C. B. KING, G. HOLMES, B. JACOBY & H. E. ROUSH.

EXCAVATING MACHINE.

APPLICATION FILED MAY 31, 1911.

1,128,151.

Patented Feb. 9, 1915.

4 SHEETS—SHEET 1.

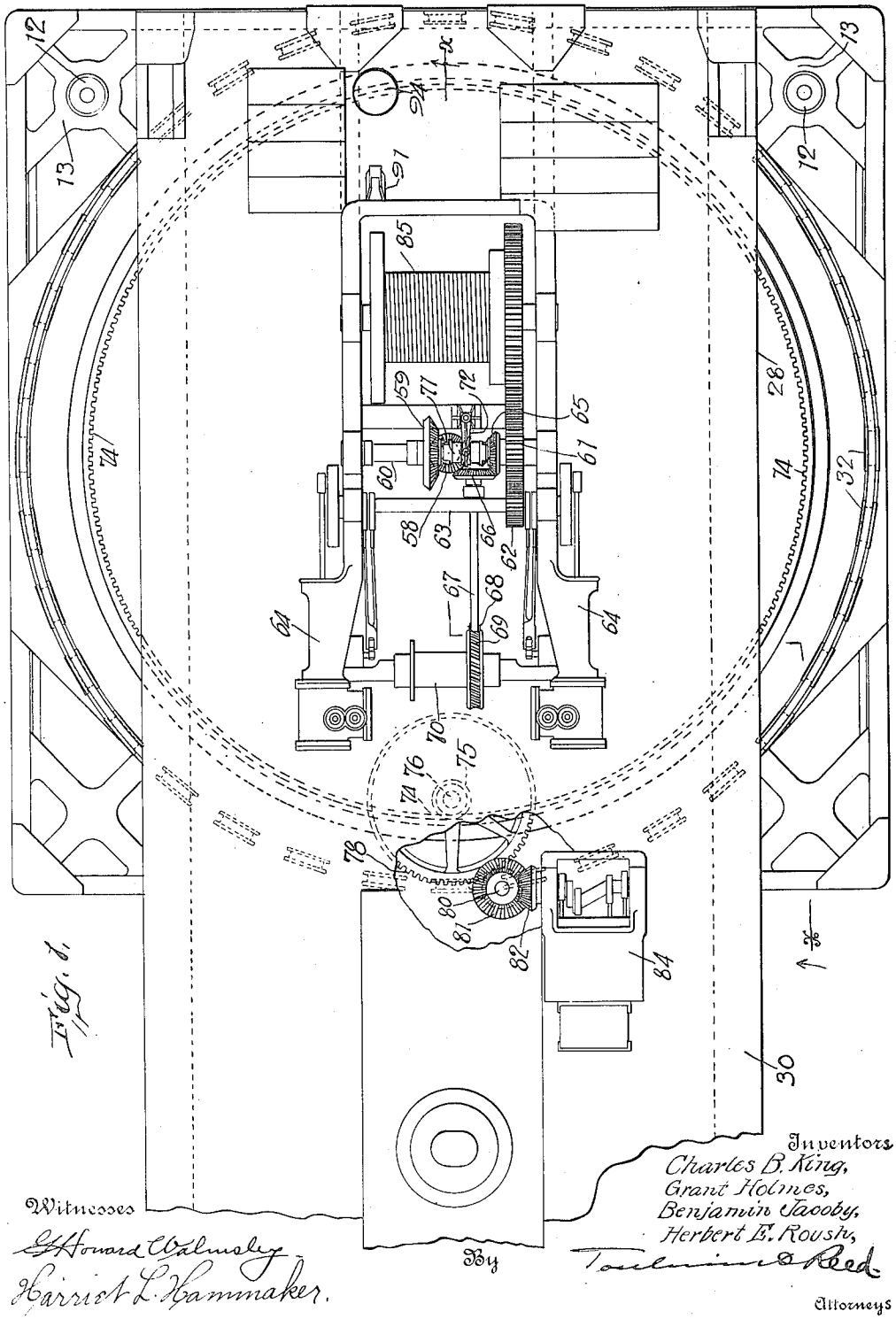

Fig. 1.

Witnesses

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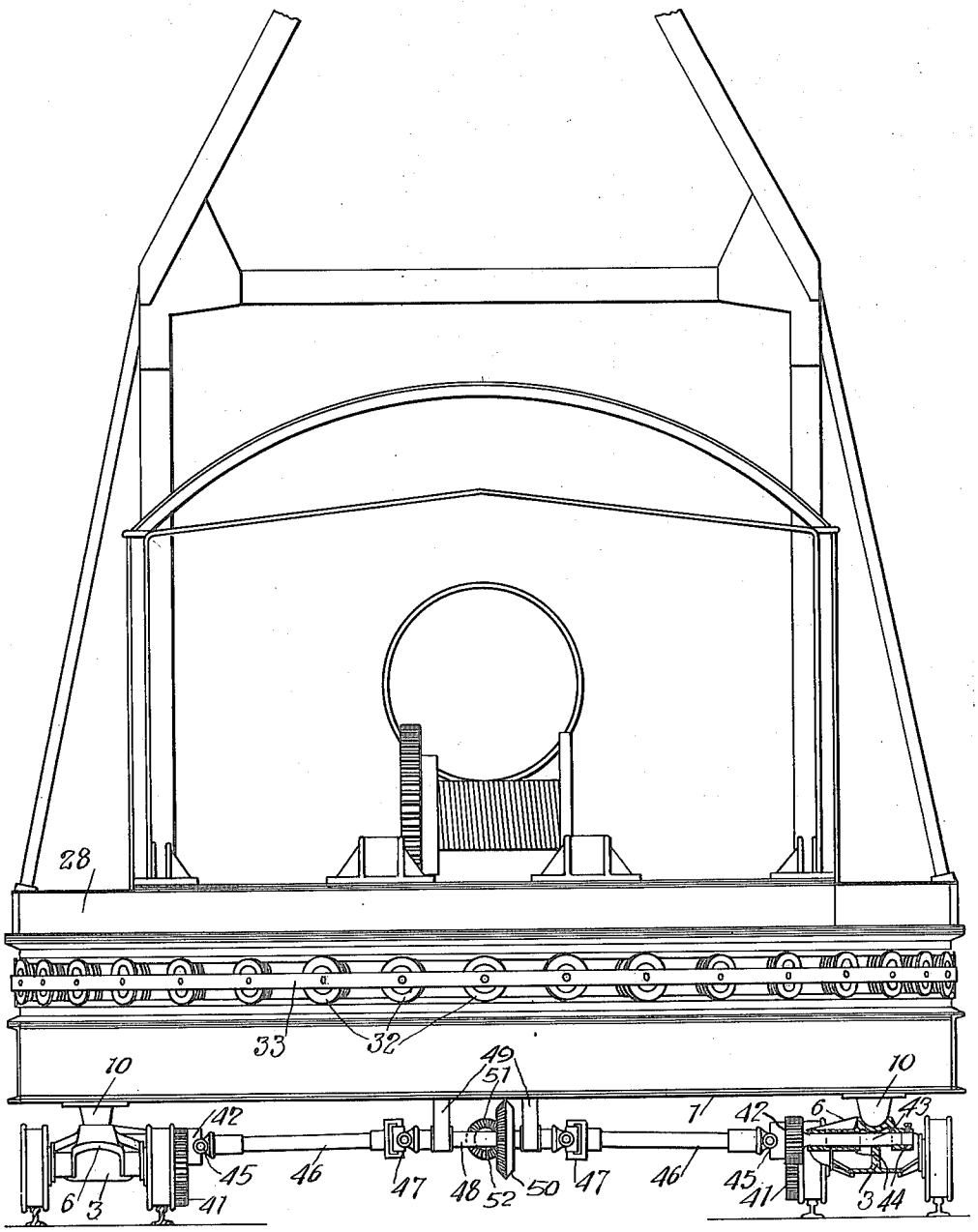

Fig. 2.

Witnesses

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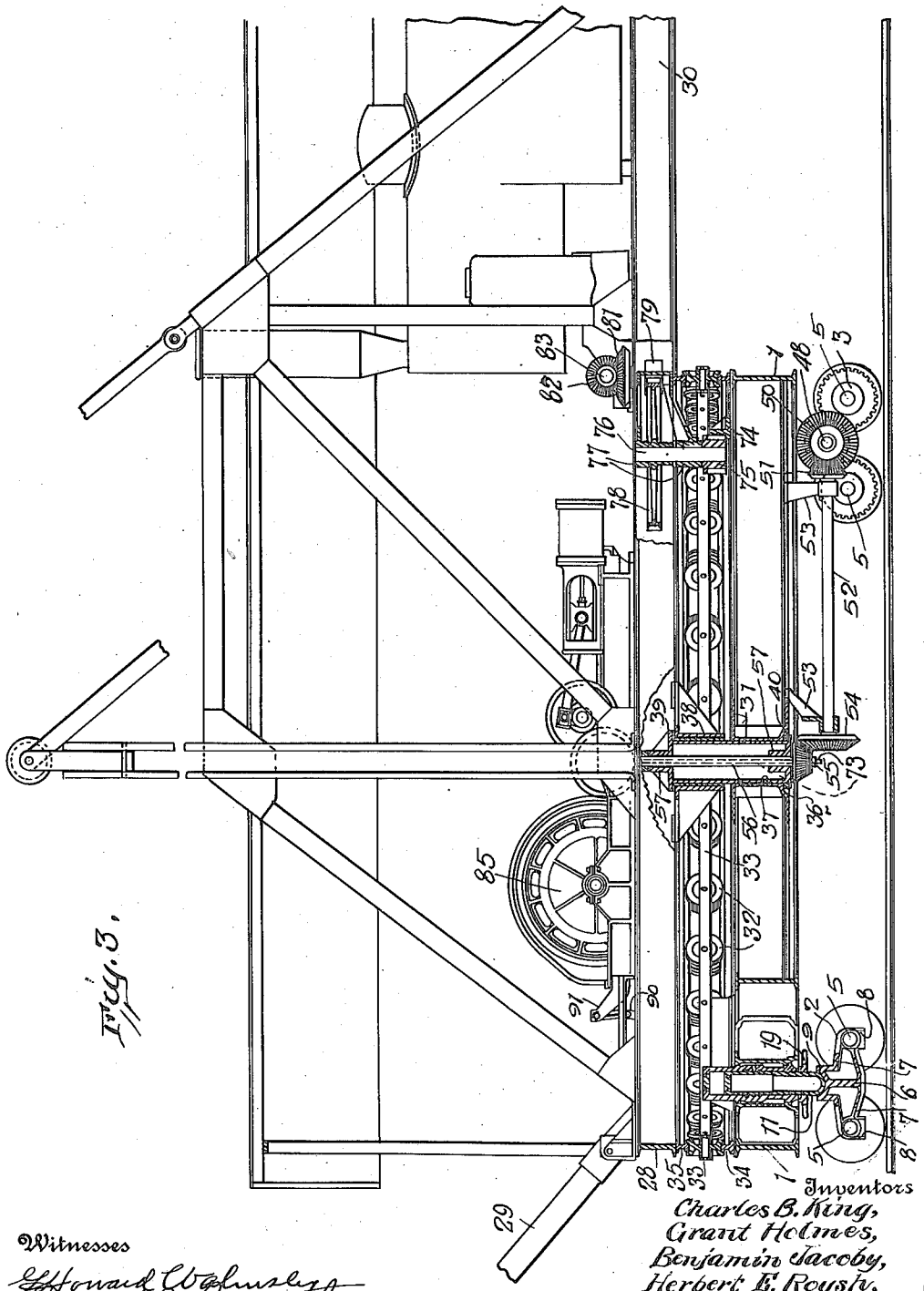

Fig. 3.

Witnesses

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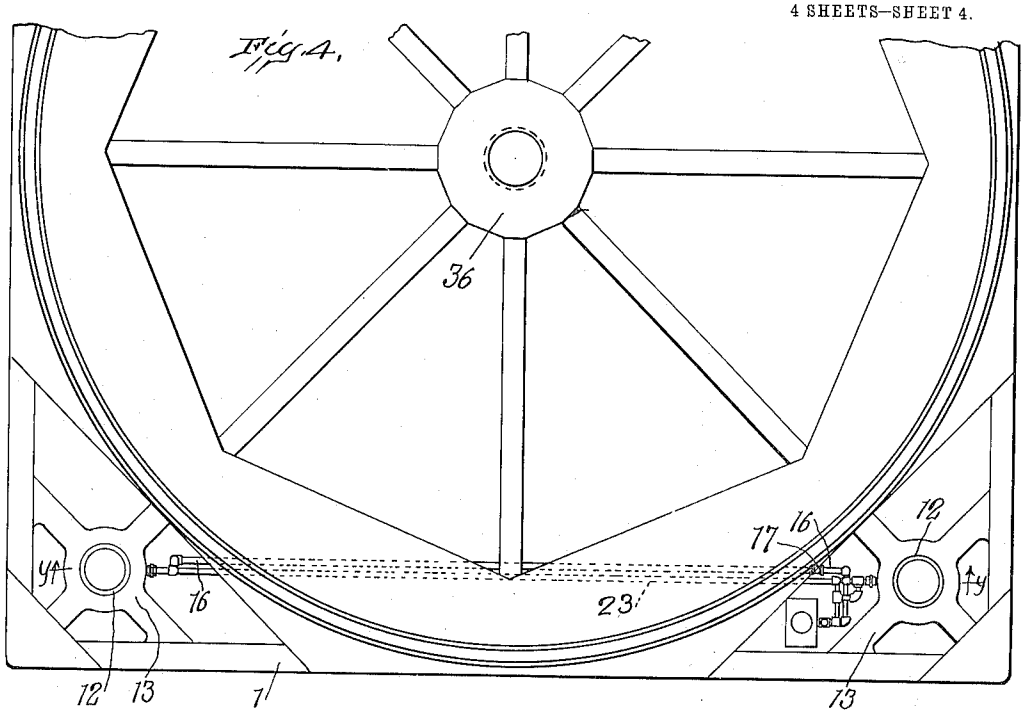
4 SHEETS—SHEET 4.

Fig. 4.



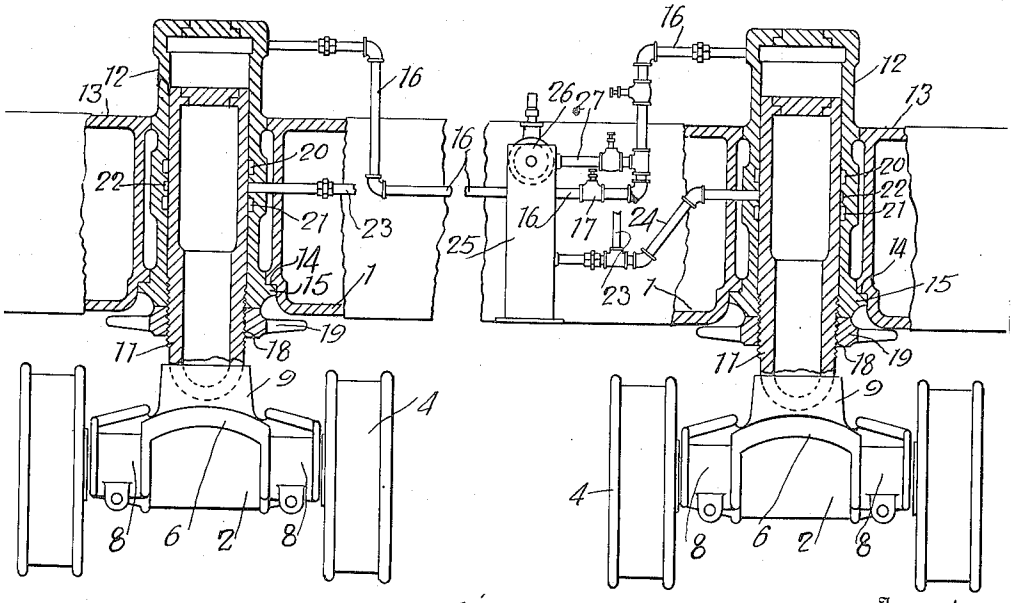


Fig. 5.

Witnesses

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UNITED STATES PATENT OFFICE.

CHARLES B. KING, OF MARION, OHIO, GRANT HOLMES, OF DANVILLE, ILLINOIS, AND BENJAMIN JACOBY AND HERBERT E. ROUSH, OF MARION, OHIO, ASSIGNORS TO THE MARION STEAM SHOVEL COMPANY, OF MARION, OHIO, A CORPORATION OF OHIO.

EXCAVATING-MACHINE.

1,128,151. Specification of Letters Patent. Patented Feb. 9, 1915.

Application filed May 31, 1911. Serial No. 630,281.

To all whom it may concern:

Be it known that we, CHARLES B. KING, residing at Marion, in the county of Marion and State of Ohio, GRANT HOLMES, residing at Danville, in the county of Vermilion and State of Illinois, and BENJAMIN JACOBY and HERBERT E. ROUSH, both residing at Marion aforesaid, citizens of the United States, have invented certain new and useful Improvements in Excavating-Machines, of which the following is a specification, reference being had therein to the accompanying drawings.

This invention relates to excavating machines, and more particularly to excavating machines of the dipper type and is designed especially for stripping coal, that is, removing the surface layer of earth and rock covering coal veins which lie close to the top of the ground.

The object of the invention is to provide an excavating machine of this character which can be operated to make excavations at any point about a circle and which will automatically accommodate itself to the unevenness of the tracks without imposing any severe strain upon the frame or mechanism.

To this end it is a further object of the invention to provide such a machine supported by four trucks, two of which are vertically adjustable; to provide means for equalizing the movement of said adjustable trucks; and also to provide means for controlling the several parts of the mechanism.

In the accompanying drawings, Figure 1 is a top, plan view of an excavating machine embodying our invention with a portion of the frame broken away; Fig. 2 is a front elevation of the same; Fig. 3 is a longitudinal, sectional view, taken on the line x x of Fig. 1 and looking in the direction of the arrows; Fig. 4 is a plan view of the rear portion of the supporting frame showing the supports for the adjustable trucks and the connections between the same; and Fig. 5 is a vertical, sectional view, taken on the line y y of Fig. 4 with the central portion of the frame broken away.

In these drawings we have illustrated one embodiment of our invention and have shown the same as applied to an excavating machine of the boom and dipper type comprising a platform upon which is rotatably mounted a frame carrying the boom, the power plant and operating mechanism for the boom and dipper. The platform is preferably rectangular in shape and is supported at each corner by a four wheel truck, which trucks travel on tracks arranged along the opposite sides of the machine. Two of these trucks are vertically adjustable, the adjustment being preferably automatic to enable the trucks to accommodate themselves to irregularities in the tracks and thus maintain the several parts of the frame in their proper alinement and avoid imposing any severe strain upon the platform or frame or the mechanism carried thereby. The adjustable trucks are connected one with the other in such a manner as to equalize their movement.

As here shown the machine comprises a supporting platform 1 which is rectangular in shape and substantially square. This platform is provided at each of its four corners with trucks 2 and 3. The trucks 2, which are located at the forward end of the platform, are vertically adjustable and the trucks 3, which are located at the rear of the platform, are propelling trucks to move the machine as a whole over the tracks. The trucks themselves may be of any suitable character and the four trucks are substantially the same in construction, each comprising four double flanged wheels 4 mounted in pairs on axles 5, which axles are journaled in bearings carried by a truck frame 6. Each truck frame is preferably formed of a single casting having near its center means for connecting the same with the platform and having four arms 7 extending forwardly and rearwardly therefrom. These arms are provided near their ends with bearings 8 to receive the axles 5 of the wheels 4. The truck frames 6 are preferably connected with the platform by ball and socket joints, and, to this end, each truck frame is provided near its center with a cup or socket 9 adapted to receive the rounded lower end of a standard secured to the platform 1. In the case of the rear trucks these standards are rigidly secured to the platform, as indicated at 10, while in the case

of the forward or adjustable trucks the standards are adjustably connected to the platform and constitute pistons, as indicated at 11. Each piston 11 is mounted in a cylinder 12 which, in turn, is rigidly secured in a spider-like casting 13 mounted in the corner of the platform 1. As here shown the casting and cylinder are provided with interlocking flanges 14 and 15, respectively, arranged to resist any tendency on the part of the cylinder 12 to move upward but to permit the removal of the cylinder. The cylinders may be filled with any suitable fluid, such, for example, as water, and are interconnected in such a manner as to equalize the movement of the pistons 11. This connection preferably comprises a pipe 16 extending transversely to the platform 1 and connected at its opposite ends to the upper portions of the respective cylinders 12. The pipe and cylinders having been filled with fluid any upward movement of one piston must necessarily displace a quantity of the fluid which will flow into the other cylinder and cause, or compensate for, a corresponding downward movement of said other piston. The pipe 16 is provided with a cut-off valve 17 by means of which the communication between the two cylinders can be interrupted. When this valve is closed there is no means of escape for the fluid from the cylinder and where a non-compressible fluid is used, the piston will be effectually locked against upward movement and but a very slight downward movement will be permitted, as such movement would create a vacuum within the cylinder. While the valve 17 will serve to lock the adjustable or floating trucks against vertical movement it is sometimes desirable, where the machine is being operated in one position for a considerable period of time, to have a positive lock which will not be affected by leakage or any other cause, and to this end, the lower portion of each piston 11 is slightly reduced in diameter and screw-threaded, as indicated at 18, and a nut 19 is mounted on the screw-threaded portion o fthe piston. By screwing this nut against the lower end of the corresponding cylinder the piston will be locked against upward movement. By reducing the diameter of that portion of the piston in which the thread is formed the thread is prevented from coming in contact with the bore of the cylinder when the threaded portion of the piston enters the latter. The construction of the piston and the cylinder is such as to effectually prevent the escape of the fluid about the lower end of the piston. As here shown each cylinder 12 is provided with a usual packing ring 20 and is further provided with a second packing ring 21 spaced a short distance below the packing ring 20. A groove 22 is formed in the inner face of each cylinder between the packing rings 20 and 21. These grooves are connected by pipes 23 and 24, respectively, with a receptacle 25. Any fluid which may work past the first packing ring, 20, will enter the groove 22 and be carried off to the receptacle 25. However, should any of the fluid escape from the annular groove between the adjacent surfaces of the piston and cylinder it will be interrupted by the second packing ring 21 and prevented from passing out of the lower end of the cylinder. The receptacle 25 has mounted therein a suitable pump 26 and is connected by means of a pipe 27 with the pipe 16 connecting the upper ends of the cylinders. By the operation of this pump the cylinders can be readily recharged with the fluid and the desired quantity of fluid maintained therein. By the use of the floating trucks and the equalizing device therefor the trucks and the platform will readily accommodate themselves to any unevenness in the tracks, and, by providing two floating trucks and two rigid trucks, we secure all the adjustability and flexibility of a three point suspension and, at the same time, retain all the rigidity of a four point suspension.

Rotatably supported upon the platform 1 is a frame 28 upon which is supported a boom 29, the operating mechanism therefor and the power plant, this latter being preferably supported on a rearward extension of the frame, as indicated at 30. The frame 28 is connected to the platform 1 by and rotates about a central shaft or pin 31. An annular series of flanged rollers 32, connected one to the other by bands 33, are mounted between tracks 34 and 35 carried by the platform and frame, respectively. The hollow shaft or pin 31 is here shown as mounted in a casting 36 rigidly secured in the center of the platform 1 and is held against rotary movement therein by a key 37, the key being of less length than the keyway to permit of a slight vertical movement on the part of the shaft, as hereinafter described. The frame 28 has secured thereto and preferably depending therefrom a casting 38 in which is formed a bearing for the upper portion of the shaft 31. Means are also provided for maintaining the frame substantially parallel with the platform and preventing the same from tipping. This is accomplished in the present instance by providing the upper portion of the shaft 31 with a part, such as an annular flange 39, arranged to engage the upper edge of the bearing 38 and by mounting on the lower end of the shaft 31 a screw-threaded nut 40. By tightening this nut the bearing 38 and the frame to which said bearing is rigidly secured can be drawn down and held firmly in their proper positions relatively to the platform. When the shafts have been drawn down in this manner the frame

will be prevented from tipping and throwing the parts out of alinement, and moreover, the whole construction of the machine will be rendered rigid and the entire weight of the platform, the frame and the mechanism mounted thereon will be utilized to counterbalance the boom and the load thereon, the platform pivoting about the axis of the trucks at the forward end thereof.

The propelling trucks at the rear of the platform 1 are driven from the engine carried by the rotating frame 28. To this end the inner wheels of each truck 3 are provided with toothed flanges or gears 41 which mesh with and are driven by pinions 42 carried by shafts 43 mounted in transverse bearings 44 carried by the respective trucks and preferably formed integral therewith. As here shown each truck is provided with an opening extending through substantially the full width thereof and having a bearing at each end to receive the shaft 43, this long bearing serving to prevent the pinion from becoming displaced or out of alinement with wear. The pinions 42 are connected by means of universal joints 45 with the outer ends of floating shaft sections 46, the inner ends of which are connected by other universal joints 47 with a shaft section 48 journaled in fixed bearings 49 carried by the platform 1. Rigidly secured to the shaft section 48 is a miter gear 50 which meshes with a miter gear 51 secured to a shaft 52 journaled in bearing brackets 53 carried by the platform 1 and having at its opposite end a miter gear 54 meshing with a miter pinion 55 rigidly secured to the lower end of a vertical shaft 56 which is journaled in bearings 57 formed in the upper and lower ends, respectively, of the hollow shaft 31 and is provided at its upper end with a miter gear 58. The gear 58 meshes with a corresponding gear 59 loosely mounted on a shaft 60 which is provided at one end with a gear 61 meshing with a pinion 62 keyed to the shaft 63 of the hoisting engine 64. A second miter gear 65 is also loosely mounted on the shaft 60 and meshes with a corresponding gear 66 mounted on a shaft 67 having at its other end a worm 68 supported in engagement with a worm wheel 69 on the drum 70. Each of the miter gears 59 and 65 on the shaft 60 is provided on its inner face with a clutch member adapted to be engaged by the adjacent end of a clutch member 71 slidably mounted on the shaft 60 and controlled in the usual manner by a yoke 72, thus enabling both the propelling mechanism and the boom hoisting mechanism to be controlled by a single lever.

The propelling shaft 56 is preferably hollow to receive a water pipe 73 which is connected at its upper end with the injector for the boiler and at its lower end with the water supply. In this manner water can be taken on without interrupting the operation of the excavating mechanism.

The frame 28 may be rotated by any suitable mechanism, but preferably a rack and pinion is employed for this purpose. As here shown an annular rack 74 is rigidly secured to the platform 1 concentrically with the shaft 31. A pinion 75, carried by a shaft 76 rotatably mounted on the frame 28, meshes with the rack 74, and, the rack being fixed, travels along the same, thereby causing the frame 28 to rotate. The shaft 76 is preferably mounted in bearing brackets 77 carried by the frame 28 and has secured thereto a gear 78 which meshes with a pinion 79 mounted on a short shaft 80, to the upper end of which is secured a miter gear 81 meshing with a corresponding gear 82 on the shaft 83 of the swinging engine 84.

The operation of the mechanism as a whole will be readily understood from the foregoing description of the several parts thereof and it will be apparent that we have provided a shovel of this character which is mounted on a plurality of trucks, a part of which are floating trucks and will automatically accommodate themselves to any irregularities in the track, and, that by combining the two floating trucks with the two fixed trucks, we secure all the flexibility and adjustability of the three point suspension while retaining the rigidity of the four point suspension. It will also be noted that we have provided means whereby both trucks may be moved in the same direction, either toward or away from the platform, to vary the distance between the platform and the supporting surface, thus enabling the platform to be maintained substantially level when the machine is standing on a sharp incline. This result is, in the present instance, accomplished by forcing a greater quantity of fluid into the cylinders or by withdrawing fluid from the cylinders into the receptacle which is provided to receive the same, thus causing the pistons to work at a greater or lesser distance from the ends of their cylinders and consequently lengthening or shortening the connections between the trucks and the platform. In this connection it may also be noted that it is not necessary to the operation of the device, as above described, that the two normally fixed trucks should be incapable of adjustment. It is quite possible to duplicate the adjustable trucks, which are here shown at the front end of the machine, at the rear end of the machine, and by locking one set of trucks against movement the operation above described would be had. Further, it will be apparent that with this construction it is possible to rotate the main frame and to operate the excavating mechanism at any point of the circle described about the

center of the rotating frame; further, that the frame is so connected to the platform that these parts are maintained at all times in substantially parallel positions and the frame is prevented from tilting and throwing any part of the mechanism out of alinement; and further, by connecting the frame firmly to the platform the whole weight of the platform, frame and the mechanism carried thereby is used to counterbalance the boom and the weight thereon. Further, it will be apparent that we have provided means whereby the machine as a whole may be propelled through the truck wheels, this propelling mechanism being actuated from the hoisting engines.

While we have herein shown and described one specific embodiment of our invention it will be understood that this embodiment is chosen for the purpose of illustration only and that we do not wish to be limited to the details of construction shown and described, for obvious modifications will occur to one skilled in the art. For example, it will be understood that the term "truck" is herein employed as meaning any member or device for movably supporting the different parts of a platform and is not to be limited to the four wheel trucks shown and described.

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

1. In an excavating machine, the combination, with a supporting platform to carry the excavating devices, of a plurality of trucks to support said platform, two of said trucks being connected with said platform on opposite sides of the center thereof and being capable of vertical movement relatively one to the other and to said platform, a connection between said vertically movable trucks to cause both of them to move relatively to said platform when one of them encounters an irregularity in the supporting surface, and means to prevent said trucks from moving relatively to said platform and to cause them to form a rigid support for said platform.

2. In an excavating machine, the combination, with a supporting platform to carry the excavating devices, of a plurality of trucks to support said platform, two of said trucks being connected with said platform on opposite sides of the center thereof and being capable of vertical movement relatively one to the other and to said platform, an equalizing connection between said trucks to cause them to move simultaneously in opposite directions independently of said platform to adjust them to irregularities in the supporting surface, and means to lock said trucks in their adjusted positions.

3. In an excavating machine, the combination, with a supporting platform to carry the excavating devices, of a plurality of trucks to support said platform, two of said trucks being connected with said platform on opposite sides of the center thereof and being capable of vertical movement relatively one to the other and to said platform, fluid controlled devices connected respectively with said vertically movable trucks, a connection between said fluid-controlled devices, whereby the vertical movement of either of said trucks will actuate said fluid-controlled devices to cause the other truck to move in a direction opposite to the direction of movement of the first-mentioned truck to cause said trucks to adjust themselves to irregularities in the supporting surface, and means to lock said trucks in their adjusted positions.

4. In an excavating machine, the combination, with a supporting platform to carry the excavating devices, of a pair of trucks arranged at one end of said platform on opposite sides of the center thereof and held against vertical movement relatively to said platform, two cylinders secured to the opposite end of said platform on opposite sides of the center thereof, pistons mounted in the respective cylinders, trucks arranged beneath said cylinders and connected with said pistons, whereby said trucks are capable of vertical movement relatively to said cylinders and said platform, said cylinders containing a non-compressible fluid, and means for connecting said cylinders one with the other to permit the fluid to flow from one cylinder to the other when either of said pistons moves vertically relatively to its cylinder.

5. In an excavating machine, the combination, with a supporting platform to carry the excavating devices, of a pair of trucks arranged at one end of said platform on opposite sides of the center thereof and held against vertical movement relatively to said platform, two cylinders secured to the opposite end of said platform on opposite sides of the center thereof, pistons mounted in the respective cylinders, trucks arranged beneath said cylinders and connected with said pistons, whereby said trucks are capable of vertical movement relatively to said cylinders and said platform, said cylinders containing a non-compressible fluid, means for connecting said cylinders one with the other to permit the fluid to flow from one cylinder to the other when either of said pistons moves vertically relatively to its cylinder, and means to lock said pistons against vertical movement relatively to said platform.

6. In an excavating machine, the combination, with a supporting platform to carry the excavating devices, of a pair of trucks arranged at one end of said platform on opposite sides of the center thereof and held

against vertical movement relatively to said platform, two cylinders secured to the opposite end of said platform on opposite sides of the center thereof, pistons mounted in the respective cylinders, trucks arranged beneath said cylinders and connected with said pistons, whereby said trucks are capable of vertical movement relatively to said cylinders and said platform, said cylinders containing a non-compressible fluid, means for connecting said cylinders one with the other to permit the fluid to flow from one cylinder to the other when either of said pistons moves vertically relatively to its cylinder, and means to interrupt said connection to prevent the movement of said cylinders relatively one to the other and to said platform, thereby retaining the same in adjusted positions.

7. In an excavating machine, the combination, with a supporting platform to carry the excavating devices, of a plurality of trucks to support said platform, cylinders secured to said platform near one end thereof and on opposite sides of the center thereof, said cylinders containing a non-compressible fluid, pistons mounted in said cylinders, two of said supporting trucks being arranged beneath the respective cylinders and connected with the pistons of said cylinders, and means for connecting said cylinders one with the other to permit said trucks to rise and fall to adjust themselves to irregularities in the supporting surface.

8. In an excavating machine, the combination, with a supporting platform to carry the excavating devices, of a plurality of trucks to support said platform, cylinders secured to said platform near one end thereof and on opposite sides of the center thereof, said cylinders containing a non-compressible fluid, pistons mounted in said cylinders, two of said supporting trucks being arranged beneath the respective cylinders and connected with the pistons of said cylinders, means for connecting said cylinders one with the other to permit said trucks to rise and fall to adjust themselves to irregularities in the supporting surface, and means to lock said pistons against movement to retain said movable trucks in their adjusted positions.

9. In an excavating machine, the combination, with a supporting platform to carry the excavating devices, of a plurality of trucks to support said platform, cylinders secured to said platform near one end thereof and on opposite sides of the center thereof, said cylinders containing a non-compressible fluid, pistons mounted in said cylinders, two of said supporting trucks being arranged beneath the respective cylinders and connected with the pistons of said cylinders, means for connecting said cylinders one with the other to permit said trucks to rise and fall to adjust themselves to irregularities in the supporting surface, and means to interrupt said connection to retain said movable trucks in their adjusted positions.

10. In an excavating machine, the combination, with a supporting platform to carry the excavating devices, of a plurality of trucks to support said platform, cylinders secured to said platform near one end thereof and on opposite sides of the center thereof, said cylinders containing a non-compressible fluid, pistons mounted in said cylinders, two of said supporting trucks being arranged beneath the respective cylinders and pivotally connected with the pistons of said cylinders, and means for connecting said cylinders one with the other to permit said trucks to rise and fall to adjust themselves to irregularities in the supporting surface.

11. In an excavating machine, the combination, with a supporting platform to carry the excavating devices, of a plurality of trucks to support said platform, cylinders secured to said platform near one end thereof and on opposite sides of the center thereof, said cylinders containing a non-compressible fluid, pistons mounted in said cylinders, two of said supporting trucks being arranged beneath the respective cylinders, a universal pivotal connection between each of said trucks and its piston, and means for connecting said cylinders one with the other to permit said trucks to rise and fall to adjust themselves to irregularities in the supporting surface.

12. In an excavating machine of the character described, the combination, with a platform to carry the excavating devices, of a pair of supporting trucks independently connected with said platform near one end thereof and on opposite sides of the center thereof, said trucks being capable of vertical movement relatively to said platform and to each other, and interconnected fluid-controlled devices connected with the respective trucks to cause them to move simultaneously in opposite directions and to adjust themselves to irregularities in the supporting surface.

13. In an excavating machine of the character described, the combination, with a platform to carry the excavating devices, of a pair of supporting trucks connected with said platform near one end thereof and on opposite sides of the center thereof, said trucks being capable of vertical movement relatively to said platform and to each other, interconnected fluid-controlled devices connected with the respective trucks to cause them to move simultaneously in opposite directions and to adjust themselves to irregularities in the supporting surface, and means to interrupt said connection between said

fluid-controlled devices to retain said trucks in their adjusted positions.

14. In an excavating machine, a platform to support the excavating devices, independently supporting trucks arranged near the respective corners of said platform, the trucks at one end of said platform being vertically movable relatively one to the other and to said platform, interconnected fluid-controlled devices interposed between the respective supporting trucks and said platform to cause said trucks to move in opposite directions to adjust themselves to irregularities in the supporting surface, the trucks at the opposite end of said platform being fixed against vertical movement relatively to said platform, power mechanism supported on said platform, and an operative connection between said power mechanism and said fixed trucks to cause the latter to propel the machine.

15. In a machine of the class described, a platform, a plurality of supporting trucks for said platform, two of said trucks being vertically adjustable relatively to said platform and to each other, fluid cylinders supported adjacent to said adjustable trucks, pistons connected with said trucks and extending into the respective cylinders, a connection between said cylinders, and a locking device carried by each piston to lock said trucks in adjusted positions.

16. In a machine of the class described, a platform, having a vertical opening therein, said opening being provided with an inwardly extending projection, a cylinder mounted in said opening and having an outwardly extending projection arranged to engage the first-mentioned projection, a piston mounted in said cylinder, and a truck connected with said piston.

17. In a machine of the class described, a platform, a substantially vertical cylinder carried by said platform and having an annular groove in the inner surface thereof, a packing ring arranged above said groove, a piston mounted in said cylinder and having its inner end extending normally above said packing ring, a truck connected to said piston, a fluid receptacle, and a connection between said fluid receptacle and said annular groove.

18. In an excavating machine, a platform, a plurality of supporting trucks for said platform, two of said trucks being vertically adjustable relatively to said platform and to each other, fluid cylinders carried by said platform adjacent to said adjustable trucks and having their lower ends open, pistons mounted in said cylinders, connected with the respective trucks and having those parts arranged near the lower ends of said cylinders provided with screw-threads, and nuts mounted on the screw-threaded portions of said pistons and adapted to engage the lower ends of said cylinders to lock said pistons against upward movement with relation to said cylinders.

19. In an excavating machine, the combination, with a platform to support the excavating devices, of a plurality of trucks for supporting said platform, two fluid-containing cylinders secured to said platform near one end thereof and on opposite sides of the center thereof, pistons mounted in said cylinders, two of said trucks being connected respectively with said pistons, a connection between said cylinders whereby said movable trucks will move in opposite directions to accommodate themselves to irregularities in the supporting surface, means for interrupting said connection to prevent the movement of said pistons, and devices carried by said pistons for positively locking the same against movement.

20. In an excavating machine, the combination, with a platform to support the excavating devices, of a plurality of trucks for supporting said platform, two fluid-containing cylinders secured to said platform near one end thereof and on opposite sides of the center thereof, pistons mounted in said cylinders, two of said trucks being connected respectively with said pistons, a connection between said cylinders whereby said movable trucks will move in opposite directions to accommodate themselves to irregularities in the supporting surface, and two separate means for preventing the movement of said pistons in said cylinders, whereby either of said means may be utilized to retain said trucks in their adjusted positions.

21. In an excavating machine, the combination, with a supporting platform to carry the excavating devices, of a plurality of trucks to support said platform, two of said trucks being connected with said platform on opposite sides of the center thereof and being capable of vertical movement relatively one to the other and to said platform, a connection between said vertically movable trucks to cause both of them to move relatively to said platform when one of them encounters an irregularity in the supporting surface, means to lock said trucks in adjusted positions, and means to adjust both trucks in the same direction either toward or away from said platform to vary the distance between the platform and the supporting surface.

22. In an excavating machine, the combination, with a supporting platform to carry the excavating devices, of a plurality of trucks to support said platform, cylinders secured to said platform near one end thereof and on opposite sides of the center thereof, said cylinders containing a non-compressible fluid, pistons mounted in said cylinders, two of said supporting trucks being arranged

beneath the respective cylinders and connected with the pistons of said cylinders, means for connecting said cylinders one with the other to permit said trucks to rise and fall to adjust themselves to irregularities in the supporting surface, and means to control the amount of fluid in said cylinder to regulate the distance between the trucks and the platform.

23. In an excavating machine, the combination, with a supporting platform to carry the excavating devices, of a plurality of trucks to support said platform, cylinders secured to said platform near one end thereof and on opposite sides of the center thereof, said cylinders containing a non-compressible fluid, pistons mounted in said cylinders, two of said supporting trucks being arranged beneath the respective cylinders and connected with the pistons of said cylinders, means for connecting said cylindears one with the other to permit said trucks to rise and fall to adjust themselves to irregularities in the supporting surface, a receptacle connected with said cylinders, and means to transfer fluid from said receptacle to said cylinders or from said cylinders to said receptacle, thereby varying the distance between the trucks and the platform.

24. In an excavating machine, the combination, with a supporting platform to carry the excavating devices, of a plurality of trucks to support said platform, cylinders secured to said platform near one end thereof and on opposite sides of the center thereof, said cylinders containing a non-compressible fluid, pistons mounted in said cylinders, two of said supporting trucks being arranged beneath the respective cylinders and connected with the pistons of said cylinders, means for connecting said cylinders one with the other to permit said trucks to rise and fall to adjust themselves to irregularities in the supporting surface, a fluid-containing receptacle connected with said cylinders, means to control the communication between said cylinders and said receptacle, and a pump to force the fluid from said receptacle into said cylinders, thereby causing the pistons to work at a greater or lesser distance from the ends of the cylinders and vary the distance between the trucks and the platform.

25. In an excavating machine, the combination, with a supporting platform to carry the excavating devices, of a plurality of trucks to support said platform, cylinders secured to said platform near one end thereof and on opposite sides of the center thereof, said cylinders containing a non-compressible fluid, pistons mounted in said cylinders, two of said supporting trucks being arranged beneath the respective cylinders and connected with the pistons of said cylinders, means for connecting said cylinders one with the other to permit said trucks to rise and fall to adjust themselves to irregularities in the supporting surface, means to control the amount of fluid in said cylinder to regulate the distance between the trucks and the platform, and means to lock said trucks in their adjusted positions relatively to said platfrom.

26. In an excavating machine, the combination, with a supporting platform to carry the excavating devices, of a plurality of trucks to support said platform, cylinders secured to said platform near one end thereof and on opposite sides of the center thereof, said cylinders containing a non-compressible fluid, pistons mounted in said cylinders, two of said supporting trucks being arranged beneath the respective cylinders and connected with the pistons of said cylinders, means for connecting said cylinders one with the other to permit said trucks to rise and fall to adjust themselves to irregularities in the supporting surface, means to control the amount of fluid in said cylinders to regulate the distance between the trucks and the platform, and means to lock said trucks both in their adjusted positions relatively one to the other and in their adjusted positions relatively with said platform.

In testimony whereof we affix our signatures in the presence of witnesses.

CHARLES B. KING.
GRANT HOLMES.
BENJAMIN JACOBY.
HERBERT E. ROUSH.

Witnesses to the signatures of Charles B. King, Benjamin Jacoby, and Herbert E. Roush:

D. L. CULP,
WM. G. SLICK.

Witnesses to the signature of Grant Holmes:

WALTER C. LINDLEY,
GERTRUDE C. KOCH.