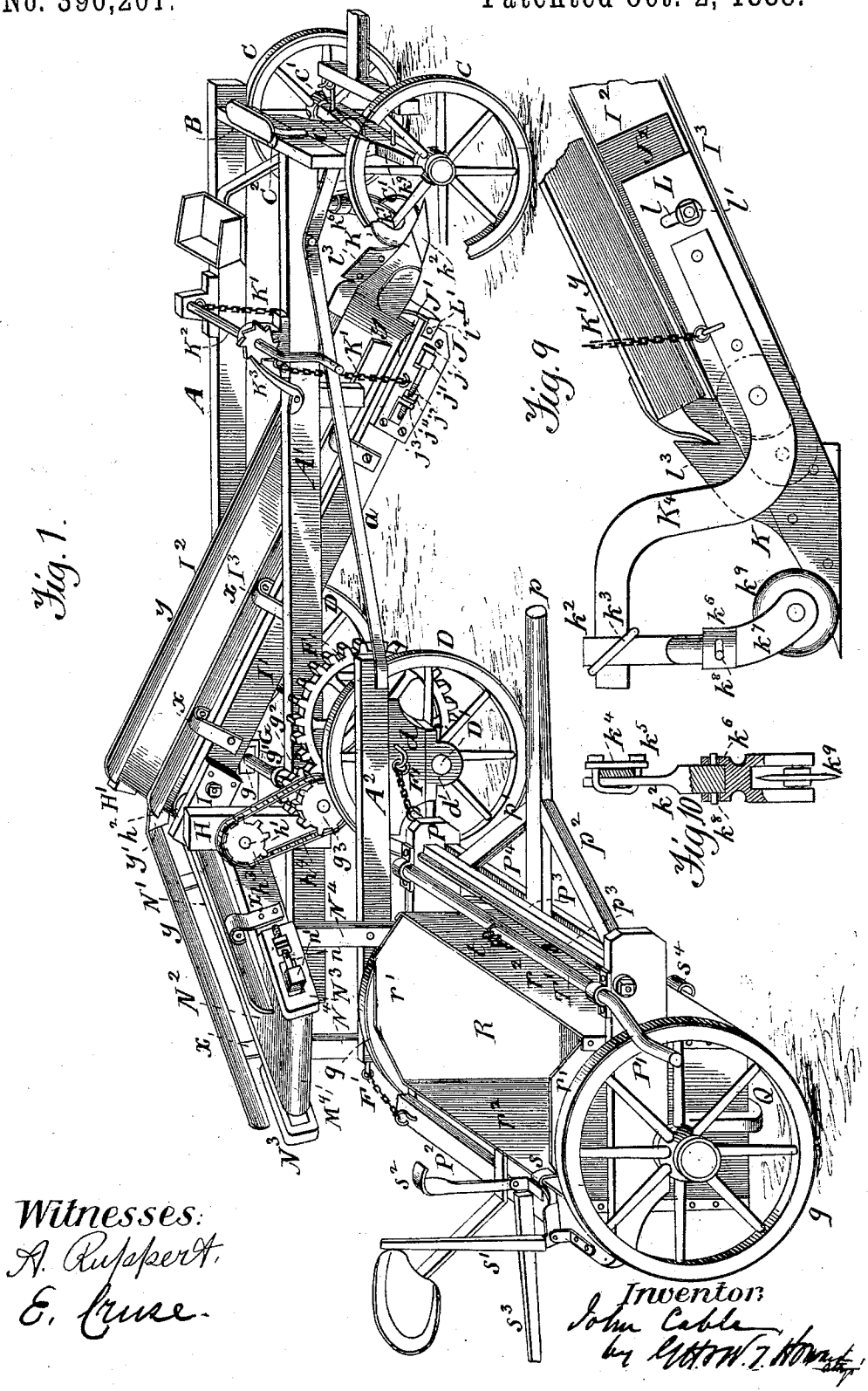
(No Model.) 3 Sheets—Sheet 1.

J. CABLE.

EXCAVATOR AND CONVEYER.

No. 390,201. Patented Oct. 2, 1888.



Witnesses:
A. Ruppert.
E. Cruse.

Inventor:
John Cable
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Fig. 4.

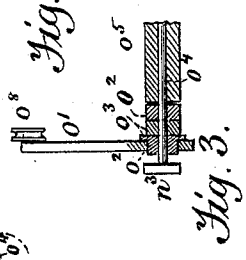


Fig. 3.

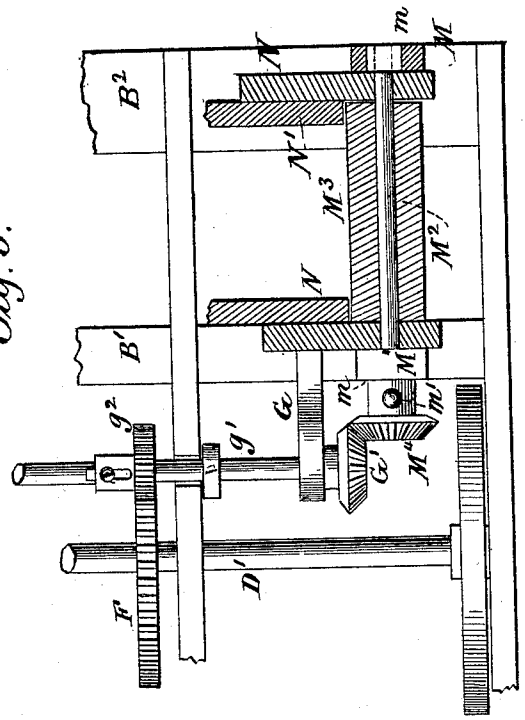
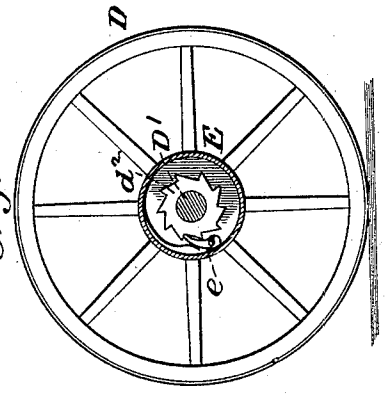


Fig. 2.

Fig. 12.



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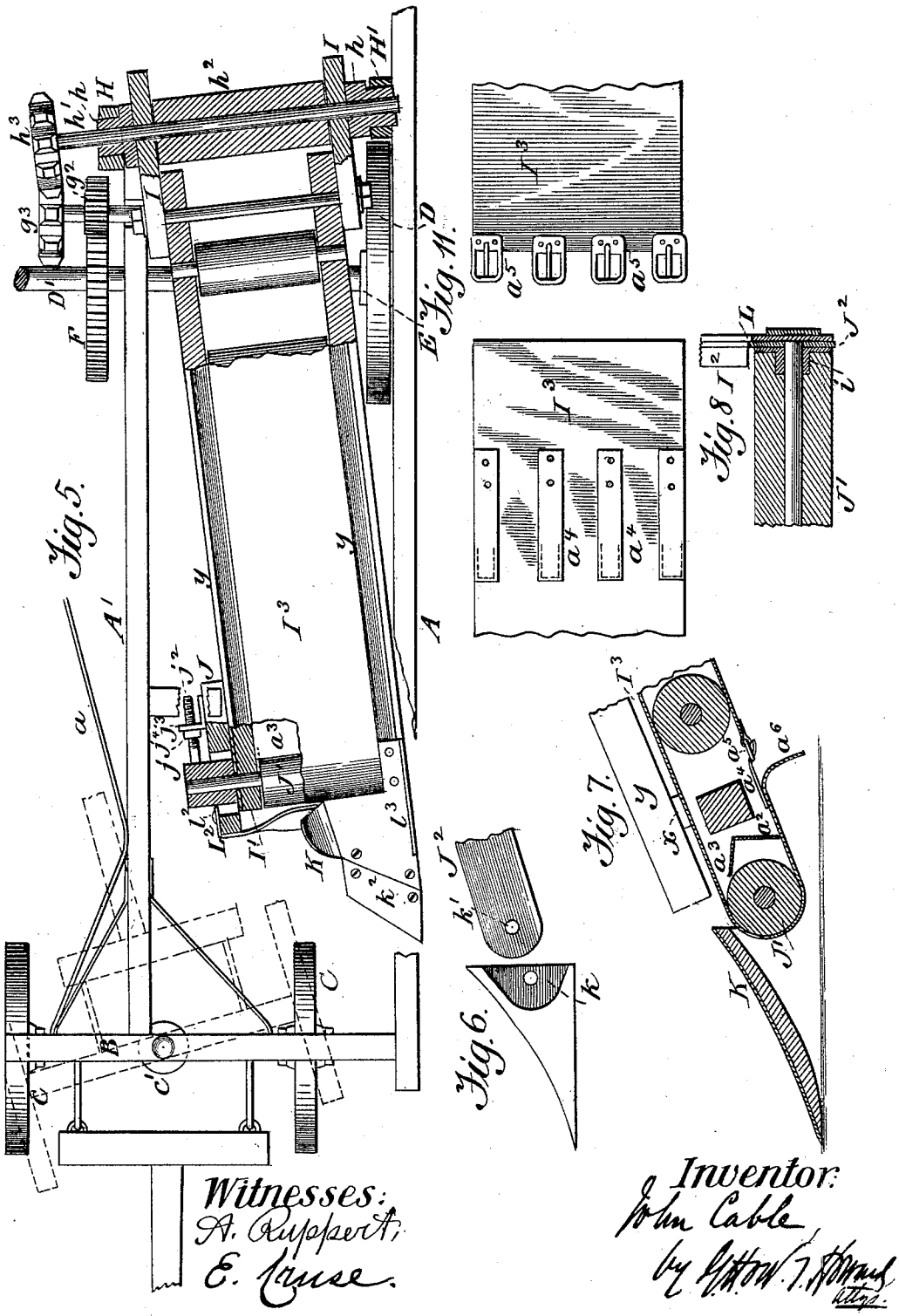
N. PETERS, Photo-Lithographer, Washington, D. C.

(No Model.) 3 Sheets—Sheet 3.

J. CABLE.

EXCAVATOR AND CONVEYER.

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UNITED STATES PATENT OFFICE.

JOHN CABLE, OF CABLE, MINNESOTA.

EXCAVATOR AND CONVEYER.

SPECIFICATION forming part of Letters Patent No. 390,201, dated October 2, 1888.

Application filed January 13, 1888. Serial No. 260,606. (No model.)

To all whom it may concern:

Be it known that I, JOHN CABLE, of Cable, in the county of Sherburne and State of Minnesota, have invented certain new and useful Improvements in Excavators, of which the following is a specification, reference being had to the accompanying drawings, and to the letters of reference marked thereon.

One object of my invention is to provide an excavator which shall make the cut on a line outside the line of the frame of the machine on the side on which the plow is located, in order that a perpendicular or sloping bank may be formed, if necessary, when making a deep cut for the purpose of forming a roadway or other analogous purpose.

Another object of my invention is to convey the dirt loosened by the plow either to a receptacle mounted on wheels which can be attached to one side of the excavator and moved with it, or else by means of a lengthened conveyer to discharge it on one side of the cut to form an embankment.

My invention consists in the construction, arrangement, and combination of the several parts, as will be hereinafter fully set forth in the specification and claims.

In the drawings, Figure 1 is a perspective view of my improved excavator, one of the front wheels of the excavator being broken away. Fig. 2 is a rear view of the excavator with a long carrying-belt attached. Figs. 3 and 4 are detached details. Fig. 5 is a plan view of the excavator, partly broken away. Figs. 6, 7, 8, 9, 10, 11, and 12 are detached details.

Similar letters of reference indicate similar parts in the respective figures.

The main frame of the machine consists of the longitudinal beams A, A′, and A^2 and the cross-beams B, B′, and B^2, the rear beams, B′ and B^2, being securely bolted to the under side of the longitudinal beams, and the front beam, B, being secured to the ends of the longitudinal beams A and A′ by means of mortises, as shown. The beam A^2 is about half the length of the beams A and A′, and the forward end of this beam is connected by means of a bent iron brace, *a*, to the beams A′ and B. The object of having the beam A^2 shorter than the other longitudinal beams and using the bent iron brace *a* will be hereinafter described.

The front part of the excavator is supported on the wheels C C, a suitable bolster, *c*, and a fifth-wheel, *c′*, being interposed between the under side of the beam B and the axle C′, the several parts being connected by means of a bolt, C^2, which passes through them and forms a pivot on which the axle C′ revolves in a horizontal plane. The wheels C C are of a size enabling them to pass freely under the frame of the machine.

The rear end of the machine is supported on the wheels D D. Suitable bolsters, *d*, are secured to the under sides of the beams A, A′, and A^2, and to these bolsters are attached the boxes *d′*, in which the axle D′ revolves. Each of the wheels D is loosely mounted on the axle inside of the frame of the machine. The inner ends of the hubs of the wheels D are provided with ratchet-teeth d^2.

E E are caps which fit over the inner ends of the hubs, and inside of each of these caps a spring-pawl, *e*, is pivoted, which engages with the teeth on the hub of the wheel, and thus causes the cap to rotate with the wheels when the machine is moving forward. The caps E being keyed to the axle D′ will also cause it to revolve with them. The wheels D being, however, loosely mounted on the axle, if the machine is moved backward, the pawl *e* will slip over the ratchet-teeth and the caps E and axle D′ will not revolve.

F is a gear-wheel keyed to the axle D′.

To the beam B′ are bolted the short supports G G, which project forward, and to which are secured the boxes *g*, in which the shaft *g′* revolves. The beam A′ is notched to receive the shaft, as shown. A small gear-wheel, g^2, is adjustably keyed on the shaft *g′* and meshes with the gear-wheel F. A sprocket-wheel, g^3, is rigidly mounted on the shaft *g′*.

H H′ are standards securely bolted at their lower ends to the beams A and A′, and at their upper ends receive the sleeves *h h*, which are firmly secured to the blocks I I, bolted to the side rails, I′ I^2, of the carrying-belt frame, and form a pivotal support for the upper end of the said frame. A shaft, *h′*, has its bearings in the sleeves *h h*, and on this shaft is mounted the roller h^2, over which the endless belt I^3 passes. One end of this shaft *h′* projects beyond the standard H and carries a sprocket-wheel, h^3. A chain, h^4, passes over the sprocket-

wheels g^3 and h^3 and transmits motion from one to the other.

To the lower end of the side rail, I′, is bolted a short block, J, provided with a slot, j, in which a box, j', is inserted. The box j' is adjustable in the slot j by means of the set-screw j^2, the lug j^3, and nut j^4. The box j' serves as a bearing for one end of the roller J′, and, being adjustable, the roller J′ and the belt I^3, which passes over it, can be adjusted. The other end of the roller J′ has its bearing in a suitable box, i, riveted to the iron plate J^2, bolted to the side rail, I^2. The end of the roller is cut out in order to fit over the box i and allow the roller to abut against the plate J^2. Between the rollers J′ and h^2 as many rollers as may be necessary to properly support the carrying-belt are journaled in the two side rails, I′ I^2.

The landside of the plow K is recessed at k to receive the end of the plate J^2, which is rounded, as shown, the two being secured together by means of the bolt k', which forms a pivot for the plow. The plate J^2 and the face of the landside K are flush with each other, and the plate forms the shank of the plow and pushes it forward.

L is a plate riveted to the landside K and extends backward over the plate J^2, being provided with a slot, l, through which the set-screw l' passes into the plate J^2, and by means of which the vertical angle of the point of the plow can be adjusted.

The plow is laterally braced by means of the bar L′, one end of which is fastened to the under side of the mold-board, the other end being bent over the end of the side rail, I′, and pivotally fastened thereto by means of the bolt l^2. The mold-board of the plow is curved slightly and provided with a fender, l^3, on each side to prevent the dirt from falling off.

The standard H is bolted to the beam A′ at such a point forward of that at which the standard H′ is bolted to the beam A as will serve to throw the shaft h' at an angle to the beams A A′, and consequently bring the plowshare h^2 just outside the line of the beam A. The carrying-belt I^3 and the mold-board of the plow will thus lie at an angle to the beams A A′, but the plowshare is attached to the plow in such a way as to lie in a line parallel with the beams A A′. This is necessary in order to prevent the plow having a tendency to pull the machine out of a straight course.

K′ K′ are chains secured at one end to the side rails, I′ I^2, and adapted to be wound on the shaft K^2, which is mounted in bearings on the beams A A′, in order to lift the plow clear off the ground when necessary, a ratchet-and-pawl mechanism, K^3, being provided to hold the shaft in position.

M M′ are short standards bolted at their lower ends to the beams B′ B^2, and receiving at their upper ends the boxes m, secured to blocks N N, bolted to the side rails, N′ N′, and form a pivotal support for their lower ends.

M^2 is a shaft which revolves in the boxes m and carries the roller M^3. One end of the shaft M^2 projects beyond the standard M, and to it is secured by means of a set-screw, m', a bevel-gear, M^4, which engages with a bevel-gear, G′, on the shaft g'. By this means the roller M^3 is revolved, and with it the carrying-belt N^2. The shaft g' is provided with an adjustable collar, which abuts against the side of the beam A′ and prevents the beveled gear-wheels G′ and M^4 from becoming disengaged.

To the upper and free ends of the rails N′ N′ are bolted the blocks N^3 N^3, each of which is provided with a slot, n, in which the boxes n' are made adjustable. The roller M^4 has its bearings in the boxes n', the carrying-belt N^2 passing over it. As many rollers as may be necessary to properly support the carrying-belt are interposed between the rollers M^3 and M^4, the interposed rollers having their bearings in the side rails, N′ N′. The rails N′ N′, and with them the belt N^2, are supported at their upper ends by means of the standards N^4 N^4, which are bolted to the beam A^2. It will be observed that by journaling the end rollers over which the belts travel in the blocks which are secured to the outer sides of the side rails I am enabled to have the end rollers and the belt almost as wide as the space between the outer faces of each pair of side rails. This is a great advantage, as it prevents in a great measure the dirt from falling in between the side rails and clogging the rollers. To each side rail are secured the metal supports x x, which extend upward above the belts, and have their ends bent over and inwardly, the bent-over portions supporting the side fenders, y y, which prevent the dirt from falling off the sides of the belt. An end fender, y', is also provided at the lower end of the belt N^2, to prevent the dirt falling off as it drops from the belt I^3.

When it is desired to load the dirt in wheeled conveyers, as shown in Fig. 1, the conveyer is attached to the side of the excavator by means of the chains F′ F′, and the team attached to the conveyer will travel alongside the excavator, keeping pace with it. When, however, it is desired to carry the dirt off to one side of the cut, the belt N^2 and its supporting frame and rollers are removed, and another belt, N^5, with its supporting frame and rollers substituted. The belt N^5 is about twice the length of the belt N^2, and the side rails, O O, rollers, &c., are constructed in the same manner as those of the belt N^2. To the blocks on the outer ends of the side rails, O O, are bolted the bent iron bars O′ O′, one arm, o, projecting below the rails O and the other arm, o', above. The arms o receive the boxes O^2, which are secured to the blocks o^3 on the side rails, O^2 O^2, and in the boxes a shaft, o^4, carrying the roller o^5, revolves.

The outer ends of the rails O^2 O^2 are provided with blocks and boxes, in which the roller o^6 revolves, and over the rollers o^5 and o^6 the belt O^4 travels. It will thus be seen that one

end of the belt O^4 and its supporting-frame are pivotally supported by the arms *o* in such a manner that when in the position shown in Fig. 2 it will receive the dirt from the belt N^5. The outer ends of the rails O^2O^2 are supported by means of the chains o^7, which pass over the pulleys o^8 in the upper end of the arms *o'*, and are wound on the shaft o^9, which is journaled in the side rails, O O. One end of the shaft of the upper roller which carries the belt N^5 projects beyond the side rail and is provided with a sprocket-wheel, n^2. One end of the shaft o^4 also projects beyond the side rail and is provided with a sprocket-wheel, n^3, a sprocket-chain, n^4, passing over these two wheels and transmitting motion from one to the other. When the belt O^4 is not required for use, it and its supporting-frame can be folded under the belt N^5 and held in that position by means of the hooks n^5. The sprocket-wheel n^2 is secured on its shaft by means of a set-screw, n^6, and when the belt O^4 is not in use the set-screw n^6 is loosened and the shaft will then revolve in the sprocket-wheel.

In practice it is found that more or less dirt, gravel, and other substances will work their way inside the belt, thereby clogging the lower roller and often cutting holes in the belt. In order to keep the lower roller clean, a scraper is usually provided, which scrapes the dirt, &c., off the roller and deposits it in a tray. This arrangement, however, does not prevent the passage of foreign substances between the lower roller and the belt, and in the case of any hard substance having sharp edges the effect is often disastrous. Another disadvantage is, that the machine has to be stopped at certain intervals in order to remove the accumulation of dirt, &c., from the tray. To avoid this loss of time, and to remedy the other defects, I dispense with the tray and attach a fender, a^2, to the scraper a^3, the fender coming nearly in contact with the belt and preventing any foreign substance, except very fine particles of dirt, from being carried to the lower roller. Instead of sewing or lacing the ends of the belt together, I attach straps a^4 to the belt on the inside, about four inches from one end, and to the other end I attach buckles a^5. The straps are then drawn through the buckles, so as to leave an open space of about two inches between the buckles and the ends of the straps attached to the belt. As the jointed portion of the belt is traveling between the upper and lower rollers on the under side of the belt-frame, the end a^6 of the belt will fall down, and when the joint reaches the scraper all the dirt, &c., will fall through the open space. When the jointed portion of the belt is traveling on the upper side of the belt-frame, the end a^6 will form a flap and cover up the open space. By this means the belt will constantly keep itself clear of the dirt, &c., which would otherwise accumulate on the inside.

Referring again to the plow, the bent iron bar K^4 is bolted at one end to the plate L, extending forward a distance about in a line with the plow-point, as shown. The vertical bar k^2 is secured at its upper end to the bar K^4 by means of a strap, k^3, and plate k^4, fitting over the ends of the strap. The ends of the strap are screw-threaded to receive the nuts k^5, by means of which the bars K^4 and k^2 are clamped together. The lower end of the bar k^2 is rounded, and rests in a cup, k^6, formed in the upper end of the bifurcated bar k^7. A slot is cut in opposite sides of the cup k^6, into which the ends of the pin k^8, which is driven through the rounded end of the bar k^2, project, thereby suspending the bar k^7 and allowing it to have a limited pivotal movement. A rolling cutter, k^9, is journaled in the arms of the bar k^7. The rolling cutter is thus pushed forward by the plow, and, having a pivotal movement, it will conform its course to that of the plow without straining any of the parts.

It will be observed that the front axle, C', is pivoted to the beam B at a point midway of the entire width of the excavator-frame, and is short enough to allow the front wheels to revolve entirely around the pivotal point, if necessary, without coming in contact with any part of the machinery. This is important when it becomes necessary to turn the machine in a narrow cut. By having the beam A^2 short and placing the bent iron brace *a* at an angle, as shown, a space is formed, which enables the horses to be pulled round to a line parallel to the brace and very near the rear wheels, the front wheels being in the position shown in dotted lines, Fig. 5. The operator is thus enabled to turn the machine in a cut very little wider than the length of the machine. At the same time the bent iron brace *a* forms a fender and prevents the horses from being injured by any part of the machine. The rear end of the beam A^2 is provided with a caster-wheel, A^3, as shown, which, should it come in contact with a bank when the machine is turning, will ride up the bank and lift that corner of the machine, whereas without it the end of the beam A^2 would embed itself in the bank.

Having described my invention, I claim—

1. In an excavator, the combination, with the frame of the machine, of a carrying-belt frame and a plow attached to the lower end of one of the side rails of said belt-frame, the belt-frame being so supported at its upper end, within the frame of the machine, as to throw the point of the plow outside the machine-frame, substantially as and for the purpose set forth.

2. In an excavator, the combination, with the frame of the machine and a carrying-belt frame supported at an angle thereto, of a plow secured to one of the side rails of the belt-frame, the share being so attached to the plow as to cut in a line with the machine-frame, while the mold-board is in a line with the belt-frame, substantially as and for the purpose specified.

3. In an excavator, the combination, with the side rail of the carrying-belt frame, of a plate secured to the rail, a plow pivotally at-

tached to the end of said plate, and another plate bolted to the plow and provided with a slot, through which a set-screw passes to the plate to which the plow is pivoted, substantially as described.

4. The combination, with the side rails of a carrying-belt frame, blocks secured to the outer sides at the upper ends of both and at the lower end of one of the rails and projecting beyond said ends, and a metal plate attached to the outer side of the other rail at its lower end and projecting beyond it, of boxes secured in the upper blocks and a roller journaled therein, a box adjustable in the lower block, a box riveted to the inner side of the metal plate, a roller journaled in said boxes, said roller being recessed at its end to fit over the box on the metal plate, and a belt which travels over the rollers, said belt and rollers being of a width equal to the space between the outer faces of the side rails, substantially as and for the purpose specified.

5. In an excavator-frame, the combination, with the beams A A′, the cross-beam B, and the short beam A^2, of the bent iron brace *a*, attached at an angle to the beams A^2, A′, and B, whereby a space is formed, for the purpose specified.

6. In an excavator, the combination, with the carrying-belt frame and the lower roller mounted in said frame, of a scraper secured to the sides of the frame and adapted to scrape said roller, and a fender extending from the scraper downward in close proximity to the belt, substantially as and for the purpose specified.

7. The combination, with the carrying-belt, of straps secured to the belt a short distance back from one end, and buckles attached to the other end, the straps engaging with the buckles so as to leave an open space, for the purpose specified, that portion of the belt between the end and the points where the straps are attached serving as a flap, substantially as described.

8. The combination, with an excavator, of a carrying-belt which receives the dirt from the plow and conveys it backward lengthwise of the machine, a second carrying-belt which receives the dirt from the first belt and conveys it across the machine to a point some distance beyond the side of the machine to form an embankment, and an extension pivoted to the forward end of the frame of the second belt and adapted to be folded under the second belt when not in use, substantially as specified.

9. In an excavator-frame, the combination, with the beams A A′, the short beam A^2, and the cross-beam B, of the bent iron brace *a*, attached at an angle to the beams A^2 A′, whereby a space is formed for the purpose specified, and a caster-wheel attached to one of the rear corners of the frame, substantially as set forth.

10. In an excavator, the combination, with the plow and a bent iron bar secured at one end to the rear of said plow, the other end extending upward and forward, of a vertical bar attached to the free end of the bent bar, and a bifurcated bar carrying a rolling cutter and having a cup at its upper end, in which the lower end of the vertical bar is pivotally secured, substantially as specified.

In testimony whereof I have hereunto set my hand and seal.

JOHN CABLE. [L. S.]

Witnesses:
E. CRUSE,
PHILIP MAURO.