

(No Model.)

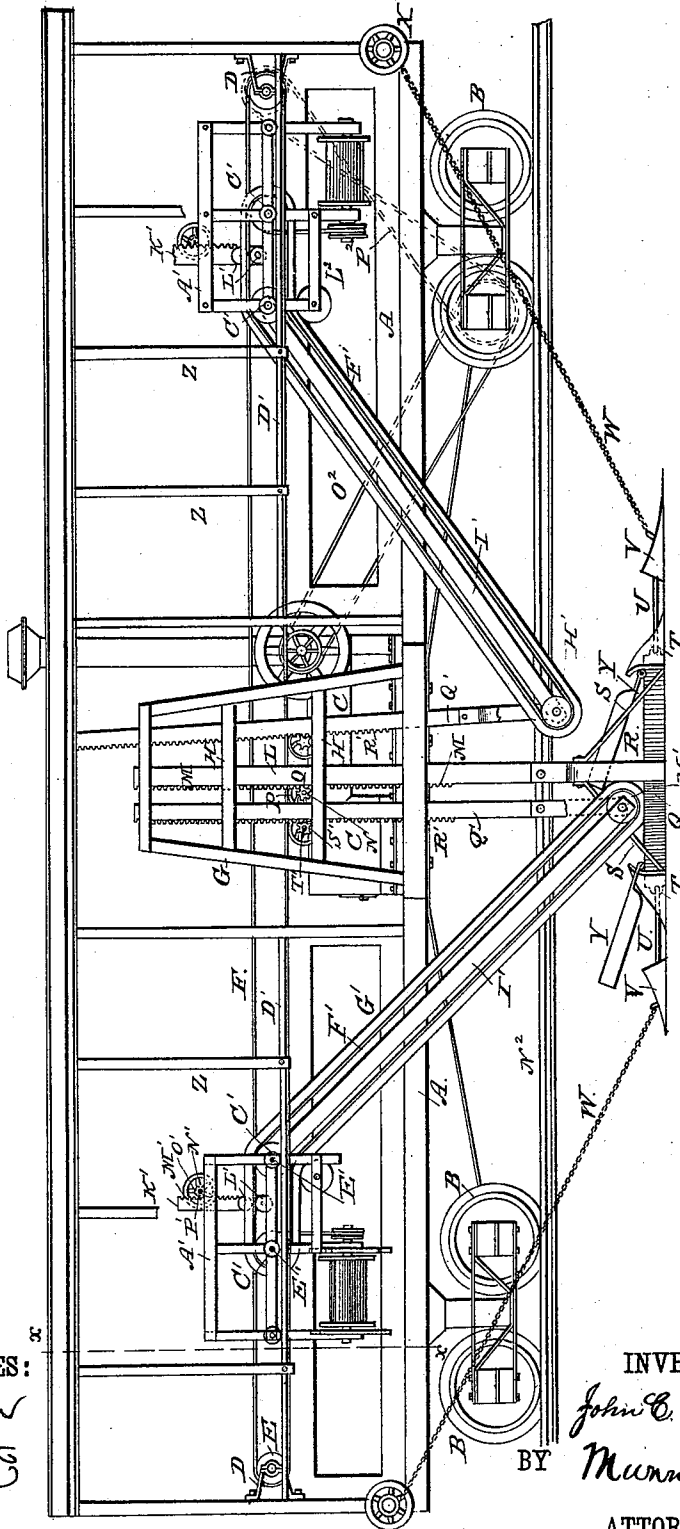
2 Sheets—Sheet 1.

J. C. SAGE.
DITCHING MACHINE.

No. 350,271.

Patented Oct. 5, 1886.

Fig. 1.



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DITCHING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 350,271, dated October 5, 1886.

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To all whom it may concern:

Be it known that I, JOHN C. SAGE, a citizen of the United States, residing at Gainesville, in the county of Hall and State of Georgia, have invented certain new and useful Improvements in Ditching-Machines, of which the following is a full, clear, and exact description.

My invention consists in the improved construction, arrangement, and combination of parts of a ditching-machine which may be employed for digging ditches, excavating the foundations of houses, or for other similar purposes, as will be hereinafter fully described, and pointed out in the claims.

Referring to the annexed drawings, Figure 1 is a side elevation of my improved ditching-machine. Fig. 2 is a vertical cross-sectional view taken on line *xx*, Fig. 1, of the drawings. Fig. 3 is a top view of a portion of the mechanism outside of the car, hereinafter described, and Fig. 4 is a similar view of one of the colters and its accompanying double plow.

The same letters of reference indicate corresponding parts in all the figures.

Referring to the several parts by letter, A represents the body of the car, which is mounted on the flanged car-wheels B B, of ordinary construction, and about its center, and which may be of any suitable construction. At each end of the car is secured, in bearings D, a band-wheel, E E, and around these band-wheels passes an endless belt, F, which is driven by the engine C, and which imparts motion to the endless flanged conveyer-belts which convey the dirt up out of the ditch or foundation being dug.

To one side of the car is secured the vertical central frame, G, the cross-pieces H of which are provided with the series of vertical slots I, J, and K, and in the central series of slots, J, of this frame slides the standard or adjusting-beam L, which carries the plows at its lower end, one side of this beam being provided with the rack M, which meshes with the teeth of a pinion, O, secured upon a central transverse shaft, N, in the frame G, and the inner end of this shaft, which projects within the car, is provided with a hand-wheel, P, by means of which the plow-beam may be conveniently raised or lowered to regulate the depth to which the

ditch or foundation is to be dug. The lower end of the plow-beam is secured to the inner side of a cross-piece, Q, which carries the plows, and an arm, R, is secured to the plow-beam near the lower end thereof, and is secured at its lower end to the outer side of the cross-piece Q, thereby securely holding the same in its operative position. Inclined braces S serve to still further strengthen the cross-piece. To the ends of this cross-piece are secured the two plows or mold-boards T T, which are curved, as shown more clearly in Fig. 4 of the drawings, so as to effectually convey the earth cut by the colter back upon and toward the center of the cross-piece, while immediately in front of each end of the cross-piece and connected thereto by a short chain or link, U, extending between the two mold-boards, is a colter, V, which is in turn connected by a chain, W, to a small windlass, X, at its end of the car, around which the upper end of the chain wraps, and by means of which the chain may be always held taut and rigid so as to hold the colter firmly to its work.

Immediately to the rear of the mold-boards are hinged on top of the cross-piece, by their forward ends, the movable guide-boards Y, having the side flanges to prevent the dirt from rolling off of them to either side. To each side of the central frame, G, are supported, in the side frames, Z Z, the adjustable frames or carriages A' A', the inner portions of which extend within the frame of the car through longitudinal side openings, B', therein, each frame being supported on rollers C' on guideways D', so that each frame may be adjusted nearer to or farther from the center of the car, for the purpose hereinafter specified.

In the outer portion of each frame or carriage A' are journaled two shafts, E', over which pass the upper horizontal portion of an endless conveyer-belt, F', having the side flanges, G', and passing at its lower portion around a roller, H', journaled in the lower end of a frame, I', which is hinged at its upper end in the frame A', as shown. The inner ends of the shafts E', which project within the car, are provided with wheels J', which lie between the upper and lower parts of the drive-belt F, previously described; but the wheels J' being of less diameter than the wheels E, around

which the drive-belt F passes, they are normally not in contact with the said belt. A vertical rod, K', slides in bearings in the side frame, immediately above these wheels J', and has journaled to one side of its lower end two pinions, L' L', between which the upper portion of the drive-belt passes. One side of this vertical rod K' is provided with a rack, M', and a short transverse shaft, N', extends through the frame A', and has an operating hand-wheel, O', and a pinion, P', which meshes with the rack M'; and it will be seen that when the vertical rod K' is lowered by turning this hand-wheel that the upper portion of the driving-belt F will be forced down into contact with the upper sides of the pinions J' on the inner ends of the shafts E', thereby rotating the said shafts, and thus revolving the endless conveyer-belts F', as will be readily understood.

To the lower end of each frame I', around which the conveyer-belts travel, is pivotally connected the lower end of a flat adjusting-rod, Q', the said flat rods passing up through the vertical apertures I and K in the central frame, G, and being provided on one of their sides with the racks R', which mesh with pinions S' on the transverse adjusting-shafts T', by means of which the said rods may be raised or lowered to throw the lower ends of the conveyer-belts into or out of their operative positions, the slots through which the said adjusting-rods pass being of greater width than the rods themselves, so that as the lower ends of the frames I, which of course swing in the arc of a circle, are raised or lowered the said rods may adjust themselves to the required angle.

The inner end of one of the shafts E' is extended across the car, and provided at its extreme inner end with a supporting-roller running on the longitudinal guideway V'. On this inner portion of this shaft is fitted a movable block, W', forming a vertical bearing for the upper portion of a vertical adjusting-rod, X', the upper portion of which is provided with a rack, Z', adapted to mesh with the teeth of a pinion, A', on a short shaft, B', journaled on the top of the bearing-block W', and having a hand-wheel for convenience in turning it. The lower end of this flat adjusting-rod X' is pivotally secured at or near one end of a frame, C', to one side thereof, the said frame having journaled at each end a roller, D' D', around which rollers passes an auxiliary endless conveyer-belt, E', that end of the frame C' which projects through that side of the car to which the operative mechanism is secured being provided with the longitudinal slot F', through which extends the transverse bolt G', which supports the slotted end of the said frame, the ends of this bolt being seated in any of a vertical series of apertures in the lower portions of two hangers of the frame or carriage A, by means of which arrangement the slotted ends of the frames C' may be raised or lowered, as desired.

A third shaft, Q', is journaled in each car, extending across the car and having its inner end supported by a roller, R', which runs upon the guideway V', and this shaft supports a sliding bearing-block, S', similar to the one upon the extended shaft E', in which is adjustably secured the upper end of a flat adjusting-rod, T', which is pivoted at its lower end to the opposite side of the frame C' to that to which the rod X' is secured, thereby supporting the opposite side of the said frame.

In order to rotate the auxiliary conveyer-belts in either direction, as desired, a grooved roller, I', is mounted rigidly upon each extended shaft E', and a drive-cable, J', round in cross-section, passes around this grooved pulley, between and under two small grooved pulleys, K', journaled side by side with a suitable space between them upon an extension of the frame A', and then around a grooved pulley, L', on the end of the shaft of the roller D', and around a similar grooved pulley, M', journaled on the side of the frame C', the grooved roller I' being immediately over the center of the space between the rollers L' and M' when the frame C' is in its normal position.

The operation of my improved ditching-machine is as follows: When it is desired, for example, to dig a ditch, a temporary track, N', is laid, on which the car runs, the wheels being revolved by an endless chain, O', from the engine C, and a similar chain, P', extends either direct from the engine or else from the car-wheel, being driven from the engine, to the shaft of one of the band-wheels E, thereby imparting motion to the drive-belt F. This belt, as previously described, revolves normally without imparting any motion to the conveyer-belts. When the point at which it is desired to commence ditching is reached, the cross-piece carrying the plows is lowered to the desired depth, the lower end of one of the main flanged conveyer-belts is lowered, as described, to the top of the cross-piece which carries the plows, and the hinged guide-board Y, at the operating end of the cross-piece Q, is swung inward until its free inner end rests upon or immediately above the lower end of the conveyer-belt, as shown in Fig. 1 of the drawings. The vertical rod K of the frame or carriage A', which is in operation, is then lowered to force the drive-belt into contact with the pinions J' on the inner ends of the shafts E', thereby causing the conveyer-belt to travel around its pulleys, and at the same time, through the cable J', the auxiliary conveyer-belt E' is revolved. It will now be seen that the earth cut by the colter will be raised by the mold-boards and guide-board Y up upon the lower end of the conveyer-belt, which will in turn convey the dirt up until it falls upon the auxiliary conveyer-belt E', the slotted end of which is then lowered, while its other end may be raised, and this conveyer-belt will convey the earth out to one side of the ditch. When the foundation of a house is being dug, the slotted end of the frame C'

may be raised and the other end lowered, so as to convey the dirt across the car and out at the other end of the conveyer-belt, the cable J² being easily arranged around its grooved pulleys so as to run the said conveyer-belt in either direction, as desired. As the plow is lowered deeper, it is of course necessary to lower the lower end of the main conveyer-belt, and to do this it is necessary to bring the carriage which supports the upper end of the said belt nearer to the center of the car, which may be readily done, as the said carriage is, as before described, mounted on rollers, as is also the auxiliary conveyer-belt, which rollers slide on the longitudinal guideways heretofore specified.

By constructing the frame C² of the auxiliary conveyer-belt with the longitudinal slot through which one supporting-bolt passes, and by supporting its other end adjustably, as described, the said frame may be moved with its ends projecting from either side of the car, as required, the peculiar arrangement of the cable J² admitting of this movement.

Having thus described my invention, what I claim and desire to secure by Letters Patent of the United States, is—

1. The combination, with the vertically-adjustable cross-piece carrying the plows and having the hinged guide-boards arranged as described, of the movable carriages, the conveyer-frames hinged at their upper ends in the said carriages, and means, substantially as described, for adjusting their lower ends vertically, the flanged conveyer-belts arranged as described, and means for rotating the said conveyer-belts.

2. The combination of the central frame having the slotted cross-pieces, and the transverse adjusting-shafts carrying the pinions near their outer ends, the vertical plow-beam sliding in the said frame having the rack upon one side, and having at its lower end the cross-piece carrying the double plows, the colters arranged in advance of the said plows and connected by the adjustable chains to the ends of the cars, the adjustable bars having the racks upon their sides sliding in the said central frame and pivotally connected at their lower ends to the lower ends of the main conveyer-frames, the guide-boards hinged, as described, to the rear of the double plows, the movable carriages, the main conveyer-frames hinged at their upper ends in the said carriages, and the flanged conveyer-belts arranged substantially as described.

3. The combination, with the endless drive-belt passing around the pulleys located at each end of the car and receiving motion from the engine, and the adjustable carriages having each two shafts around which the upper portion of its conveyer-belt passes, the inner ends of the said shafts being provided with the wheels, which extend within the endless drive-

belt, as described, and the vertically-adjustable rods supported in the said carriages and having journaled near their lower ends the two rollers between which the upper portion of the drive-belt passes, substantially as described, for the purpose set forth.

4. The combination, with the carriages each having the two shafts around which the upper portion of its conveyer-belt passes, the inner ends of the said shafts being provided with the wheels, which receive motion from the drive-belt, as described, and one of the said shafts being extended across the car and provided with a supporting-roller at its inner extremity, of the carriage-shaft extending across the car and provided at its inner end with a supporting-roller, the auxiliary conveyer-belt frame having the slotted end adjustably supported by the said carriage and having pivotally secured to it, near its other end, the lower ends of the vertical adjustable rods having racks formed on one of their sides, and the movable bearing-blocks having the adjusting shaft and pinion and supported on the extended portion of the shaft of the carriage and the independent carriage-shaft, as described, and means, substantially as described, for revolving the auxiliary conveyer-belt from the extended shaft of the carriage.

5. The combination, with the movable carriage, of the shaft extending across the car and having the supporting-roller on its inner end, and adapted to be rotated, as described, of the independent carriage-shaft extending across the car and having the supporting-roller on its inner end, the auxiliary conveyer-belt frame having the slotted end adjustably supported by the said carriage, and having pivotally secured to it, near its other end, the lower ends of the vertical adjustable rods having the racks formed on one of their sides, the movable bearing-blocks having the adjustable shaft and pinion and supported on the extended portion of the carriage-shaft and the independent carriage-shaft, the grooved roller mounted upon the said extended shaft, the grooved rollers, one of which is journaled upon the side of the frame of the auxiliary conveyer, while the other is secured to the projecting end of the shaft at the slotted end of the said conveyer-frame, the cable, round in cross-section, passing around the grooved roller on the extended shaft of the carriage, under two small grooved rollers journaled in the frame of the carriage, and around the grooved rollers of the conveyer-belt frame, and the auxiliary flanged conveyer-belt, all constructed and arranged to operate in the manner and for the purpose shown and set forth.

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