Oct. 25, 1932. A. HAUGE 1,884,672

MATERIAL HANDLING MECHANISM

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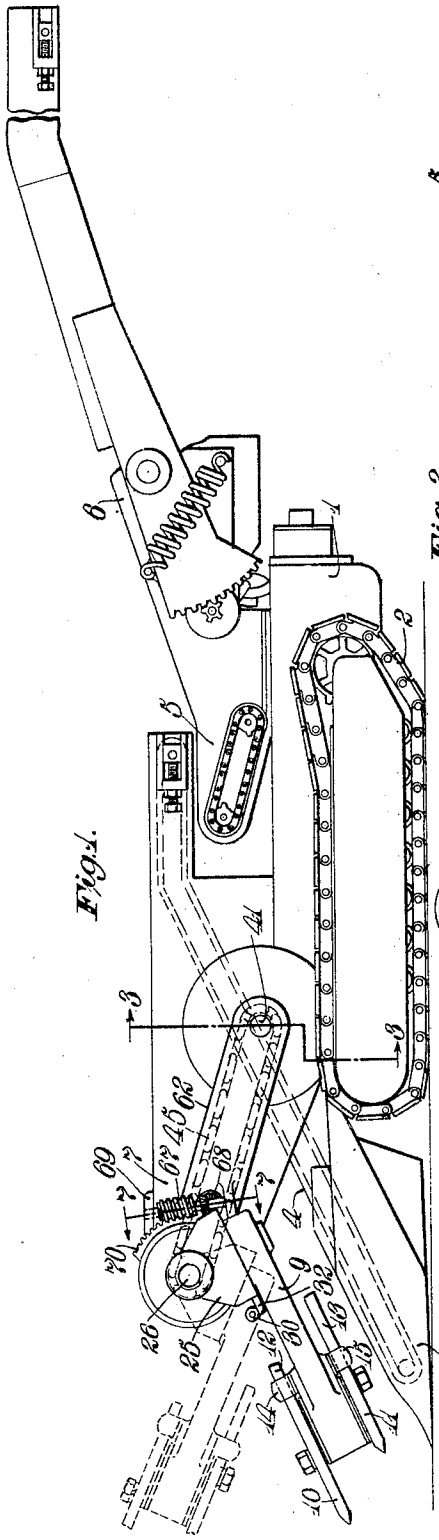


Fig. 1.

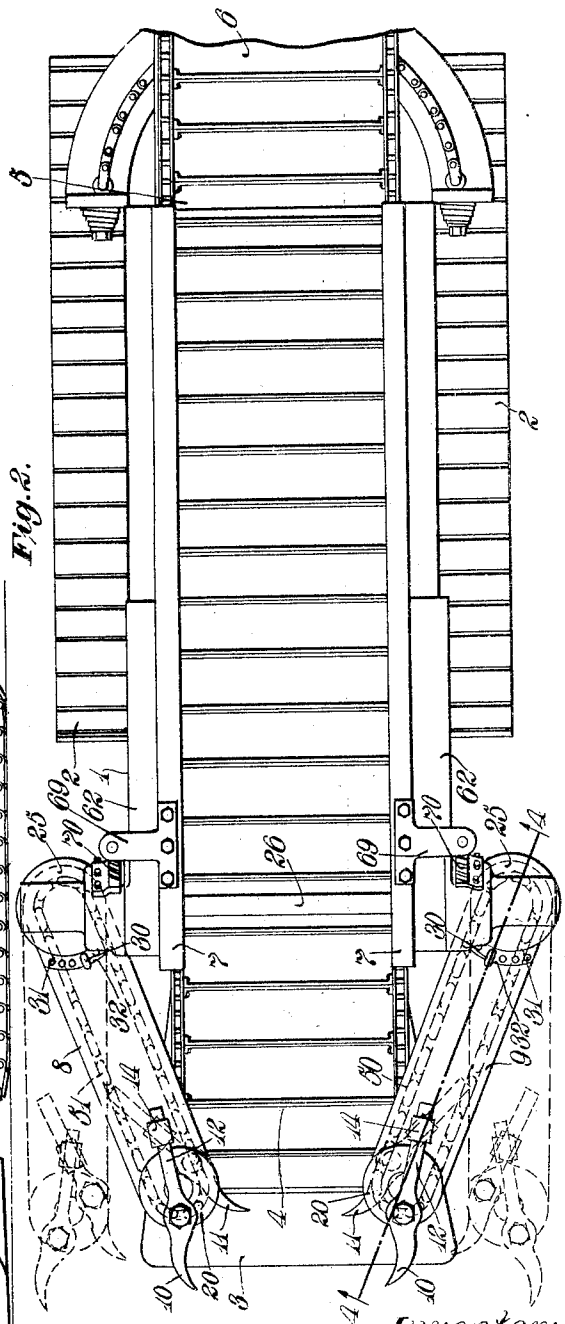


Fig. 2.

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Fig. 3.

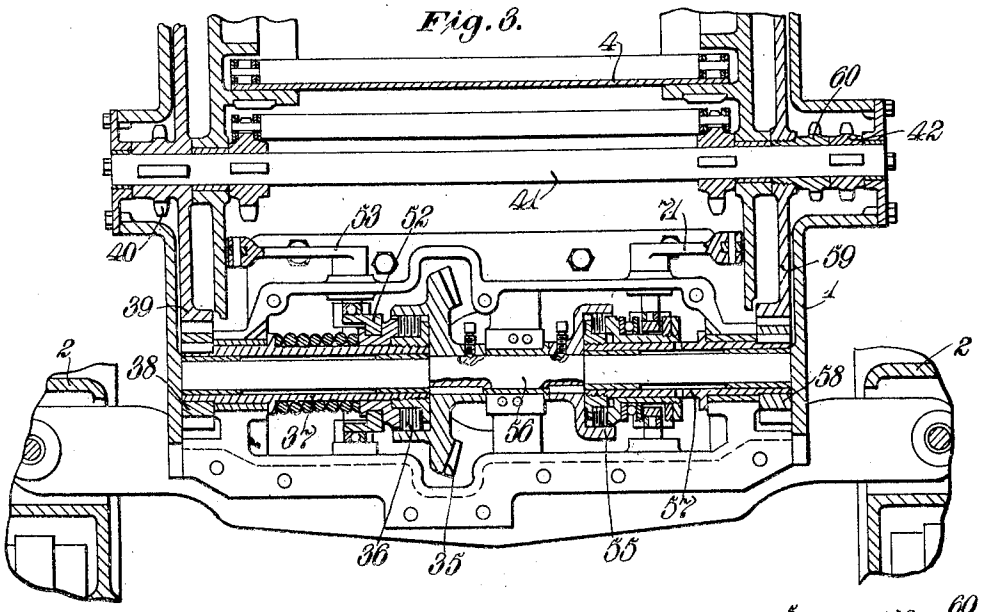
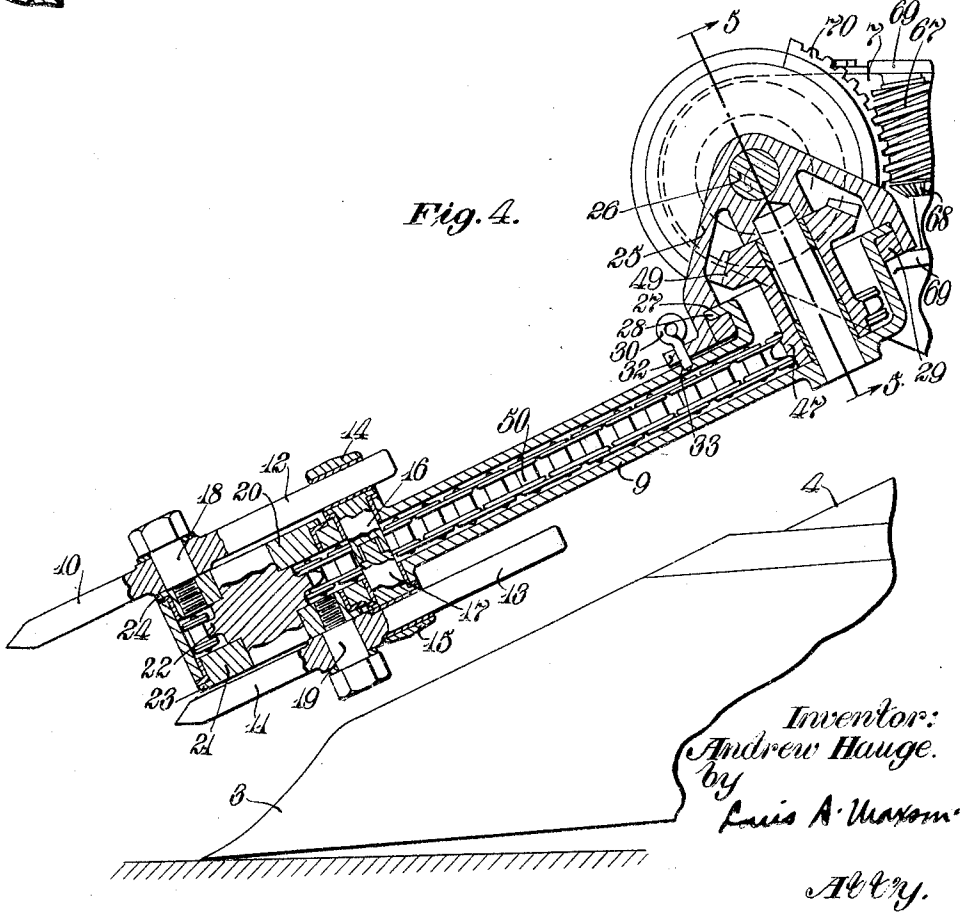


Fig. 4.



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MATERIAL HANDLING MECHANISM

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Fig. 5.

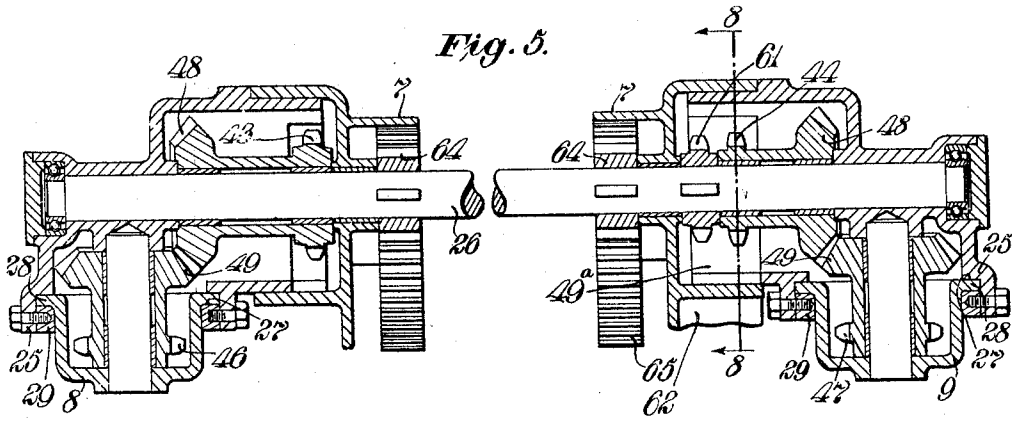


Fig. 6.

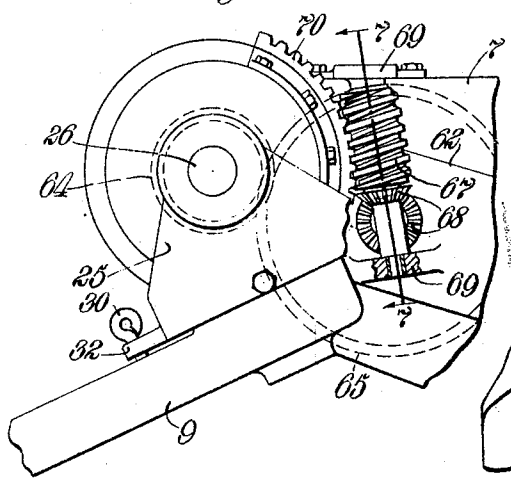


Fig. 7.

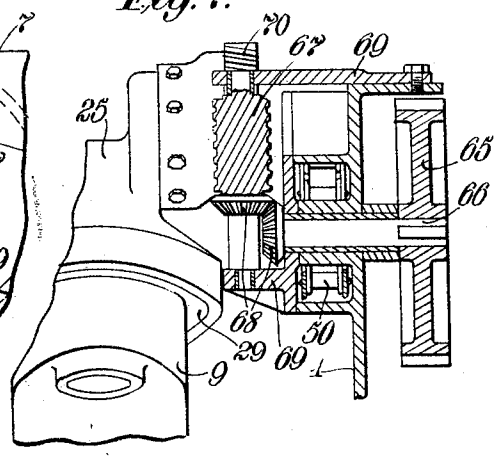
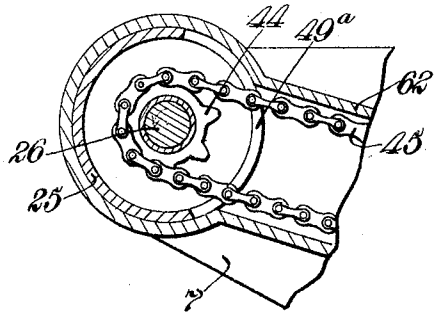


Fig. 8.



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Patented Oct. 25, 1932 1,884,672

UNITED STATES PATENT OFFICE

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MATERIAL HANDLING MECHANISM

Application filed April 21, 1930. Serial No. 445,987.

This invention relates to material handling mechanism and more particularly to improved means for gathering material for a loading machine or for otherwise suitably working material immediately in front of the loading machine whereby the material may be more effectively moved from the ground and onto the machine.

An object of my invention is to provide improved material engaging means adapted for cooperation with a loading machine or other suitable mechanism for conveying the material away from the material engaging means. A further object is to provide an improved so-called gathering head for a loading machine provided with a rearwardly moving conveying system. Another and more specific object of the invention is to provide improved laterally movable material engaging means. A further object is to provide improved gathering mechanism having a plurality of gathering units adapted for vertical adjustment relative to a shovel, and, if desired, also for lateral adjustment relative thereto. A further object is to provide an improved gathering unit or units having a plurality of material engaging elements disposed in superimposed planes. Other objects are to provide improved means for effectively adjusting the elevation of the gathering unit or units by power and of controlling the lateral position of the units, for effecting improved power operation of the gathering elements, and in general to provide an improved relation between a gathering head and the shovel portion of a loading machine with an improved structural arrangement for supporting the various elements whereby the various operations and functions heretofore or hereinafter mentioned may be performed.

Other objects and advantages will be more apparent to persons skilled in the art, and various modifications of my invention will also be apparent to such persons, from the following description of the accompanying drawings, in which,—

Fig. 1 is a side elevation of a coal loading machine equipped with the illustrative embodiment of the improved gathering mechanism;

Fig. 2 is a plan view thereof with the rear portion broken away;

Fig. 3 is a transverse vertical section taken substantially on line 3—3 of Fig. 1;

Fig. 4 is an enlarged vertical section through one of the gathering units and taken substantially on line 4—4 of Fig. 2;

Fig. 5 is an enlarged transverse section taken substantially on the line 5—5 of Fig. 4;

Fig. 6 is an enlarged fragmentary side elevation of the elevating and locking worm gear construction;

Fig. 7 is an enlarged fragmentary partial sectional view taken substantially on line 7—7 of Figs. 1 and 6; and

Fig. 8 is a detail sectional view taken on line 8—8 of Fig. 5.

While my improved arrangement is illustrated in connection with a well known type of loading machine it will of course be understood that the improved gathering mechanism may be used in cooperation with any type of loading machine for which it might be suited. The details of construction and operation of the loading machine herein illustrated are shown in the copending application of Frank A. Halleck, Serial No. 160,486, filed January 11, 1927, but as the details do not constitute a part of the present invention it will suffice to say that the loading machine comprises a suitable frame 1 mounted upon suitable transporting elements such as track laying treads 2, a shovel generally indicated at 3 and provided with a rearwardly moving chain conveyor 4 extending rearwardly and overlying the front portion 5 of a tiltable and laterally swingable tail conveyor 6. As is shown in Fig. 2, the shovel is relatively wide and adapted to be disposed substantially close to the ground or floor upon which the material to be loaded is disposed.

The loading machine frame has forwardly projecting side arms 7 carrying at their sides what are herein termed "gathering units" 8 and 9. Each of these units is provided with upper and lower material engaging elements 10 and 11 preferably in the form of picks and having rearwardly projecting

guiding stems 12 and 13 which project respectively through guiding blocks 14 and 15 mounted coaxially with each other and for pivotal movement as by stems 16 and 17 disposed in suitable bearings formed in the unit arms 8 or 9. The picks are pivotally supported intermediate their ends as by pins 18 and 19 respectively secured in rotating discs 20 and 21 which are keyed or otherwise suitably secured against axial displacement from hubs of, and for rotation with, sprockets 22. Each of the discs is provided with small flanges 23 and 24 overlying a portion of the unit arm, it being noted that each of the arms is hollow. The unit arms are pivotally supported both for lateral and vertical movement as by brackets 25 journaled upon a transverse shaft 26 and cylindrical bearings carried by the side arms 7 of the machine frame (Figs. 2 and 4). The lower portion of the bracket is provided with a circular bearing recess 27 in which is disposed a flange portion 28 of the unit arm, a suitable annular keeper ring or retaining member 29 being suitably held within this bearing recess so as to retain the arm in proper supported relation to the bracket 25 and at the same time permit lateral swinging of the arm. To hold the arm in any suitably laterally disposed position, a pin 30 extends through any one of a plurality of openings 31 formed in a flange 32 projecting outwardly from the bracket 25 and into a suitable recess 33 formed in the upper surface of the unit arm.

Inasmuch as both of the gathering units are identical with the exception that the picks are shaped to rotate toward each other, the above detailed description of one supporting arm and picks will suffice for the other arm also. It will of course be understood that while a plurality, specifically two, gathering units have been shown, if desired only one may be employed or under certain conditions of operation one or the other of the units may be disconnected and swung away from its operative position. To drive the sprocket 22 and thus cause the points of the picks 10 and 11 to move in a non-circular orbital path, power is transmitted from a suitable electric motor disposed with its axis longitudinally of the machine and carrying a bevel pinion meshing with and driving a bevel gear 35 from which power is adapted to be transmitted through a spring held releasable clutch 36, a sleeve 37, pinion 38 keyed thereto and meshing with gear 39 to drive a sprocket 40 and a shaft 41 keyed thereto, which shaft likewise drives a second sprocket 42. Sprockets 40 and 42 are connected (Fig. 5) to sprockets 43 and 44 as by chains 45 or other suitable power transmitting mechanism (Fig. 1), to drive sprockets 46 and 47 through a set of bevel gears 48 and 49 respectively (Figs. 4 and 5). It will herein be noted that the brackets 25 must be suitably slotted at 49[a] (Fig. 8) to permit the chain 45 to engage the sprockets within the brackets and to permit rotative movement of the brackets about the axis of shaft 26 relative thereto without interfering with the drive.

A chain 50 connects sprockets 47 and 22 of gathering unit 9 while a similar chain 51 connects the corresponding sprockets of gathering unit 8. It is thus seen that by controlling clutch 36 as by suitable shipping mechanism including a shipping collar 52 and lever 53, that the picks 10 and 11 may be continuously driven.

To raise or lower the gathering units 8 and 9 from the same source of power there is provided adjustable clutch 55 adapted to connect a shaft 56, to which the bevel gear 35 is connected, to a sleeve 57 carrying a gear 58 which drives a gear 59 secured to the hub of a sprocket 60 from which power is transmitted (Fig. 5) to sprocket 61, by a chain not shown but which is disposed within the same casing (Fig. 1) 62 containing the chain 45. The adjacent bracket 25 is also slotted to permit engagement of the chain with the sprocket 61 and to permit rotative movement of the bracket. The sprocket 61 drives the shaft 26 to which are secured pinions 64 meshing with and driving gears 65 (Figs. 5 and 7). Each gear 65 drives a shaft 66 offset to the rear of shaft 26 and this shaft in turn drives a worm 67 through a set of bevel gears 68. The worm and one of the bevel gears are carried by a shaft supported by brackets 69 rigidly secured to the side of the side arm 7 of the frame. The worms 67 mesh with worm gear segments 70 secured to the brackets 25 of the gathering units.

It is thus seen that by manipulating clutch 55 through a shipper arm 71 controlling the drive of the duplicate sets of worm and worm gear segments 67 and 70, one set of each of the gathering units 8 and 9, the latter may be raised or lowered to and held in any desired elevation; it being noted that the pitch of the worms is such as to provide a positive locking means for holding the gathering units as desired.

From the foregoing description it is seen that upon operation of the common driving motor, the two sets of gathering units after being raised and lowered to their desired elevation as by operation of the clutch 55, may then be operated by engaging clutch 36 thereby causing the upper and lower gathering elements of one unit to be moved in their paths toward the corresponding elements of the other gathering unit and vice versa. Also by adjusting the lateral position of each of the units either a symmetrical relation to the center line of the loader or any desired asymmetrical relation to the center line as might be desired is obtained, thereby providing a very effective and flexible arrangement whereby either loose material may be effec-

tively moved toward the shovel 3, or standing coal effectively attacked in such a manner as to break it down in very desirable large lumps. It is also seen that by the superimposed relation of the picks on each unit, if a large lump of coal or other material should tend to get away from one pick, the other pick immediately follows up so as to more positively insure that the lump of material will be pushed onto the shovel thereby reducing to a minimum what might be termed "slippage" between the picking elements and the material being gathered. By this double action the possibility of lump coal being broken is also reduced to a minimum. It will be noted as more clearly shown in Fig. 2, that the crank pins 18 and 19 for the picking elements are not disposed exactly 180° about, but are preferably disposed with a smaller angle between the pins. While the plurality of picking or material engaging elements for each arm is most effective it will of course be understood that if desired only one element may be used while obtaining the remaining advantages in connection with the ability to raise and lower the gathering arms or to swing the same laterally.

While there is in this application specifically described one form which this invention may assume in practice, it will be understood that this form of the same is shown for purposes of illustration and that the invention may be modified and embodied in various other forms without departing from its spirit or the scope of the appended claims.

What I claim as new and desire to secure by Letters Patent is:

1. In a loading machine, conveying means, and material gathering means associated with said conveying means for moving the material onto the conveying means including a pair of relatively movable material engaging picks swingably mounted at each side of the conveying means, the picks of each pair mounted to move in superimposed planes.

2. In a loading machine, conveying means, and material gathering means associated with said conveying means for moving the material onto the conveying means including a pair of relatively movable material engaging picks swingably mounted at each side of the conveying means to move in superimposed planes, said picks of each pair being so arranged that when one pick swings outwardly away from the conveying means the other pick simultaneously swings inwardly toward the conveying means.

3. In a loading machine, conveying means, and material gathering means associated with said conveying means for moving the material onto the conveying means including a pair of relatively movable material engaging picks swingably mounted at each side of the conveying means to move in superimposed planes, said picks of each pair being so arranged that when one pick swings outwardly away from the conveying means the other pick simultaneously swings inwardly toward the conveying means, two picks moving simultaneously inwardly toward the conveying means while the other two move simultaneously outwardly away from the conveying means.

4. In a loading machine, conveying means, and material gathering means associated with said conveying means for moving the material onto the conveying means including a pair of relatively movable material engaging picks swingably mounted at each side of the conveying means, the picks of each pair mounted to move in superimposed planes, and driving means for said picks including a pair of rotating discs at each side of the conveying means, one for each pick and on which the picks are swivelly mounted.

5. In a loading machine, conveying means, and material gathering means associated with said conveying means for moving the material onto the conveying means including a pair of relatively movable material engaging picks swingably mounted at each side of the conveying means, the picks of each pair mounted to move in superimposed planes, and driving means for said picks including a pair of rotating discs at each side of the conveying means, one for each pick and on which the picks are swivelly mounted, each pick having an integral guide bar and a swiveled guide block for slidably receiving said bar for guiding the pick during swinging movement thereof.

In testimony whereof I affix my signature.

ANDREW HAUGE.