clear, and exact description of the construction and operation of the same, reference being had to the accompanying drawing which makes part thereof, in which—

Figure 1 is a plan or top view of a machine embracing my improvements. Fig. 2 is a vertical section in the line *xx*, Fig. 1, with a portion of the apron-frame in elevation to show the pinion and rack-bar. Fig. 3 is a perspective view of one of the buckets of the apron detached.

My invention relates to machines for digging or cutting and cleaning ditches; and it consists: 1st, in the arrangement of the main frame upon the axle of the supporting-wheels in such manner as to admit of adjustment horizontally to exert the requisite degree of tension upon the driving-bands or chains of the endless apron of buckets as may be required when the elevation of the digging-frame has been changed for a deeper or shallower cut. 2d, in the arrangement of the frame carrying both the colters and the endless apron of buckets upon the main frame, in combination with the bracing-rods connecting the two frames together in the line of draft, so that the digging-frame may be raised and lowered, by means of its rack and pinion, as desired, without weakening the machine, as will be more fully described. 3d, in constructing the buckets of the endless apron with a concave bottom—that is to say, a bottom deeper in the center, adjacent to the holding-rib, and gradually becoming flush with said rib at either side and at its discharging end to discharge the dirt more equally onto the delivering-spout or saddle-shaped trough, as will be more fully explained. 4th, in providing the front of the main frame with plow mold-boards for clearing a path on either side of the ditch for the passage of the track-wheels, which mold-boards are capable, from their manner of attachment, of being carried up in the arc of a circle and secured from contact with the ground when the machine is in transit, as will be further described. 5th, the digging-frame so secured upon and within the main frame as that it will admit of a change of inclination, when

deemed necessary, by shortening or lengthening the rods connecting it with the front of the main frame, while it also admits of being raised or lowered at such varying angles of inclination, and secured at any desired elevation, as will be further described.

In the accompanying drawing, the main frame of the ditching-machine is composed of two longitudinal side pieces, *A*, connected at either end by transverse bars *B*, and suitably braced throughout its extent. It is mounted upon the axle *C* of the carrying-wheels *D*, in a manner which will be hereafter described. Within and upon the main frame of the machine is arranged the frame *E*, which carries the mechanism for cutting or cleaning the ditch and also the endless apron *F* of buckets for elevating, carrying rearward, and discharging the earth taken out of the ditch. This frame *E* is constructed so as to leave a space between the upper and lower timbers thereof to receive and allow of the revolution of a shaft, on which are arranged two gear-wheels, *a*, which mesh into a toothed plate, *b*, affixed to each side of the upper section of the frame *E*. The shaft of the gear-wheels has its bearings in studs *c*, projecting upward from the main frame, and is provided at either end with cranks *d*. These devices so arranged constitute an effective means for raising and lowering the frame *E*, as may be required, in digging a deep or shallow ditch; and the said frame may be secured at any desired elevation by passing a stop-pin, *i*, through the stud into one of a series of holes provided in the gear-wheels on either side of the machine, or in any equivalent manner. Near the bottom of this frame *E*, and projecting therefrom toward the front, are two arms, *G*, one on either side, which form the bearings for the axle *H* of the circular cutters *I*, which are revolved by the forward motion of the machine and cut the vertical sides of the ditch. These circular cutters are arranged on a vertical line with the outer sides of the series of colters *J* which cut the bottom of the ditch, and these latter are likewise secured to the frame *E* and project downward obliquely from the lower end thereof. Upon this frame *E* the endless apron *F* is mounted and supported; the said frame being provided with rollers *K* *L* at its upper and lower ends, around which the apron turns, motion being communicated to said apron by means of bands or chains *M* passing

from the driving-wheels N, which form part of the ground-wheels D and take their motion therefrom, to the upper roller K in the frame.

In changing the elevation of the digging-frame certain means are necessary to be employed to take up the slack of the driving-chains or ropes. This I effect by making the main frame adjustable on its axle; and for this purpose the longitudinal timbers A of said main frame are provided with a slot, P, through which a set-screw, Q, passes into the axle C beneath. When, therefore, the elevation of the digging-frame is altered, the set-screws are loosened, the frame moved in the required direction to exert the requisite tension on the driving-chains, and securely bolted to the axle, thus effecting the change in the grade of the ditch in a simple and convenient manner. The lower end of the digging-frame is securely connected and braced to the front of the main frame by rods R. It may be sometimes necessary in different soils to alter the inclination of the said digging-frame, and for this purpose the rods may be provided with extension links S, which will admit of the frame E being inclined more or less, as may be required. The frame E is supported at its outer end by a beam, T, which fits in a socket in an upright, U, at the lower end of which is arranged a guide-wheel, V, which follows in the track of the machine, and in the ditch already dug. This beam is made adjustable in its socket to accommodate the varying elevations of the digging-frame, and is secured at any desired point by means of a set-screw, h, or in any other suitable manner. Attached to the rear end of the apron-frame, and beneath the discharging-buckets of said apron, is a saddle-shaped trough, W, having its apex in the center transversely of the carrying-apron. Onto this trough the dirt taken from the ditch and carried up by the buckets of the apron is delivered, and it, in turn, distributes it equally on either side of the ditch, and in rear of but outside of the track of the machine. The stocks X of the plow mold-board for clearing a track in front of the ground-wheels D are arranged in boxes secured to the lower face of the cross-bar B of the main frame in such manner as that they may be raised in the arc of a circle clear of the ground and secured when the machine is in transit, as shown by dotted lines in Fig. 2.

It sometimes becomes necessary to clean out ditches already dug, and my machine is equally applicable for this purpose. When this is done, the digging colters are removed from the end of the frame and in their stead are arranged scoop-like shares or "slashers," as termed, which scoop up the excess of dirt in the bottom of the ditch and deliver it onto the discharging-apron. I also contemplate the removal of the central digging-plow of the series, and securing in its stead a shovel-shaped plow, having a greater downward projection than its fellows, whereby a central channel is cut in the ditch to receive drain-tiles should their use be necessary.

The operation of the machine is as follows: The frame E is arranged upon and within the

main frame A B at such elevation as will give the colters J a proper working depth, and the main frame is so adjusted upon its axle as to draw the driving-chains or ropes "taut" around the roller of the endless apron and the drive-wheels. The machine is now drawn forward, the earth taken up by the colters being delivered into the buckets of the carrying-apron, whence it is delivered at the rear end of said frame onto the saddle-shaped trough, and discharged therefrom to the rear and on either side of the track of the machine. The machine, having traveled its allotted distance, is carried back, the digging-frame lowered, and the proper tension exerted upon the driving-bands or chains by its adjustment, as described, it is again drawn forward, taking off another layer of earth, and thus the operation is continued until the requisite depth of ditch is obtained.

The machine is compact in its arrangement of parts, strong and durable in construction, and efficient in operation. It may be drawn by horsepower or arranged to be worked over its course by a steam-engine or propelled thereby, as may be found desirable.

Having described my invention, I claim—

1. The arrangement of the main frame A B of a ditching-machine upon the axle of its supporting-wheels in such manner as to admit of horizontal adjustment to exert the requisite degree of tension upon the driving-bands or chains operating the endless apron of the buckets when the elevation of the digging-frame is changed, as herein shown and described.

2. The arrangement of the frame E carrying both the colters I J and the endless apron of buckets F, in combination with the bracing-rods R, connecting the two frames together in the line of draft, so that the said digging-frame may be lowered by means of the rack b and pinion a, and inclined more or less, as may be desired, as herein shown and described.

3. The buckets of the endless apron F, constructed with a concave bottom, deeper in the center adjacent to the holding-rib, and becoming flush with said rib at either side and at its discharging end to discharge the dirt more equally onto the delivering-spout W, as shown and described.

4. The combination of the main frame A B, mounted upon its axle C so as to be horizontally adjusted, the frame E carrying the circular and plow-colters I J at its lower end, and the pulley K and trough W at its opposite end, the driving-chains or bands M for giving motion to the endless apron F, having buckets, as described, and the adjustable guide-wheel V, the whole arranged and operating as herein shown and described.

In testimony whereof I have hereunto signed my name.

BENJAMIN RHETT, M. D.

Witnesses:

S. M. GOWAN,
WM. H. PARKER.