(No Model.) 2 Sheets—Sheet 1.

H. W. HYDE.

TRACTION WHEEL.

No. 356,472. Patented Jan. 25, 1887.

Fig. 1.

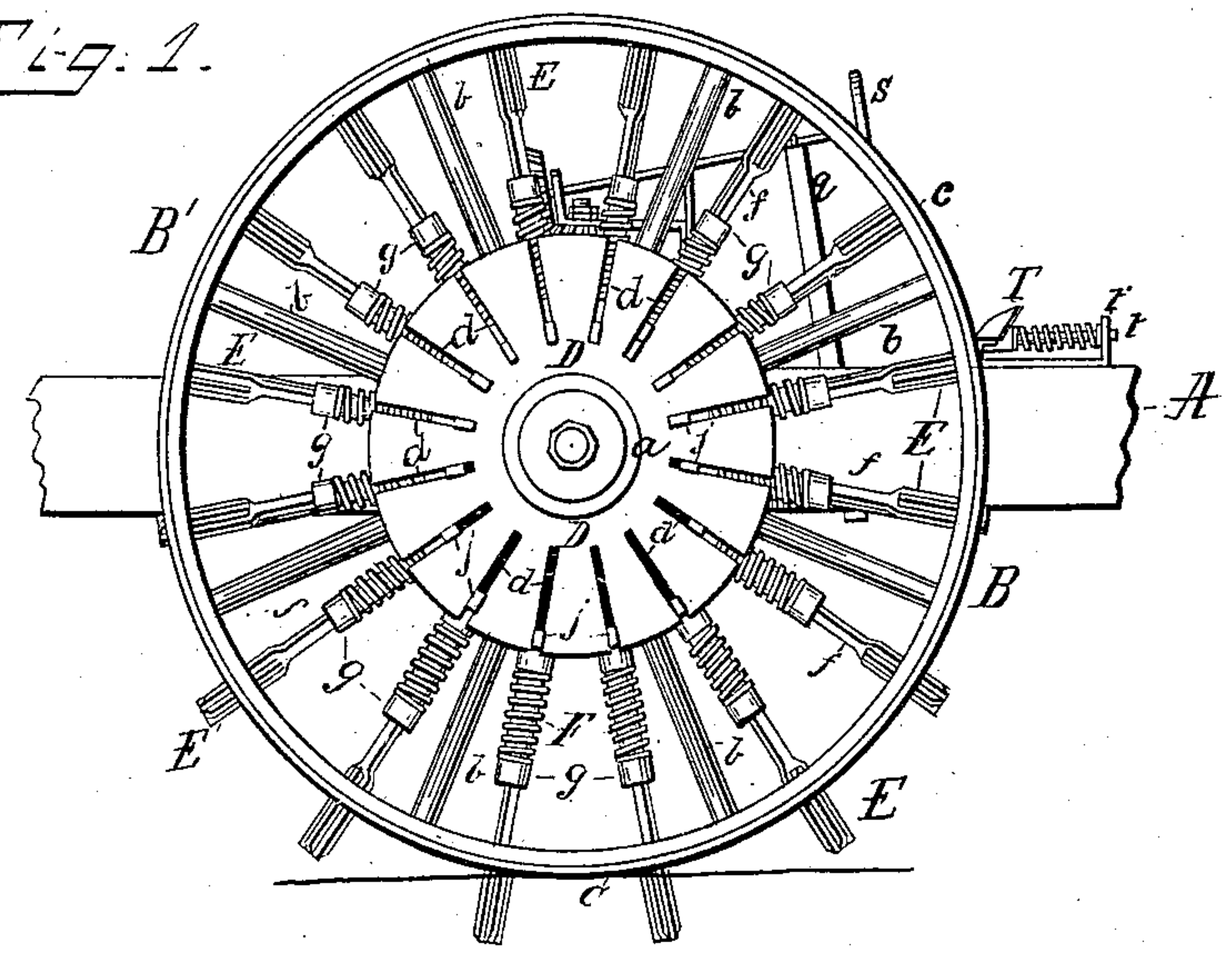


Fig. 2.

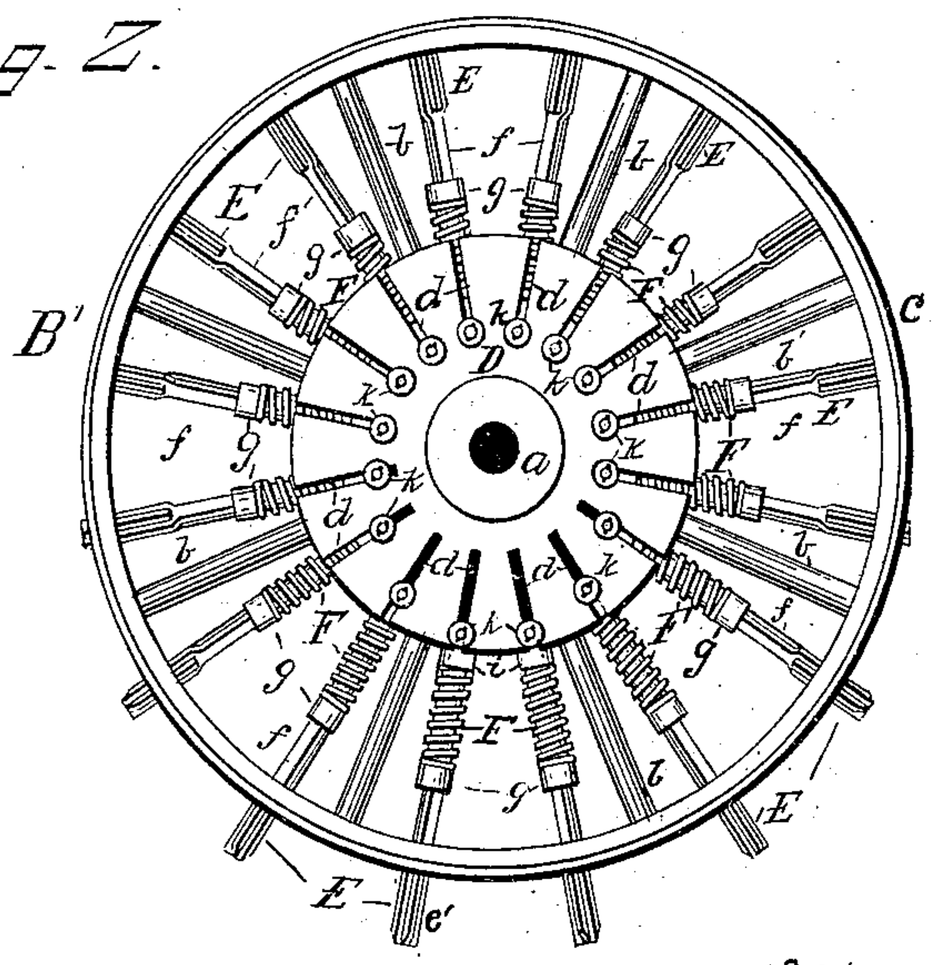
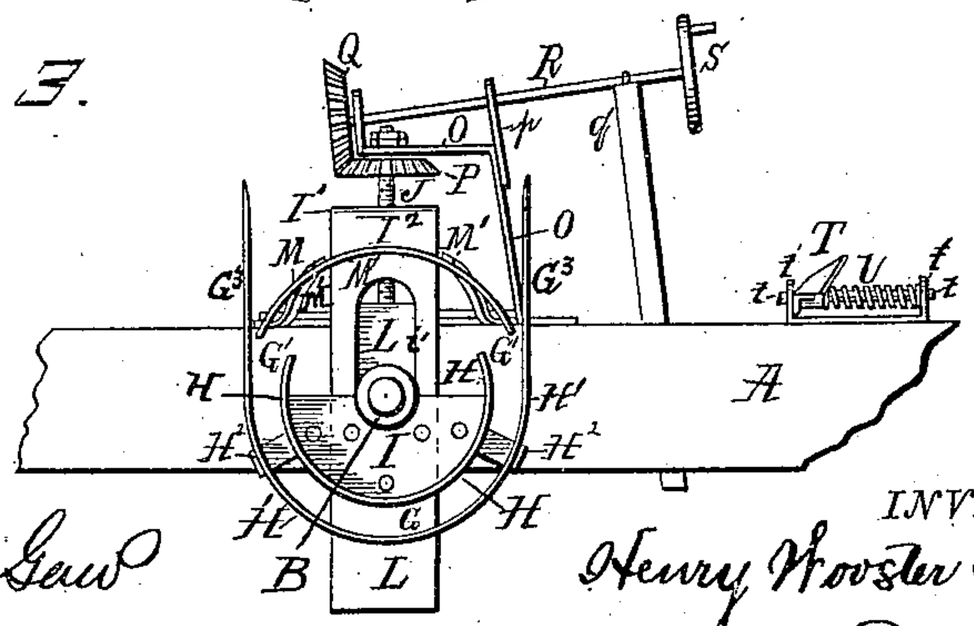


Fig. 3.



WITNESSES

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Douglas S. Mackall

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(No Model.) 2 Sheets—Sheet 2.

H. W. HYDE.

TRACTION WHEEL.

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Fig. 4.

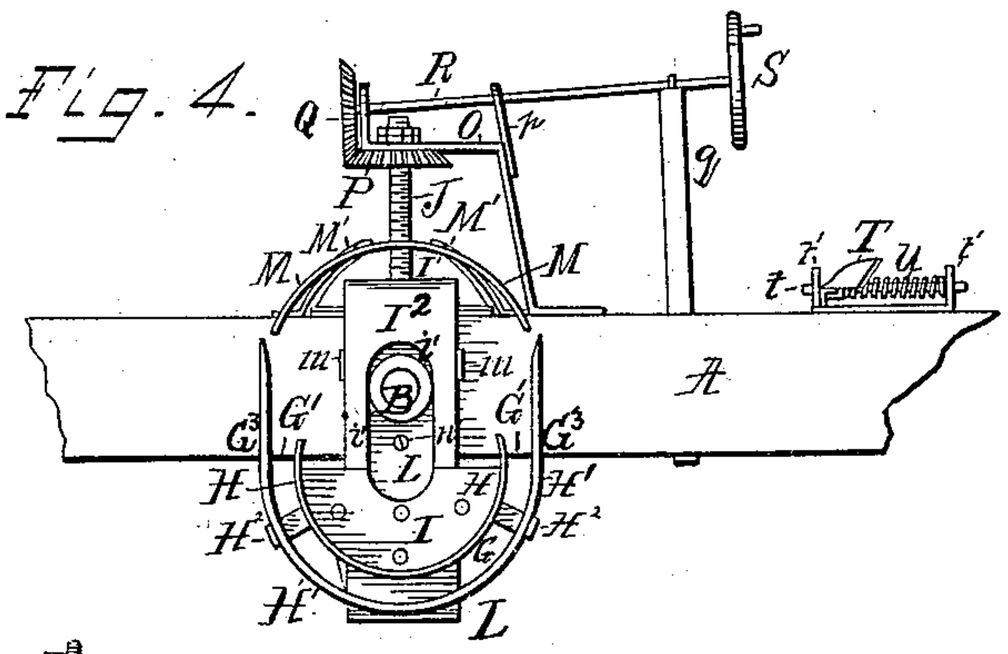


Fig. 5.

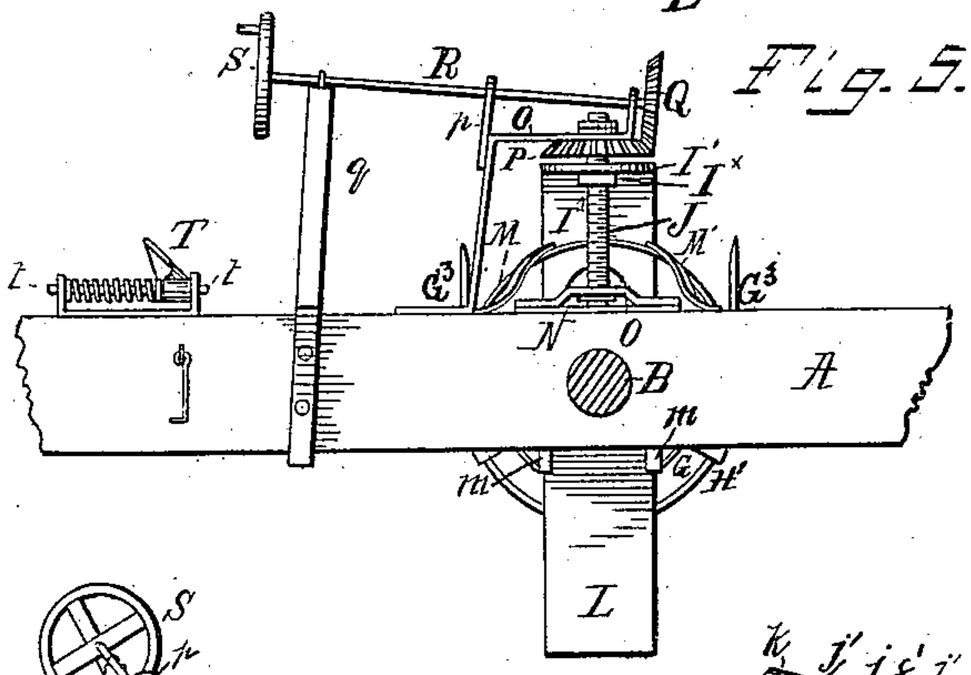


Fig. 6.

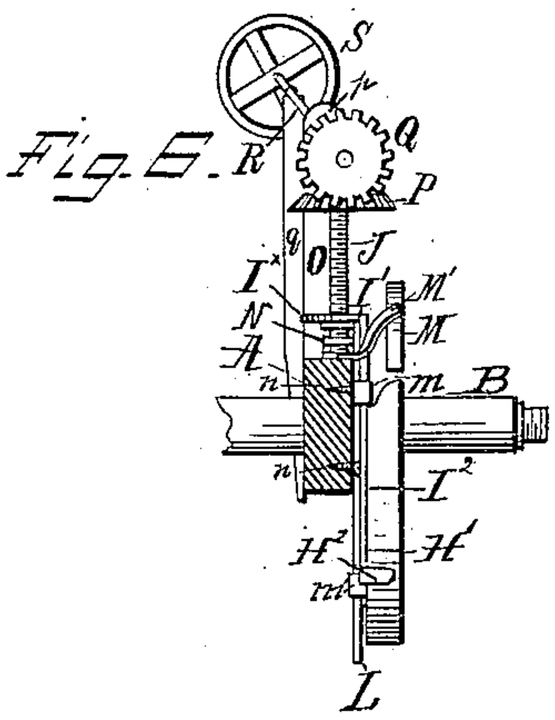


Fig. 7.

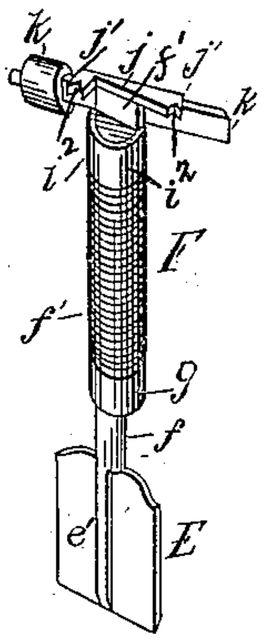


Fig.

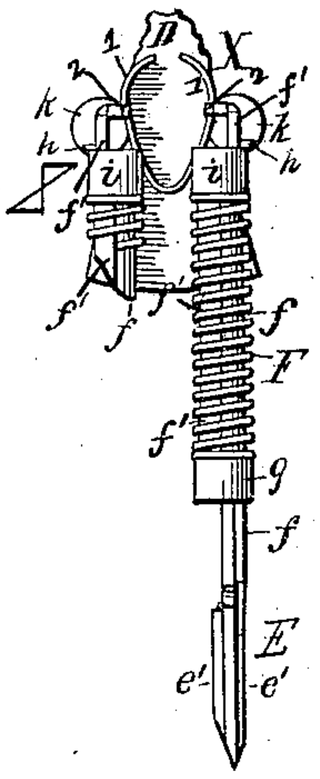
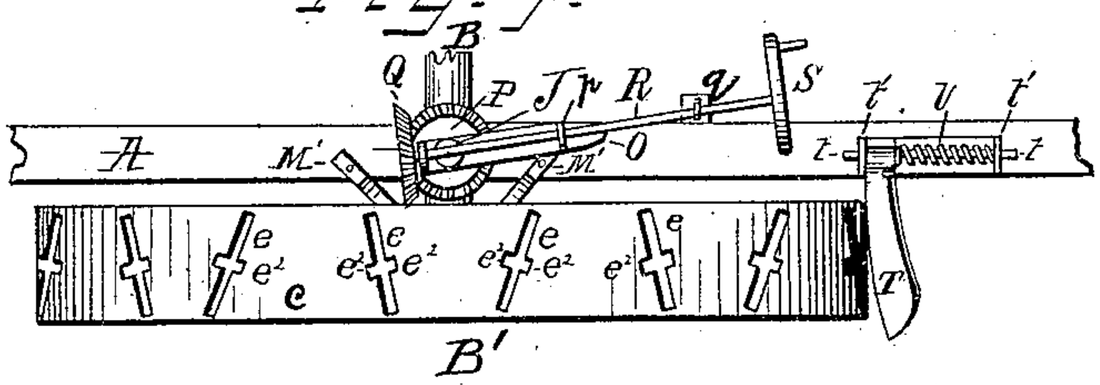


Fig. 9.



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UNITED STATES PATENT OFFICE.

HENRY WOOSTER HYDE, OF SUMMIT, FLORIDA.

TRACTION-WHEEL.

SPECIFICATION forming part of Letters Patent No. 356,472, dated January 25, 1887.

Application filed April 22, 1886. Serial No. 199,841. (No model.)

To all whom it may concern:

Be it known that I, HENRY WOOSTER HYDE, a citizen of the United States, residing at Summit, in the county of Marion and State of Florida, have invented certain new and useful Improvements in Traction-Wheels; and I do 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, reference being had to the accompanying drawings, and to the letters and figures of reference marked thereon, which form a part of this specification.

My invention relates to the traction-wheels of common road-locomotives or steam-engines, mowing, reaping, and thrashing machines, as well as all such similar machines as are intended to be propelled or driven upon trackless roads by their ground or supporting wheels; and my said invention consists of certain details of construction and arrangement of the parts composing said traction-wheel and their anchor-adjusting devices, whereby an increased effectiveness in the operation of the same is the result. The anchoring-blades are made reacting, so that injury thereto or their bearings, in case impenetrable substances are encountered by them, is prevented, and the degree of penetration or anchorage of the said blades may be regulated to suit the nature of the road-bed over which the said wheels have to pass, thereby insuring a positive anchorage under any condition of said road, whether hard or soft.

The object designed to be accomplished by this invention is twofold: first, to so construct the anchoring devices that in case an impenetrable object is encountered by the blades thereof when the wheel is in operation the stems or plungers of said blades will react upon themselves, or telescope, and thereby relieve undue pressure upon their bearings and prevent breakage thereof, as well as to prevent breakage or injury to the blades themselves; and, second, to provide for the adjustment of said anchoring devices, whereby any degree of projection of the blades thereof is permitted, so as to insure secure anchorage of the wheel in all conditions of the road-bed, be it loose or compact; and, further, by reason of the adjusting feature for regulating the degree of projection of the blades, the anchoring devices may be thrown entirely out of action and the blades altogether withdrawn from projection from the periphery of the wheel, whereby said wheel may be used as an ordinary ground-wheel and without reference to the said anchoring devices attached thereto, if such at any time be desired, or should paved roads be encountered.

For a better understanding of the details of construction of my invention reference must now be had to the accompanying drawings, in which—

Figure 1 represents a face view or side elevation of an adjustable traction-wheel with its anchor-adjusting devices constructed according to my invention as applied to the side rail of a traction-engine or other similar machine, the anchors being in their extended position. Fig. 2 represents a rear face view of the wheel as removed from its axle, showing the bearing-rollers of the anchor-plungers as in an eccentric position, and the blades as correspondingly projected from the periphery of the wheel, the same as in Fig. 1. Fig. 3 represents a face view of the adjustable way or track and mechanism for adjusting the degree of anchorage of the blades, the wheel being removed from its axle, and said way being shown in its position upon the side rail of the machine and as on the same center or concentric with the axle thereof, the position of the parts being represented as when the anchoring devices of the wheel are not in operation; and Fig. 4 is a similar view showing the way as in its lowest position or eccentric with the axle, the position of the parts being represented in this figure as when the anchoring devices are at their full stroke, or in opposition to the position shown in Fig. 3. Fig. 5 is a sectional rear elevation of the adjustable way, taken transversely of the axle, and with the wheel as removed therefrom and the way as at its central position, as in Fig. 3. Fig. 6 is a transverse sectional elevation taken at right angles to Fig. 5 and longitudinally of the axle, and with the wheel removed and the way as at its eccentric position, as in Fig. 4. Figs. 7 and 8

are detached views of one of the anchoring-blades and its appurtenances. Fig. 9 is a plan view of Fig. 1.

A represents the side rail of a mower, reaper, traction-engine, common road-wagon, or similar machine usually supported upon and driven by ground-wheels, and B the axle thereof, carrying at its ends the supporting-wheels B′, the construction of which wheels I will now proceed to particularly describe—that is to say, these wheels are formed, as usual, of a central hub, *a*, spoke *b*, and broad rim or tire *c*. Upon each side of the hub *a*, and encircling the same and secured to the spokes *b*, are disks D D, having a series of slots, *d*, formed therein, which radiate from a common center and form the guideways for the inner ends of the shanks or plungers of the anchoring-blades.

E E are the blades of the anchoring devices, which radiate in position from a common center, and whose bearing at their inner ends is in the disks D D, and at their outer ends in slots *e*, formed through the rim or tire of the wheel. The shanks of these blade are, as shown in Figs. 7 and 8, made double—that is, of a part or half, *f*, carrying the blade E at its end, a collar, *g*, and a stop, *h*, and a part or half-section, *f′*, with collar *i* and cross-head *j*, bearing a roller, *k*, upon one side thereof. Between the collar *g* of the part *f* and the collar *i* of the part *f′* is arranged a spiral spring, F, which tends to keep the sections of the plunger extended. The cross-head *j* fits within the slot *d* of the disks D, and thereby forms the supporting-guide for the inner end of the plunger, as before stated. Near each end of the said cross-head *j* are formed shoulders *j′*, which press upon the inner face of the disks D and serve to prevent lateral displacement of said cross-head, and upon each side of the blades E is formed a rib or spline, *e′*, which, at the same time that it forms a strengthening-brace for the blade, also serves as a guide for the blade when entering a slot, e^2, in the rim of the wheel at the center of and at right angles to and upon each side of the slot *e* for the blade proper, as seen in Fig. 9. These slots *e*, formed in the rim or tire of the wheel for the entrance of the anchoring-blades, are, as seen in Fig. 9, placed alternately at right and left angles to the plane of the wheel, so as to obtain a better anchorage than were the blades placed at right angles to the plane of the wheel, as is usually the case in traction-wheels.

X is a locking-spring, secured to the inner face of the disk D, whose bent ends 1 engage a notch, 2, in the shoulder *j′* of the cross-head *j*, and hold the blades in their closed position.

This now completes the anchoring mechanism, which, as shown, is formed upon and as an integral part with the supporting-wheels of the machine.

I will now proceed to describe the mechanism for adjusting or regulating the degree or depth of anchorage of the blades. This consists of a circular way or track, G, formed by an inner wall, H, which is secured to a central supporting-disk, I, and an outer wall, H′, separated a sufficient distance from the wall H, to which it is secured by straps H^2, to admit the rollers *k* of the anchoring-plungers. The ends of the inner wall or flange, H, of the way flare inward, and the ends of the outer wall or flange, H′, flare outward, to form a mouth, G′, to the way to facilitate the entrance therein of the roller-bearings of the anchoring devices, and this way is supported upon a standard, I^2, slotted at its center, as at *i′*, to admit the passage therethrough of the axle B and permit the adjustment of said standard, and which terminates at its top in a head or right-angled part, I′, through which passes a screw, J. At the top and bottom of this standard I^2, and upon each side thereof, are formed ears *m*, which engage over a plate, L, secured to the side rail, A, of the machine, as at *n*, Figs. 4 and 6, and form the means whereby the way G is secured in position upon the machine.

M is a circularly-arranged flange or fender, secured by brackets M′ to the rail A of the machine, and forming the upper limit of the path of the roller-bearings of the anchoring devices, as will presently appear. This fender, as also the ones H and H′, composing the way G, are formed on circles of which the axle B is the center, so that when the way G is in its concentric position, as represented in Fig. 3, with the rollers *k* of the anchoring devices therein, the cross-heads *j*, carrying said rollers, will be at the bottom of the slots *d* in the disks D and upon a concentric circle with the axle, and upon the rotation of the wheel, the rollers moving in concentric circles with the axle, there will be no movement of the plungers, but they will remain inactive.

Referring now to the guideway for the plunger-roller bearings, the construction of which having now been explained, I will proceed to describe the particular mechanism employed by me for effecting the vertical adjustment of the said way so as to cause the same to assume an eccentric position relatively to the axle of the machine, and thereby effect a corresponding movement of the plungers and, through them, the degree of projection from the lower circumference of the wheel of the anchor-blades, to wit:

As before stated, the parts composing the way G are secured to an upright, I^2, which slides upon a support, L, and is formed at its top into a screw-threaded head or nut, I′, which forms the seat for a vertically-arranged screw, J. This screw J is held at the lower end in a shoe, N, and at its top in a bracket, O, secured to the top of the side rail, A, of the machine, whereby vertical displacement of said screw is prevented. Near the top end of this screw J is keyed a beveled gear-wheel, P, into which meshes a similar gear-wheel, Q, carried upon the outer end of a shaft, R, whose bearings are in supports *p* and *q*, secured to the rail A, and which shaft is supplied with a hand-wheel, as at S, placed adjacent the engineer's or driver's

seat upon the machine, by which means the adjustment of the way G is effected by said engineer or driver. As before shown, the screw J being held stationary in its bearings, upon turning the same, because of the nut I′ through which it passes forming a part of the standard I^2, which carries the way G, said standard is caused to move up or down, as the case may be, and a corresponding movement in the position of the said way is effected, so as to bring it in a more or less eccentric position relatively to the axle.

T is a mud-scraper for the wheel, arranged upon a shaft, *t*, secured in bearings *t′* upon the side rail, A, of the machine, and supplied with a spring, V, by which it is held in position against the periphery of the wheel, and by reason of which provision injury thereto is prevented should it encounter a projecting anchor-blade.

If desired, the wheel may be keyed to the axle or turn loose upon the same, as the movement of the axle has no bearing upon or relation to the operation of the anchoring devices.

The operation is as follows: Supposing the way G to be in the central or concentric position relatively to the axle, as shown in Fig. 3, with the rollers of the plungers therein against the inner end of the slots in the disks D. If, therefore, the wheel be revolved there will be no movement of the anchoring-blades, for their roller-bearings, by which they are operated, will move in a circular path around the axle of the machine. This is the position of the parts when the road-bed is sufficiently hard for the wheel to secure a hold by friction alone and without the use of flanges across the rim or tire of the same. If, now, the road be soft or yielding, a simple turn of the hand-wheel S by the operator causes a movement of the gear-wheels P and Q and a corresponding revolution of the screw J, and through it a depression of the standard I^2, which, being integral with the way G, carries the same with it, and by removing said way from adjacent the axle causes it to assume an eccentric position relatively to the same. By this movement of the way G such of the bearing-rollers of the plungers of the anchoring-blades as are within said way are carried downward and out of a circular path relatively to the axle. Upon the revolution of the wheel which carries the said rollers around with it, they (the said rollers) are therefore caused to move in an eccentric circle around the axle, the degree of which eccentricity depending upon the degree of depression or distance of the way G from the axle, and through said rollers the plungers and their attached blades are caused to project a corresponding distance from the periphery of the wheel, and, entering the ground a more or less degree, a corresponding anchorage for the wheel is the result. If the road-bed be very soft and yielding, the blades are correspondingly projected. If hard, they are withdrawn by operating the screw J through the hand-wheel S, as aforesaid, so as to draw the way G toward the shaft and cause its track to assume less of an eccentric circle.

When, in the operation of the machine with the anchoring-blades projecting therefrom, said blades encounter rocks or other impenetrable substances in the earth beneath the wheels, injury to said blades will be prevented by reason of the sections of the plunger telescoping upon themselves, the spring F, whose tension is only sufficient to hold the blades extended when ordinary soil or resistance is encountered by them, permitting such movement, and immediately that such obstruction is passed the resilience of the spring causes the blades to assume their normal position. By reason of this spring F breakage or injury to either the blade itself or its securing devices is prevented, and a corresponding saving thereby effected in the cost of the machine.

As by reference to Figs. 3 and 4 it will be seen that the track or way for the rollers of the plungers is formed of a half-circle, so that the said rollers only occupy said way during half their movement around the axle, when, therefore, the rollers escape from or pass beyond the said way they will by their own weight drop back to their normal position. This, however, is not altogether depended upon, for the blades may, by reason of the presence of mud or other obstruction, not move freely in their bearings. A guard or fender, as at M, is therefore arranged above the way G and permanently secured upon the rail A of the machine in a curved position whose center is the axle, so that the rollers as they pass from the way G will encounter this guard and be thereby forced inward toward the center of the wheel. A positive motion, both back and forth, is therefore given to the anchoring-blades, and their proper reciprocation assured.

Both the way G and the guard M act in the same way—that is, to propel or force the anchoring-blades downward; but in so doing they cause contrary movements of said blade—one away from the center of the wheel, which projects the blades from the periphery thereof, and the other toward the center, which withdraws said blades from an extended or projected position.

As before stated, by reason of the blades being arranged at alternate right and left angles relatively to the plane of the wheel, in addition to a more secure bearing resulting therefrom, less mud will accumulate between said blades and be easier of removal than were the blades arranged at right angles, as is usual. Any lodgment, however, that should occur will be removed by the spring-scraper T, the shaft of which being supplied with a spring, injury to said scraper cannot occur should it engage the projecting edge of any blade; but it will be permitted to move upward and ride over the obstruction, and then again assume its proper position.

Referring again to the way G, it will be seen that while the lower portion of the outer wall,

H′, is upon the arc of a circle, the portion of the ends thereof which extends above a line drawn through the center of said way, when it is concentric with the axle, is straight, or on a tangent to the circle, as seen at G^3, and this tangent portion should be of such length or be extended to an equal degree with the greatest eccentricity of the way or penetration of the blades, whereby, when the way is at its greatest eccentricity, the end of the outer wall thereof will not be below the axle, so that the escape of the bearing-rollers of the blades is prevented and the withdrawal of the said blades assured at any position of the way.

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

1. In a traction-wheel, the combination, with said wheel and the frame of the machine, of a series of anchoring-blades radiating in position in bearings within said wheel, and carrying a roller-bearing at its end, which projects from the inner face of the wheel, an adjustable way in which said roller-bearing travels, secured upon the said frame of the machine independent of the wheel, and means, substantially such as described, secured to the frame of the machine for effecting the adjustment of said way, for the purposes specified.

2. A traction-wheel having disks D D secured thereto, upon each side thereof, around the hub, formed with a series of slots, *d*, radiating from the center thereof, and a slotted rim or tire, *c*, combined with a series of anchoring-blades, E, whose bearings are in said disks and slotted rim, and means for causing a reciprocation of said blades, substantially as shown and described, for the purposes specified.

3. In a traction-wheel, in combination with said wheel having the slotted central disks, D, and slotted rim *c*, the anchoring-blades E, having a shouldered cross-head, *j j′*, which enters the slots in said disks, having a notch, 2, and locking-spring X′, as shown and described, for the purposes specified.

4. In a traction-wheel, in combination with said wheel having a slotted rim, *c*, and central slotted disks, D, the anchoring-blades E, whose bearings are in said rim and disks, formed with a double shank, *f f′*, which slide upon or telescope with each other, and supplied with a reacting spring, F, substantially as and for the purposes described.

5. In a traction-wheel, an anchoring-blade having bearings in said wheel, the shank of which is formed of two members sliding upon each other and held in an extended position by a spring, the bearing by which the shank is operated being upon one member, while the blade is upon the other, so that each member of the shank may move independent of the other and thereby prevent injury to either the shank, its bearing, or blade.

6. In a traction-wheel, in combination with said wheel formed with a slotted rim and slotted central disks, D D, the anchoring-blades E, having double shanks *f f′*, cross-head *j*, carrying a roller, *k*, and spring F, encircling the shanks, substantially as shown and described, for the purposes specified.

7. In a traction-wheel, in combination with said wheel and a series of radiating anchoring-blades supplied with roller-bearings at their inner ends, and having their bearings in said wheel, the track or way G, formed of the curved plates H and H′, standard I^2, sliding upon a support, L, screw J, bevel-gears P Q, and shaft R and hand-wheel S, all constructed and arranged substantially as shown and described, for the purposes specified.

8. In a traction-wheel, in combination with the adjustable way G, the stationary guard M, arranged upon a circle above said way and concentric with the axle of the machine, substantially as and for the purposes described and shown.

9. A traction-wheel formed with a series of anchoring-blades having bearings in said wheel, whose shanks carry the blades at one extremity and the bearings to receive the pressure necessary to operate the same at the other, and are made collapsible or telescopic, and a vertically-adjustable way or track whereby the degree of projection of said blades from the wheel may be regulated, and the parts of the shank will move upon each other should the blades meet an obstruction.

10. A traction-wheel for land-engines, &c., formed with a series of anchoring-blades which project from the rim of said wheel at alternate right and left angles to the plane of said wheel, as and for the purposes described and shown.

11. The combination, in a traction-wheel formed with a series of anchoring-blades which project from the rim of said wheel alternately at right and left angles, and suitable mechanism for operating said blades, of the spring-actuated mud-scraper arranged upon the frame of the machine so as to engage the periphery of the wheel, and adapted to react upon engagement with said projecting blades and prevent injury to either said blade or scraper.

12. In a traction-wheel, the anchoring-blades formed with a central strengthening rib or spline, combined with the rim of said wheel, formed with slots therethrough to receive the body of the blade and cross-slots to receive the rib or spline of said blade, as shown and described, for the purposes specified.

HENRY WOOSTER HYDE.

In presence of—
Mrs. C. L. CHRISTOPHER,
C. L. CHRISTOPHER.