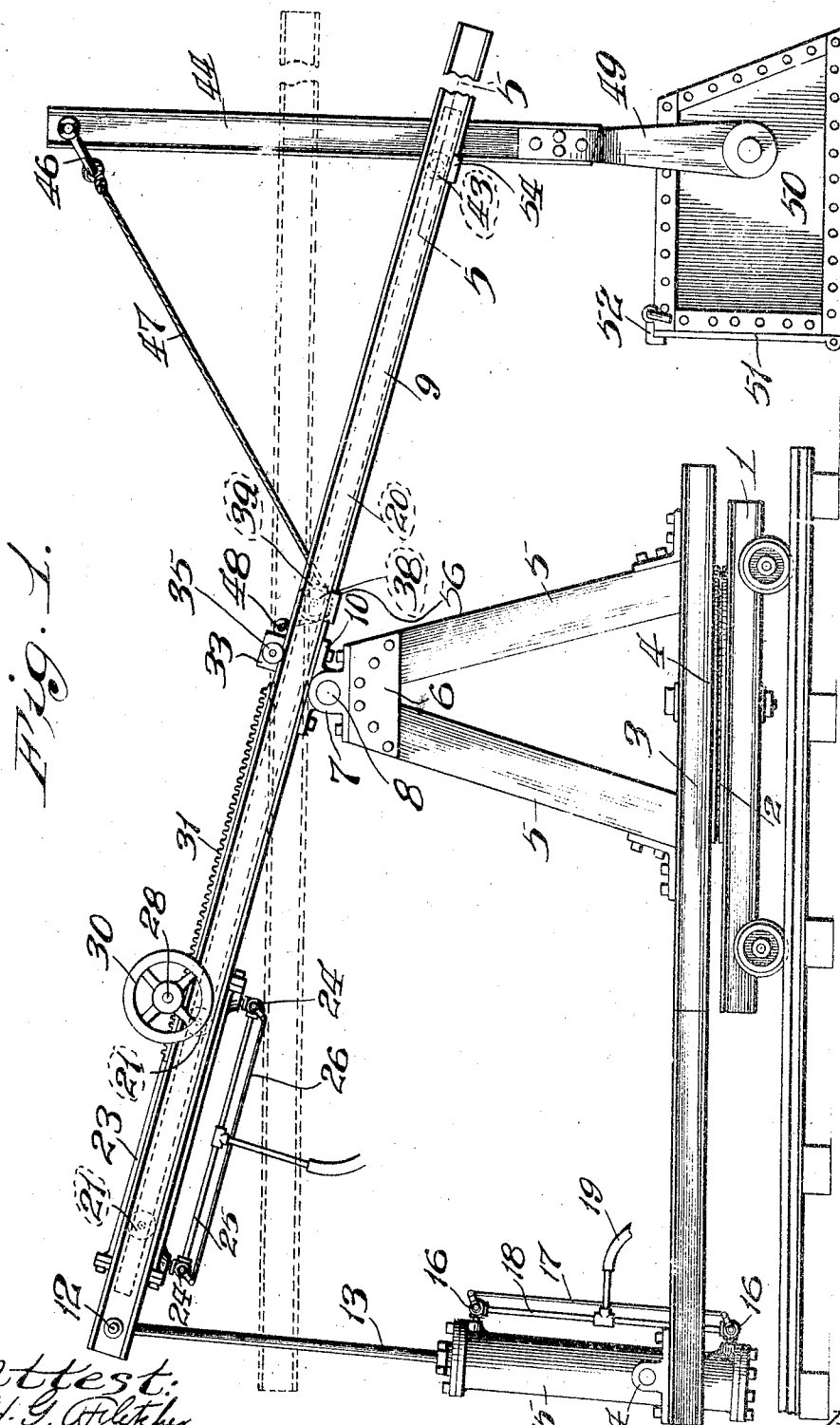


971,036.

C. L. GLASS.
SHOVELING MACHINE.
APPLICATION FILED JAN. 24, 1910.

Patented Sept. 27, 1910.

3 SHEETS-SHEET 1.



Attest:
H. G. Fletcher.
N. G. Butler.

Inventor:
Charles L. Glass
By Higdon & Longan Attys.

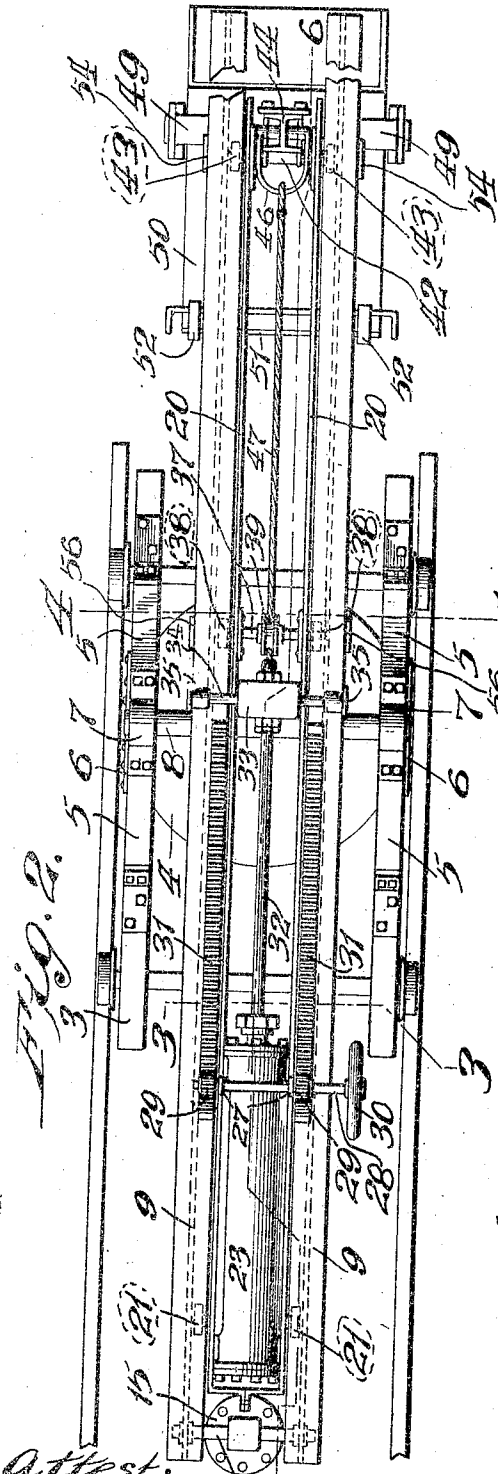
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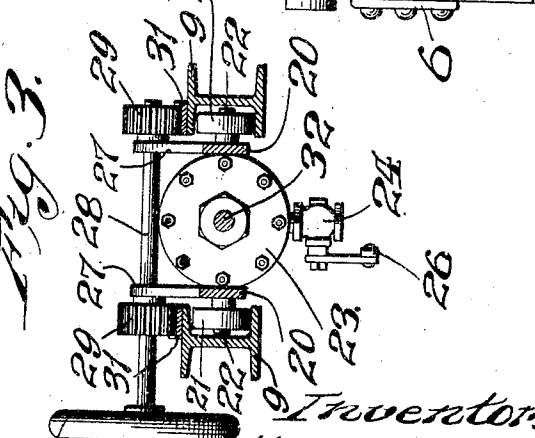
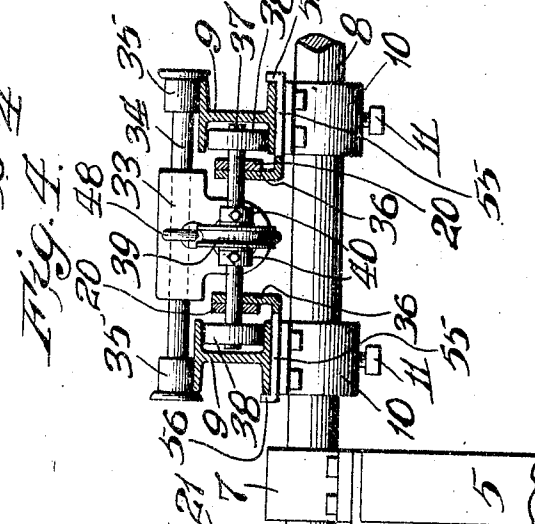
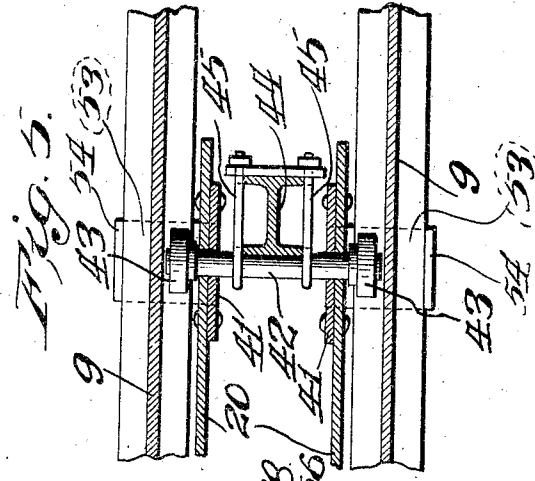
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3 SHEETS—SHEET 2.



Attest:
A. C. Fletcher
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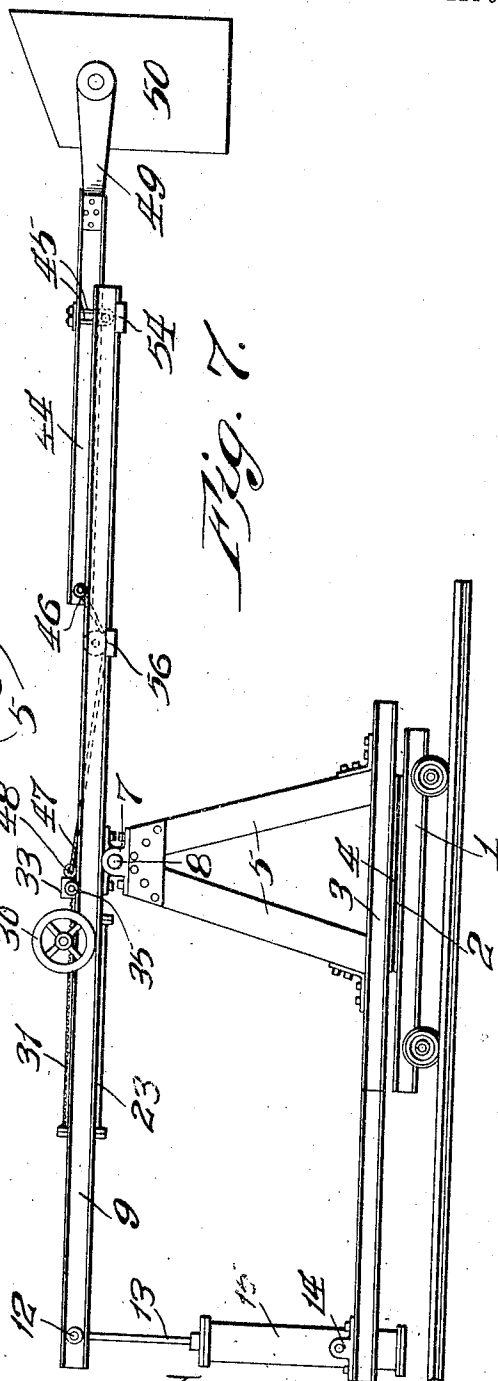
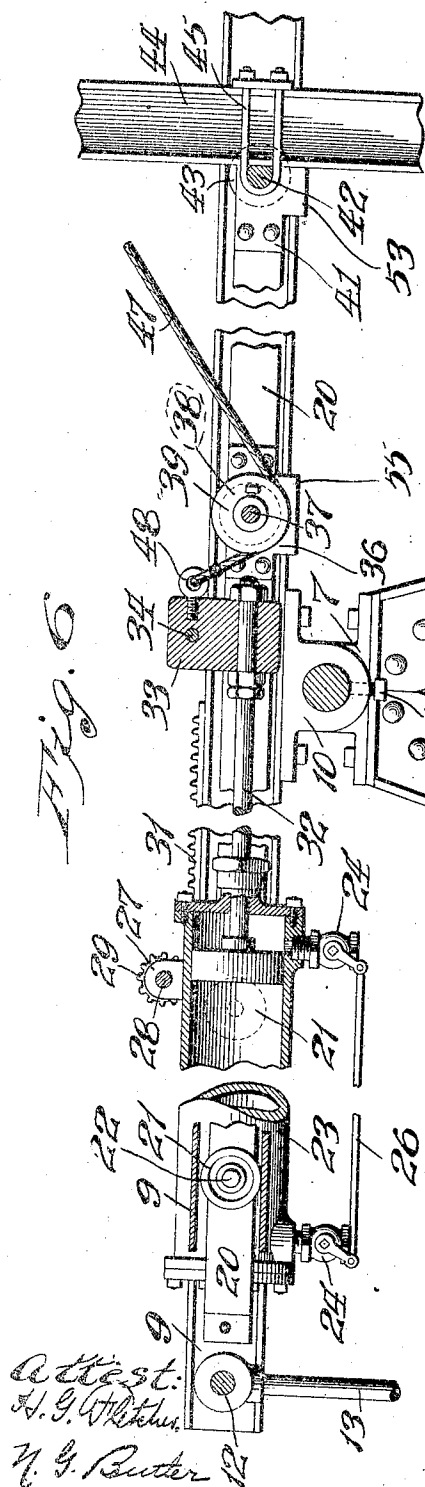
Inventor:
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3 SHEETS-SHEET 3.



Inventor:
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UNITED STATES PATENT OFFICE.

CHARLES L. GLASS, OF JOPLIN, MISSOURI.

SHOVELING-MACHINE.

971,036.

Specification of Letters Patent. Patented Sept. 27, 1910.

Application filed January 24, 1910. Serial No. 539,789.

To all whom it may concern:

Be it known that I, CHARLES L. GLASS, a citizen of the United States, and resident of Joplin, Jasper county, Missouri, have invented certain new and useful Improvements in Shoveling-Machines, of which the following is a specification, containing a full, clear, and exact description, reference being had to the accompanying drawings, forming a part hereof.

My invention relates to improvements in shoveling machines, the primary object of my invention being to construct a machine which will operate in a space equivalent to the combined length of the shovel and its beam.

A farther object of my invention is to construct a shoveling machine employing a tilting crane and a shovel beam fulcrumed over the end of the tilting crane and to provide movable parts carried by the tilting crane and connected with the free end of the shovel beam whereby the shovel may be operated in such manner as to be operative in a vertical space equivalent to the combined length of the beam and shovel.

A further object of my invention is to construct a machine of the class described in which there is a tilting crane having a fluid motor carried thereby and means for moving the motor bodily, relative to the crane and employing in connection with such a tilting crane a shovel having a beam which fulcrums over the end of the crane and is connected with the fluid motor in such manner as to be operative in a vertical space equivalent to the combined length of the shovel and beam.

For the above purposes my invention consists in certain novel features of construction and arrangement of parts as will be hereinafter more fully described, pointed out in the claims and illustrated by the accompanying drawings, in which:

Figure 1 is an elevation of my improved shoveling apparatus; Fig. 2 is a plan of the complete apparatus; Fig. 3 is an enlarged, transverse, sectional elevation taken on the line 3—3 of Fig. 2; Fig. 4 is an enlarged, transverse, sectional elevation taken on the line 4—4 of Fig. 2; Fig. 5 is an enlarged, sectional plan taken on the line 5—5 of Fig. 1; Fig. 6 is an enlarged, detail, sectional elevation taken on the line 6—6 of Fig. 2, portions of the apparatus being broken away;

and Fig. 7 is an elevation of the complete apparatus showing the shovel and its beam in a position approximately parallel with the tilting crane and showing the fluid motor and parts carried therewith in positions approximately at their forward limits of movement.

Referring by numerals to the accompanying drawings: 1 designates a wheeled truck, and 2 designates a member of a turn table which is secured to the truck.

3 designates the base section of a movable frame and 4 the upper member of the turn table which is secured to the base section 3 of the movable frame. The base section is preferably constructed of parallel beams, the middle pair of beams being extended a considerable distance beyond the rear end of the remaining beams.

5 designates uprights which are preferably constructed of angle irons and converge toward the top of the frame and are united by means of the plates 6. Supported on the top of the frame are the bearings 7 which support and embrace the shaft 8.

9 designates a pair of parallel beams, each of which carries a bearing 10 which are mounted upon the shaft 8. The beams 9 are preferably I-shape in cross section and constitute together with their support a tilting crane. The beams 9 are maintained at a proper distance of separation by means of the set screws 11 which are carried by the bearings 10 and impinge against the shaft 8. The space between the beams 9 is not spanned by any connecting parts except at its rear-most end where the shaft 12 is located, to which shaft the piston rod 13 is pivotally connected.

Secured upon the upper faces of the above referred to middle beams, of the base section 3 of the frame, are the bearings 14, in which bearings is pivotally mounted a cylinder 15 which is provided with the ordinary two-way valves 16—16 which are operated in a common manner by a connecting rod 17, and the valves are supplied with fluid pressure through the pipe 18 and the flexible connection 19 from a suitable source of fluid pressure supply (not shown), it being understood that the cylinder 15 incloses a piston head (not shown) which is secured to and operated with the piston rod 13.

20—20 designate straps which are disposed between the beams 9.

21 designates rollers which are carried by the straps 20 and are arranged to ride or travel upon the inner lowermost flanges of the beams 9. Trunnions 22 for said rollers 21 are preferably formed integral with the cylinder 23 which is identical in construction with the cylinder 15 and is provided with valves 24, a fluid pressure supply pipe 25 and an operating lever 26 similar to those employed in connection with the cylinder 15.

Formed on or carried by the straps 20 are the upwardly extended, perforated ears 27 which are designed to support the shaft 28 which shaft carries the pinions 29 and hand wheel 30. Said pinions are arranged to mesh with the racks 31 fixed to the upper faces of the beams 9 for purposes of moving the cylinder 23, the straps 20 and the parts carried thereby longitudinally relative to the beams for purposes hereinafter made clear.

32 designates the piston rod, the piston of which is inclosed by the cylinder 23 and to which piston rod 32 the cross head 33 is secured. Extending through the cross head 33 is a rotatable shaft 34, the outer ends of which are embraced by the flanged rollers 35 which rest and travel upon the upper faces of the beams 9 in advance or forwardly of the racks 31. Carried by the straps 20 are the reinforcing strips 36 which straps and strips are provided with coinciding bearing openings through which the shaft 37 is extended. Carried by the outer ends of the shaft 37 are the rollers 38 which rest and travel upon the upper face of the inside flanges of the beams 9. Loosely mounted upon the shaft 37, approximately at its longitudinal center, is a pulley 39 which is secured against movement longitudinally of the shaft by means of the collars 40.

At the forward end of the straps 20 are the reinforcing plates 41, similar to the strips 36 which are also provided with bearing openings coinciding with similar openings through the straps 20 through which the shaft 42 is extended, and rotatably mounted on the ends of the shaft 42 are the rollers 43. A portion of the shaft 42, between the plates 41, is flattened for a distance equal to the face of the beam 44, the beam being secured to the shaft 42 by means of the U-bolts 45. The beam 44 is provided at its upper end with a bail 46 to which is secured a flexible member such as a cable 47, the other end of which cable is secured to an eye 48 carried by the cross head 33. Secured to the lowermost end of the beam 44 is a pair of outwardly and downwardly extending arms 49, and pivotally carried by the arms 49 is a shovel 50 which is provided with a hinged door 51 and a catch 52 for holding the door closed.

To prevent spreading of the beams 9 forwardly of their pivotal support, I have pro-

vided the integral, lateral extensions 53 carried by the reinforcing plates 41. The extensions 53 terminate in vertically, disposed flanges 54 which engage the outer base flanges of each of the beams 9.

To prevent buckling of the beams 9 between the flanges 54 and the pivotal support of the beams, I have provided the reinforcing strips 36 with integral, lateral extensions 55, which extensions terminate in upturned flanges 56, the extensions 55 and flanges 56 being the exact counterparts of the extensions 53 and flanges 54.

The shoveling machine, as hereinbefore described, is primarily designed for use in mining, it being understood that the excavating in drifts must be accomplished within as small a vertical space as possible for the sake of economy in the handling of the earth or rock above and below the vein or lead being mined.

By such a construction of machine as described, I am enabled to operate a shovel and a beam, the combined lengths of which are nearly equal to the height of the drift. In other words, in an eight foot drift I am enabled to operate a machine employing a shovel and a shovel beam, the combined lengths of which are approximately eight feet; such an operation is possible and due to the arrangement of the shovel beam and the tilting crane together with the movable parts carried by the crane, which movable parts operate to move the shovel in a working position in a comparatively small vertical space.

In the practical operation of the machine, the truck 1 is mounted on suitable rails which are arranged lengthwise of the drift and at the approximate transverse center, there being similar rails (not shown) arranged to one or, in some cases, both sides of the rails which support the machine, which rails are designed for the moving of the mineral and earth or rock. In mining with such a machine the operation of loosening the earth, rock or mineral is carried about in the usual manner as by blasting or, in some cases, by hand, using the miners' picks. After the earth has been loosened sufficiently and it is desired to remove the same, the entire machine is brought to a position at the end of the drift and the wheels of the truck 1 are secured in any suitable manner, preferably by wedge shaped blocks (not shown) being placed to the rear of one or more of the supporting wheels. The machine is then connected with a suitable source of fluid pressure supply, preferably compressed air, and the operating lever 17 is manipulated which permits air to enter behind the piston carried by the rod 13, which action tilts the entire crane to a position as shown in Fig. 1.

To operate the shovel the lever 26 is ma-

manipulated which permits air to enter the cylinder in advance of the piston and forces it rearwardly, it being understood that the cylinder is locked against movement longitudinally of the crane by any suitable means (not shown) and preferably by wedge shaped blocks which are placed between the supporting wheels and the flange of the beams 9, such a movement of the piston and its rod draws the cross head 33 rearwardly, which cross head draws the cable 47, and by reason of the cable being connected with the upper free end of the shovel beam 44 and by reason of the shovel beam being fulcrumed over the end of the straps 20 which are fixed immovable relative to the beams 9, the shovel beam and shovel are extended into the matter to be excavated.

Simultaneously with the movement of the shovel into the matter to be excavated, the entire tilting crane is moved, thereby constantly changing the fulcrum point of the beam 44, the movement of the crane being accomplished by a manipulation of the valves controlling the admission of compressed air to the cylinder 15. This operation is continued until the parts assume the position approximately as indicated in Fig. 7, and when the parts have assumed such position the entire machine is moved on the turn tables so that the shovel may occupy a position over a car or the like located at the side of the machine.

When it is desired to advance the operative parts without moving the truck 1, the hand wheel 30 is manipulated and the pinions 29 caused to move upon the racks 31 which movement advances the cylinder 23 and parts carried thereby, the pulley 39 and the beam 44, all of which are connected by means of the straps 20.

I claim:

1. In a machine of the class described, a tilting crane, members movable longitudinally relative to the tilting crane, a shovel, a beam connected with the shovel, said beam being fulcrumed over one of the movable parts carried by the crane and a flexible connection between the upper end of the shovel beam and one of the movable parts carried by the crane.

2. In a machine of the class described, a tilting crane and straps provided with rollers carried by the crane, a shovel, a shovel beam pivotally secured to the shovel, a shaft carried by the forward end of said straps and means for connecting the shovel beam with said shaft, a pulley carried by said straps, a cross head carried by the crane, a flexible connection between the cross head and the upper end of the shovel beam, said connection embracing said pulley, a motor for moving the cross head longitudinally relative to the crane and a motor for tilting the crane.

3. In a machine of the class described, a tilting crane constructed of parallel beams, straps interposed between said beams and movable longitudinally relative to the beams, a shaft carried by said straps adjacent their forward ends, a pulley carried by said straps, a motor carried by said straps, a cross head movable longitudinally of the beams and connected with said motor, a shovel, a shovel beam pivotally secured to the shovel and arranged to fulcrum over the shaft carried adjacent the free ends of said straps, a flexible connection between the cross head and the upper free end of the shovel beam, said flexible connection embracing said pulley, means for changing the bodily position of the straps and the parts carried thereby longitudinally relative to the beams and means for tilting said beams.

4. In a machine of the class described, a tilting crane constructed of parallel I-beams, straps interposed between said beams, shafts connecting said straps, rollers carried by said shafts and arranged for travel on the flanges of said beams, a fluid pressure motor carried by said straps, a pulley carried by said straps, a cross head provided with rollers connected with said motor and arranged for movement longitudinally relative to the beams, a shovel, a beam pivotally secured to the shovel, said beam being secured to the foremost shaft carried by said straps, a flexible connection between said beam and said cross head and means whereby the strap and parts carried thereby may be moved longitudinally relative to the beams.

5. In a machine of the class described, a tilting crane constructed of parallel I-beams, straps interposed between said beams, shafts connecting said straps, rollers carried by said shafts and arranged for travel on the flanges of said beams, a fluid pressure motor carried by said straps, a pulley carried by said straps, a cross head provided with rollers connected with said motor and arranged for movement longitudinally relative to the beams, a shovel, a beam pivotally secured to the shovel, said beam being secured to the foremost shaft carried by said straps, a flexible connection between said beam and said cross head, means whereby the straps and parts carried thereby may be moved longitudinally relative to the beams, a wheeled truck supporting the crane and a fluid motor carried by said truck and connected with the crane for operating the crane.

6. In a machine of the class described, the combination of a tilting crane, with a shovel having a beam, movable parts carried by the crane, said shovel beam being arranged to fulcrum over one of said movable parts, a flexible connection between the upper end of the shovel beam and one of the movable parts, means for moving the movable parts arranged and combined in such manner so

that the shovel beam is operated in a vertical space equivalent to its length and the length of the shovel.

7. In a machine of the class described, a
5 wheeled truck, a frame rotatably mounted on the truck, a tilting crane supported on said frame, means carried by said frame for tilting the crane, members movable longitudinally relative to the crane, a motor carried
10 by said movable members, a pulley carried by said movable members, a shaft carried by said movable members, a cross head carried by the crane and connected with said motor,

a shovel provided with a beam which fulcrums over the shaft carried by said movable members and a flexible connection between the upper end of said shovel beam and said cross head, which flexible member embraces said pulley. 15

In testimony whereof, I have signed my name to this specification, in presence of two subscribing witnesses. 20

CHARLES L. GLASS.

Witnesses:

C. H. WATKINS,
JOEL S. GOSS.