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G. C. GRIFFIN.
DITCHING MACHINE.
APPLICATION FILED FEB. 28, 1907.

PATENTED SEPT. 10, 1907.

4 SHEETS—SHEET 1.

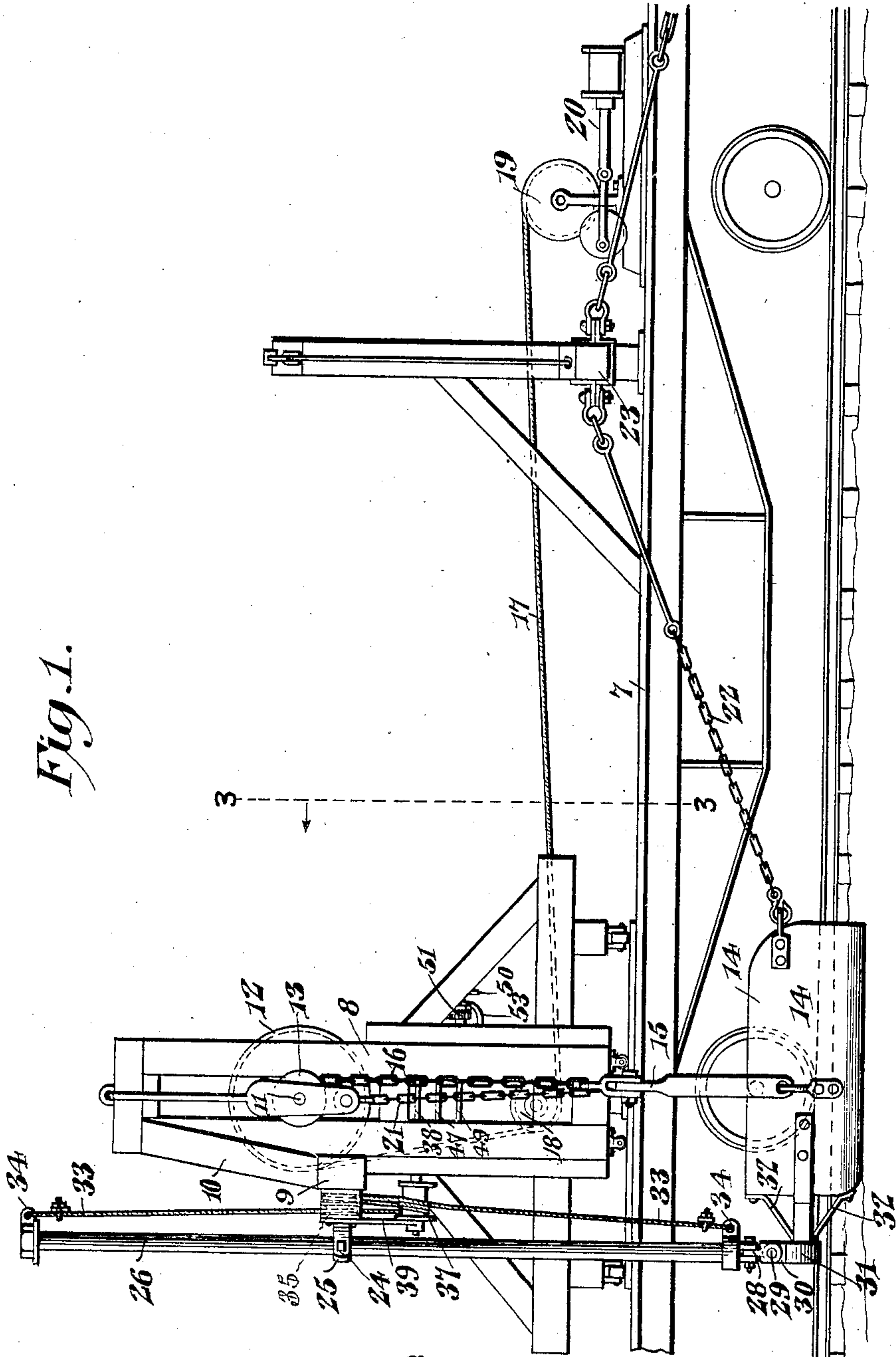


Fig. 1.

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Witnesses
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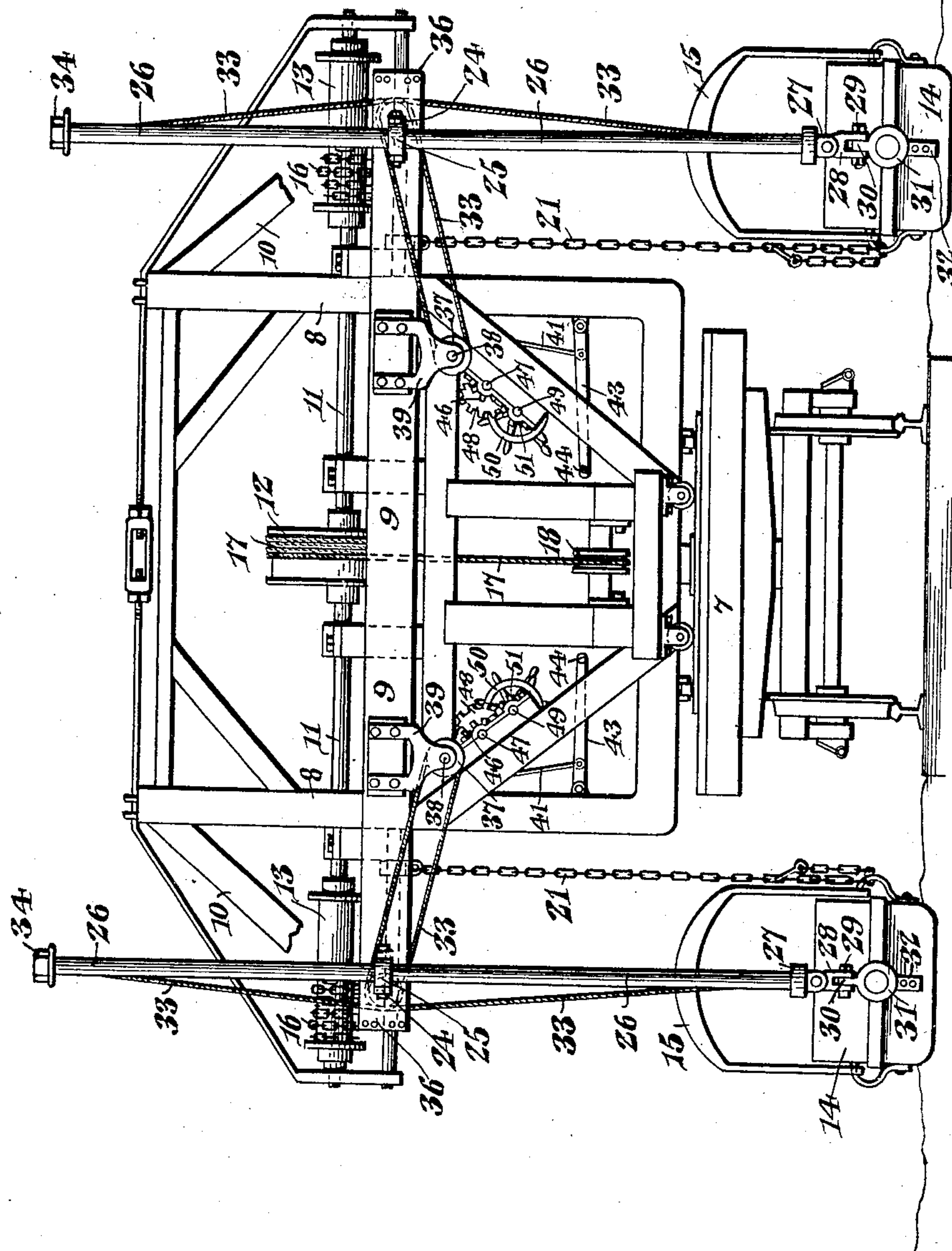
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4 SHEETS—SHEET 2.

Fig. 2.



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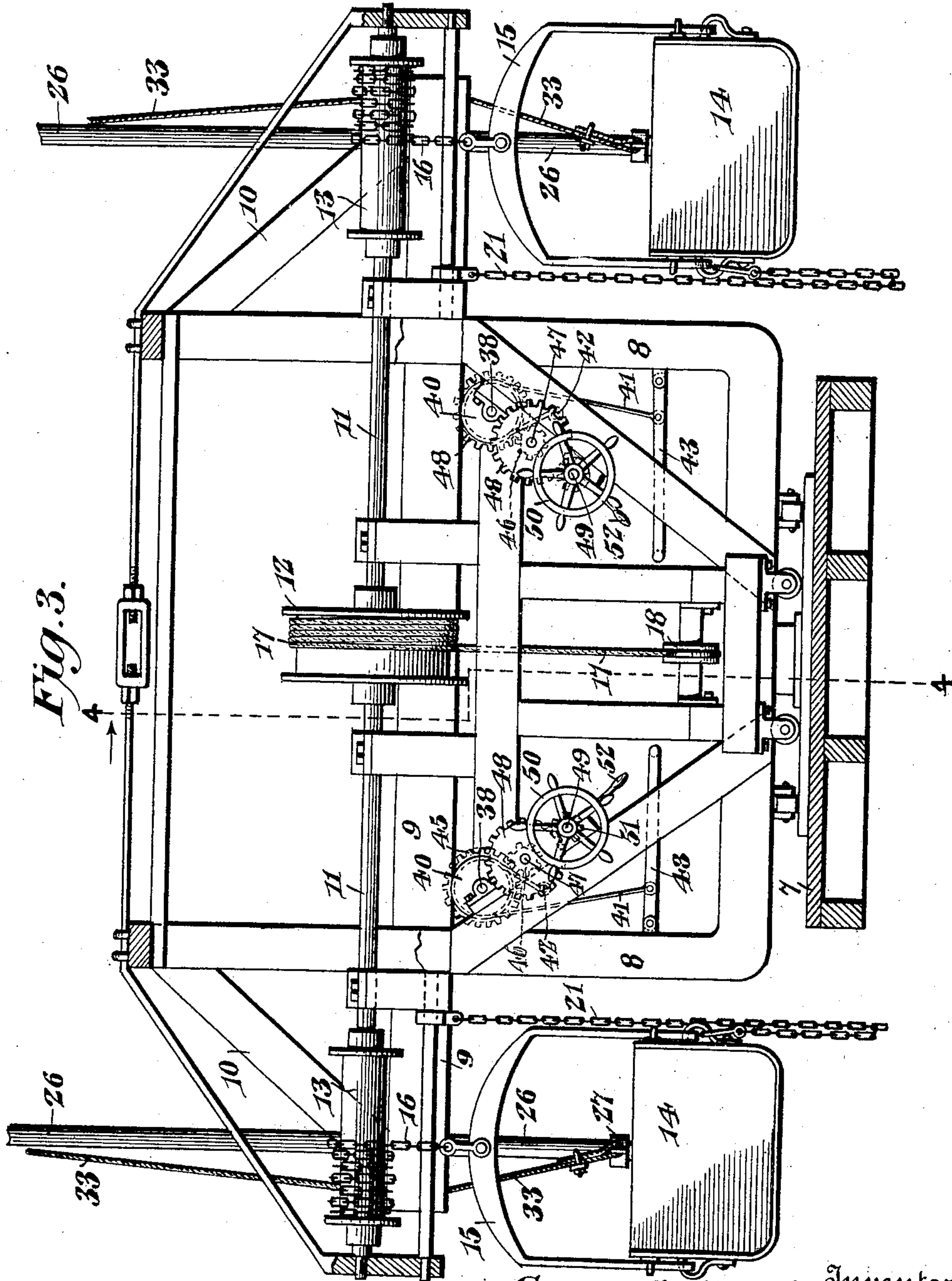
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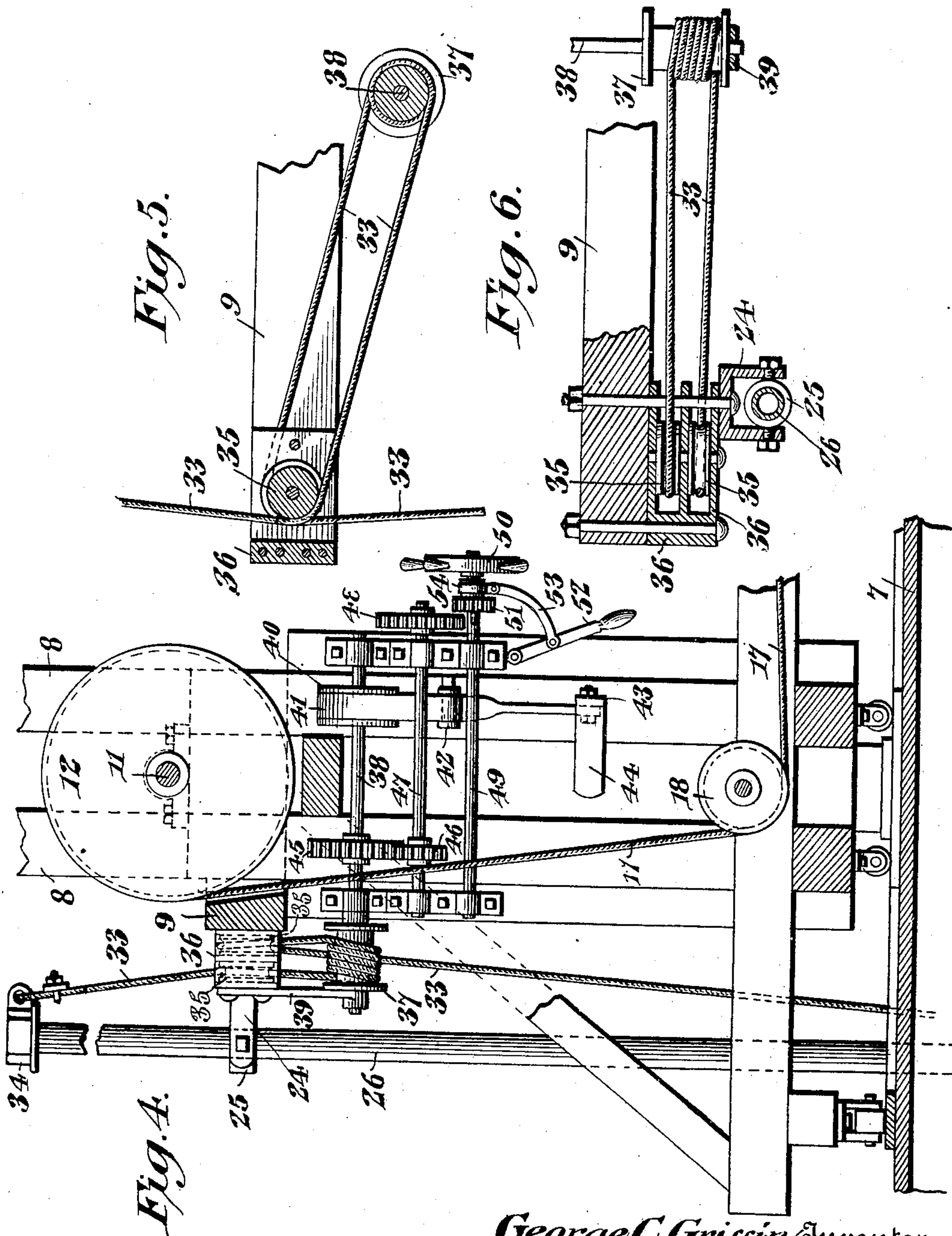
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4 SHEETS—SHEET 4.



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UNITED STATES PATENT OFFICE.

GEORGE CONRAD GRIFFIN, OF HOUSTON, TEXAS.

DITCHING-MACHINE.

No. 865,381.

Specification of Letters Patent.

Patented Sept. 10, 1907.

Application filed February 28, 1907. Serial No. 359,809.

To all whom it may concern:

Be it known that I, GEORGE CONRAD GRIFFIN, a citizen of the United States, residing at Houston, in the county of Harris and State of Texas, have invented
5 a new and useful Ditching-Machine, of which the following is a specification.

This invention has particular relation to that type of ditching machines employed in railroad work wherein shovels are drawn alongside a car, and mechanism is
10 mounted on the car for raising and lowering the shovels. At the same time, there are perhaps features of this invention that are useful in other analogous structures.

The type of ditching machine that has proven the most successful is that wherein the shovels, scoops or
15 buckets are suspended by chains or cables that are wound upon power-operated drums journaled on a supporting frame on the car. Heretofore, however, the shovels or buckets have been manually guided or directed by long poles projecting rearwardly therefrom.
20 In ordinary work, it requires the services of at least three persons at each pole, besides a fourth to control the dumping action from the car. The ditching machine therefore ordinarily requires the services of a crew of eight men exclusive of the engineer and con-
25 ductor. Further than this, the poles have proven extremely dangerous, so much so that in many cases, it is practically impossible to secure workmen to handle the same. For instance, suppose the shovels are being filled, and the machine is being drawn forward, if the
30 shovel strikes abnormal resistance, such as a stone or stump, it will quickly turn, and thus throw the pole with great force. Now this pole is ordinarily thirteen feet long, and it often happens that workmen have been thrown high into the air or against an embankment, re-
35 sulting in serious, and sometimes fatal injuries. Moreover to avoid this trouble as much as possible, it has been necessary for the machine to be moved at a very slow speed, thus materially limiting its capacity.

The present invention has for its primary object the
40 provision of directing means, which will eliminate dangerous poles of the above character, as well as the necessity of the workmen to operate them, and furthermore to so construct the mechanism that the speed, and consequently the capacity of the machine is greatly
45 increased, while safety mechanism is provided that will eliminate all danger of breaking the shovels or the operating mechanism should an obstruction be encountered.

The preferred embodiment of the invention is illus-
50 trated in the accompanying drawings, wherein:—

Figure 1 is a side elevation of the same. Fig. 2 is a rear elevation thereof. Fig. 3 is a sectional view on the line 3—3 of Fig. 1. Fig. 4 is a sectional view on the line 4—4 of Fig. 3. Fig. 5 is a detail sectional view of a por-
55 tion of the structure showing the guide sheave and

drum for one of the shovels. Fig. 6 is a plan view of the same.

Similar reference numerals designate corresponding parts in all the figures of the drawings.

In the embodiment of the invention illustrated, a
60 portion of the car is disclosed, of which the deck is designated 7. Upon the rear end of this car is rotatably mounted a suitable supporting frame 8, which includes a cross bar or beam 9 that projects beyond the main body of the frame, and has its ends reinforced by braces
65 10. Upon the supporting frame is journaled a shaft 11 having a central drum 12 and end drums 13. Shovels, scoops or buckets 14, located on opposite sides of the car, have bails 15 to which are connected chains 16 that are wrapped upon the end drums 13. A cable 17 is wrapped
70 upon the central drum 12, and extends beneath a guide sheave 18 to the drum 19 of a suitable hoisting engine 20, located upon the front end of the car. Grade chains 21, connected to the frame, are adjustably connected to the inner sides of the shovels or buckets. Draft chains
75 22 are connected to the front ends of the buckets or shovels and to a draft beam 23 mounted on the front portion of the car.

So far as described, the mechanism, with the excep-
80 tion of the cross beam 9 and its braces 10, is well known in the prior art, and no further description is believed to be necessary, except to state that upon the rotation of the drum 12 by the engine 20, through the medium of the cable 17, the buckets may be elevated, and if said cable is slackened, the buckets will drop. The novelty
85 of the present invention resides more particularly in the means for directing these buckets and the disclosed construction has proven entirely satisfactory for this purpose. Inasmuch as the mechanism for each bucket or shovel is the same, a description of one is believed to be
90 entirely sufficient. Journaled on the projecting end of the beam 9 is a yoke 24, and pivotally mounted therein, is a guide element in the form of a collar 25. This collar thus has practically universal movement. A guide stem preferably in the form of a tubular rod 26, slidably
95 passes through the collar, and has a universal joint connection at its lower end with the rear end of the bucket. This connection is preferably made by having the lower end of the stem provided with a yoke 27 in which is pivotally mounted the upper end of another yoke 28
100 that is pivoted as shown at 29 to the ear 30 of a collar or cap 31 secured to a bracket 32 fastened to the rear end of the bucket. Cables 33 are secured, as shown at 34 to the upper and lower ends of the guide stem 26, and pass around opposite sides of independent sheaves 35 jour-
105 naled in suitable brackets 36 carried by the ends of the cross beam. These cables are thus simultaneously movable in opposite directions, and their inner ends are oppositely wrapped or wound upon a drum 37 that is carried by a shaft 38 journaled transversely in the sup-
110

porting frame 8 and in a depending bracket 39 secured to the cross beam 9. The shaft 38 is furthermore provided with a frictional band brake and safety device, consisting of a pulley or drum 40 and a band 41 surrounding the same. One end of this band is secured as shown at 42, while the other end is connected to a lever 43 fulcrumed at one end on the supporting frame 8 and having its other end offset as shown at 44 to provide a seat for the operator. The shaft 38 is furthermore provided with a gear wheel 45, and meshing therewith is a pinion 46 carried by another shaft 47 journaled alongside the shaft 38 and having on its inner end another gear wheel 48. Still another shaft 49 is located below the shaft 47, and has secured to one end, a hand wheel 50. A pinion 51, feathered upon the shaft 49 is movable into and out of mesh with the gear wheel 48, and this movement is secured by means of a lever 52 having a link connection 53 with a yoke 54 that engages the hub of the pinion 51. Thus by swinging the lever 52, the pinion may be thrown into and out of mesh with the gear wheel and through the shaft 47, and gearing 45—46, with the drum.

With this machine, but one operator is necessary for each shovel and each is stationed so as to control the band brake 40—41, and in convenient relation to the hand wheel 50. Under ordinary conditions, the hand wheels are disconnected from the drums 37, as shown in Fig. 4, and the direction of the shovels or buckets is accomplished solely by means of the band brakes. Thus in raising and lowering the shovels or buckets, the band brakes are loosened and the drums 37 being freely revoluble, the stems will move up and down with the buckets. In lowering the buckets, however, the drums 37 are stopped by applying pressure to the bands 41 just before the buckets have reached their lowermost positions, immediately the stems 26 are stopped and the buckets may thus be made to assume slightly downward inclinations in order that they will properly dig into the earth. While in action, the operators have only to sit upon the brake-controlling levers 43, and thus securely hold the buckets to their work. At the same time, if an obstruction is encountered, or abnormal resistance to the movement of the shovels is met with, before breakage occurs, the buckets will turn, raising the stems, and rotating the drums by overcoming the resistance of the band brakes. The brakes therefore act as safety devices to the buckets in addition to governing the movements of the stems. As soon as the buckets or shovels are loaded, the brakes are released, and therefore upon the elevation of said buckets or shovels, the stems will raise with them. Having reached the dump, to discharge the contents, it is only necessary to again brake the drums 37 and lower the buckets, whereupon the front ends of the bucket will tilt downwardly, and the material will discharge therefrom. It will thus be evident that a workman skilled in the operation of the machine, can ordinarily direct his bucket by properly operating the band brake. If, however, through carelessness, inadvertence, or mistake, the bucket assumes a wrong position, the operator can readily correct the same by throwing the hand wheel into gear with the drum, and turning said drum, thereby raising or lowering the same, and consequently tilting the bucket, as desired. This manually operated mechanism is also convenient

in connecting the stems to the buckets or disconnecting them therefrom in assembling the parts.

It will thus be seen that simple mechanism of a novel nature is provided, by means of which a single workman can adequately control a shovel or bucket with ease and without danger to himself, thereby eliminating the necessity for a number of workmen and avoiding considerable danger. Furthermore, experience has demonstrated that with this structure, fully two-thirds again as much work can be accomplished as with the machines having manually directed poles, for the engineer of the locomotive can open his throttle to the fullest extent, as soon as the buckets are engaged with the soil, and even if obstructions are met with, no damage will occur to the shovels or the associated mechanism for the reasons above given. A still further and important feature of the invention resides in the fact that it can be employed as a spreader. After the cut is completed and ditched, the dirt carried therefrom, has been deposited on the fill, so that the same is rough, making it necessary to spread the material or level it down. The present machine can be employed for this purpose where heretofore it has been necessary to carry a separate spreader with the ditching machine. In using the machine as a ditcher, all that is necessary is to release the hand brakes and lower the buckets to the desired elevation for spreading. The locomotive is backed up and the machine is then taken over the fill, which levels the surface at a distance from the tracks 2. The buckets are then drawn alongside the car by passing the grade chains 21 around the uprights 8 of the main frame and hooking them up short. The result is that when the buckets are lowered, they will be drawn in close to the ends of the ties and upon moving the machine again over the fill, the dirt in close proximity to the ends of the ties will be spread. It may be necessary to go over the fill once more as first mentioned in order to effectively complete the work particularly where an extra wide fill has been made, but in a great number of instances, a single operation has been found sufficient.

From the foregoing, it is thought that the construction, operation, and many advantages of the herein described invention will be apparent to those skilled in the art, without further description, and it will be understood that various changes in the size, shape, proportion, and minor details of construction, may be resorted to without departing from the spirit or sacrificing any of the advantages of the invention.

Having thus fully described my invention, what I claim as new, and desire to secure by Letters Patent, is:—

1. In a machine of the character set forth, the combination with a shovel, of means for elevating the same, draft mechanism for the shovel, and upwardly extending longitudinally movable guiding means for the shovel that permits the sidewise or substantially horizontal swinging of said shovel.

2. In a machine of the character set forth, the combination with a shovel, of means for elevating the same, draft mechanism for the shovel, and longitudinally movable guiding means for the shovel having a hinged connection therewith that permits the sidewise swinging of said shovel.

3. In a machine of the character set forth, the combination with a shovel, of means for elevating the same, draft mechanism for the shovel, and swinging guiding

means for the shovel having a universal joint connection therewith.

4. In a machine of the character set forth, the combination with a car, of a shovel associated therewith, draft means connecting the car and shovel, means mounted on the car for elevating and lowering the shovel, and upwardly extending means longitudinally slidable on the car for guiding the shovel and permitting its sidewise or substantially horizontal swinging movement.

5. In a machine of the character set forth, the combination with a shovel, of a guide element, and a guide stem connected to the shovel and slidably engaging the guide element.

6. In a machine of the character set forth, the combination with a shovel, of a guide collar, and a guide stem connected to the shovel and slidably passing through the collar.

7. In a machine of the character set forth, the combination with a shovel, of a pivotally mounted guide element, and a swinging guide stem connected to the shovel and slidably engaging the guide element.

8. In a machine of the character set forth, the combination with a support, of a yoke pivotally mounted thereon, a collar pivotally hung in the yoke, a shovel, and a swinging guide stem connected to the shovel and slidably passing through the guide element.

9. In a machine of the character set forth, the combination with a car, of a shovel carried thereby, a stem slidably mounted on the car, and a universal joint connection between the stem and shovel.

10. In a machine of the character set forth, the combination with a car, of a supporting frame mounted thereon, a yoke pivotally mounted in the frame, a collar pivotally hung in the yoke, a shovel, a stem having a universal joint connection with the shovel and slidably mounted in the collar, means for elevating and lowering the shovel, and draft means for said shovel.

11. In a machine of the character set forth, the combination with a shovel, of cables connected to the shovel and simultaneously movable in opposite directions, and means for effecting their simultaneous movements.

12. In a machine of the character set forth, the combination with a shovel, of a guide, a stem connected to the shovel and slidably mounted in the guide, and means associated with the stem for controlling its sliding movement in the guide.

13. In a machine of the character set forth, the combination with a shovel, of a stem connected thereto, and cables connected to the end portions of the stems for controlling its movement.

14. In a machine of the character set forth, the combination with a shovel, of a pivotally mounted guide collar, a swinging stem connected to the shovel and slidably passing through the collar, and cables connected to the ends of the stem for controlling the movement thereof through the collar.

15. In a machine of the character set forth, the combination with a shovel, of cables connected to the shovel, and simultaneously movable in opposite directions, a rotary drum on which the cables are oppositely wound, and means for controlling the rotation of the drum.

16. In a machine of the character set forth, the combination with a shovel, of cables connected to the shovel, and simultaneously movable in opposite directions, a rotary drum on which the cables are oppositely wound, operating means for the drum geared thereto, and mechanism for disassociating the operating means and the drum.

17. In a machine of the character set forth, the combination with a shovel, of cables connected to the shovel, and simultaneously movable in opposite directions, a rotary drum on which the cables are oppositely wound, a hand wheel, gearing connecting the hand wheel and drum, and means for disconnecting the gearing to disassociate the hand wheel and drum.

18. In a machine of the character set forth, the combination with a supporting frame, of a collar pivotally mounted thereon, a shovel, a guide stem pivoted to the shovel, and slidably mounted in the collar, a drum, cables oppositely wound on the drum and connected to the ends

of the stem, a hand wheel, gearing connecting the hand wheel and the drum, and means for throwing the gearing into and out of mesh.

19. In a machine of the character set forth, the combination with a shovel, of movable means for directing the shovel, said means including a safety holding member for maintaining the shovel in a predetermined position yet permitting its movement upon its encounter with an abnormal resistance.

20. In a machine of the character set forth, the combination with a shovel, of movable means for directing the shovel, said means including a safety friction member for maintaining the shovel in a predetermined position yet permitting its movement upon its encounter with abnormal resistance.

21. In a machine of the character set forth, the combination with a shovel, of draft mechanism and raising and lowering means connected to the shovel, and movable guide means for directing the shovel, said means including a safety holding member for maintaining the shovel in a predetermined position yet permitting its movement upon its encounter with abnormal resistance.

22. In a machine of the character set forth, the combination with a shovel, of a rotary member having a connection with the shovel, and a band brake for controlling the rotation of the member.

23. In a machine of the character set forth, the combination with a shovel, of movable means for directing the shovel, said means including a stem connected to the shovel, a rotary drum, a cable connection between the stem and drum, and means for holding the drum against rotation.

24. In a machine of the character set forth, the combination with a shovel, of movable means for directing the shovel, said means including a longitudinally movable stem connected to the shovel, a rotary drum, cables connected to the stem and oppositely wrapped upon the drum, and a friction band brake for controlling the rotation of the drum.

25. In a machine of the character set forth, the combination with a car, of a supporting frame mounted thereon, a shovel, means for raising and lowering the shovel, said means being mounted on the supporting frame, a guide carried by the supporting frame, a guide stem connected to the shovel and slidably engaged with the guide, cables connected to the ends of the stem, a drum upon which said cables are oppositely wrapped, a hand wheel having a geared connection with the drum, and a band brake for resisting the rotation of the drum.

26. In a machine of the character set forth, the combination with a car, of a supporting frame mounted on the car and including a cross bar, shovels located on opposite sides of the car, means mounted on the frame for raising and lowering the shovels, draft connections between the car and shovels, guide collars pivotally mounted on the ends of the cross bar, swinging stems having universal joint connections with the shovels and slidably passing through the collars, drums journaled on the supporting frame, cables wrapped upon the drums and connected to the ends of the guide stems, hand wheels having geared connections between the hand wheels and the drums, means for moving the gears into and out of mesh to disconnect the hand wheels from the drums, and band brakes for controlling the movement of the drums, said band brakes including levers.

27. In a machine of the character set forth, the combination with a shovel, of a guide element, a stiff guide member connected to the shovel and slidably engaged with the guide element, said member constituting means for directing the shovel, and means connected to the guide member for moving the same.

In testimony, that I claim the foregoing as my own, I have hereto affixed my signature in the presence of two witnesses.

GEORGE CONRAD GRIFFIN.

Witnesses:

BILL PARKER,
G. A. FAULK.