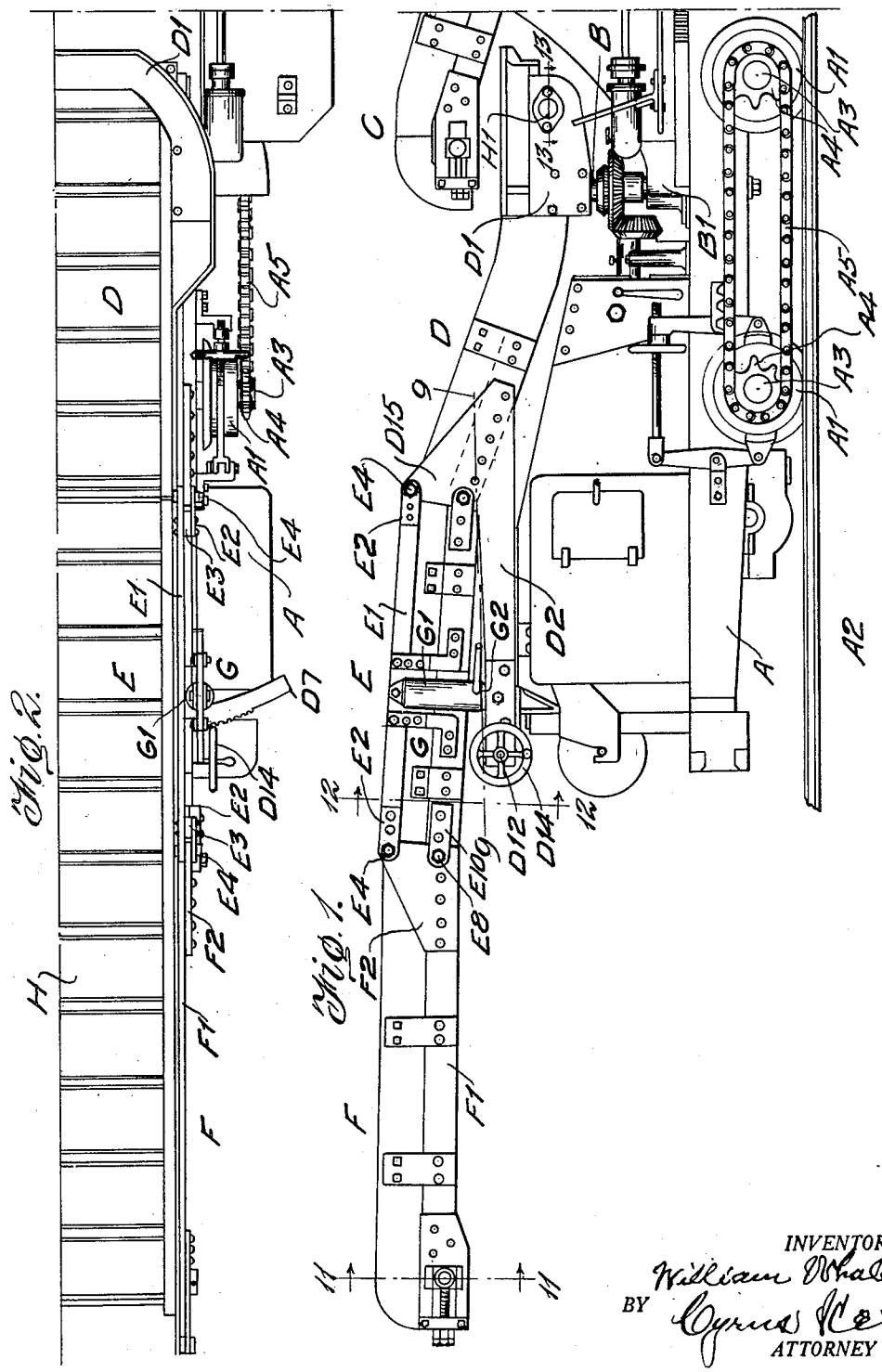
Jan. 5, 1932. W. WHALEY 1,839,625

CONVEYER FOR LOADING MACHINES

Filed Jan. 29 1930 4 Sheets-Sheet 1

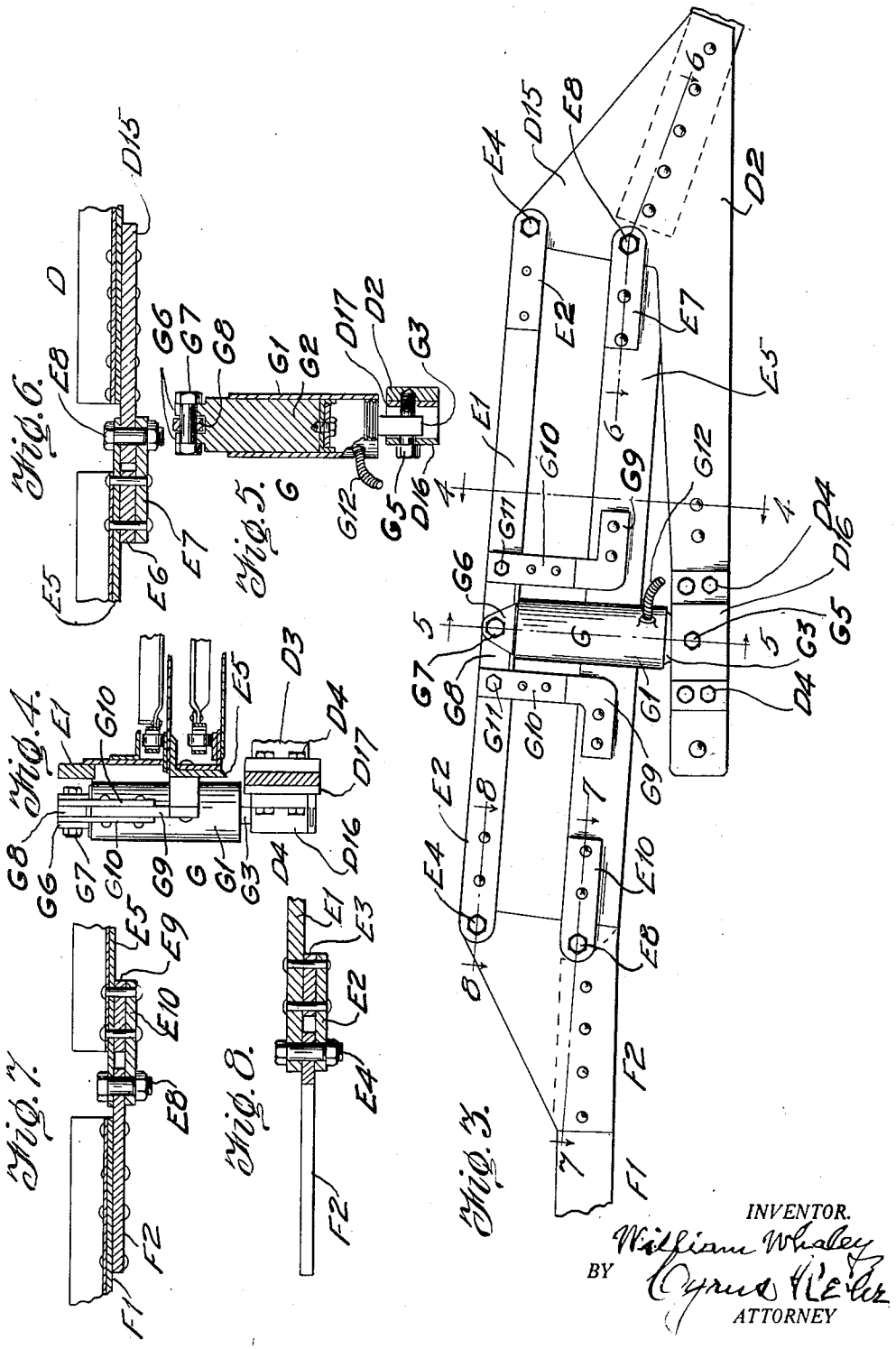


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CONVEYER FOR LOADING MACHINES

Filed Jan. 29 1930 4 Sheets-Sheet 2



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CONVEYER FOR LOADING MACHINES

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Fig. 9.

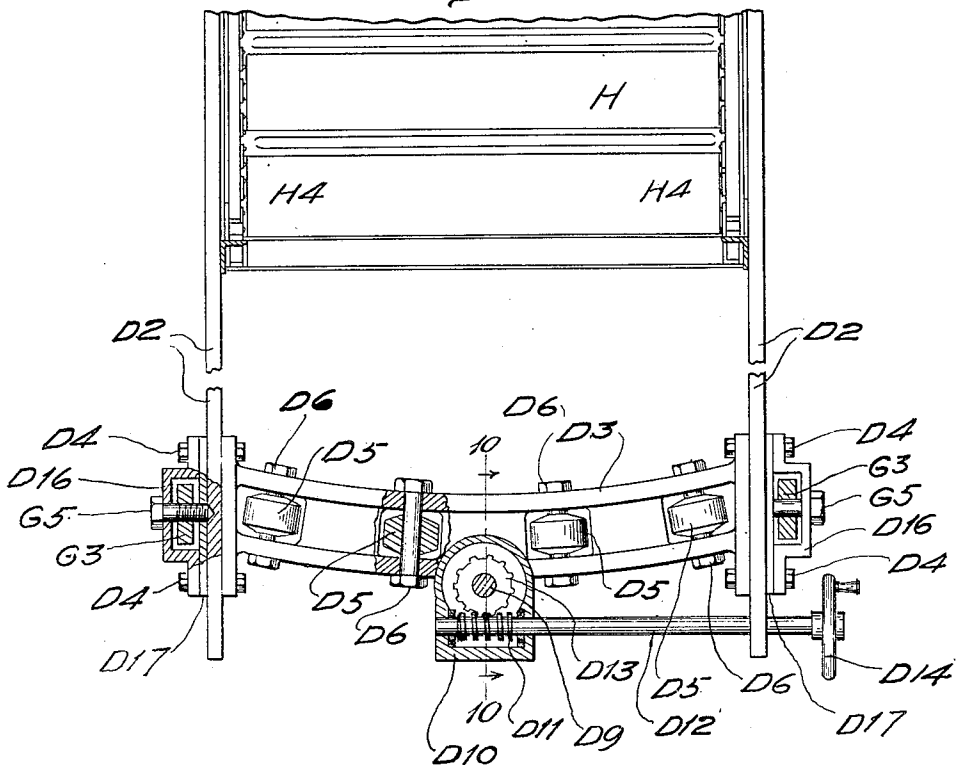


Fig. 11.

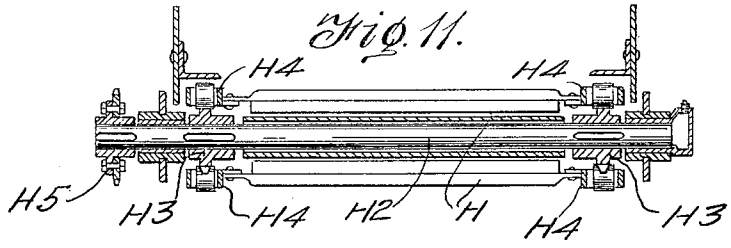
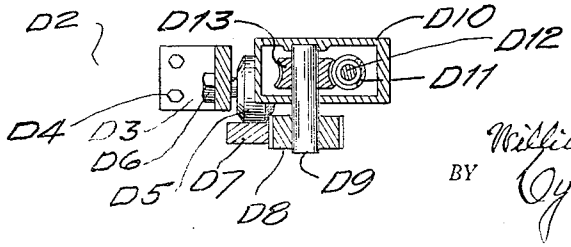


Fig. 10.



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Fig. 12.

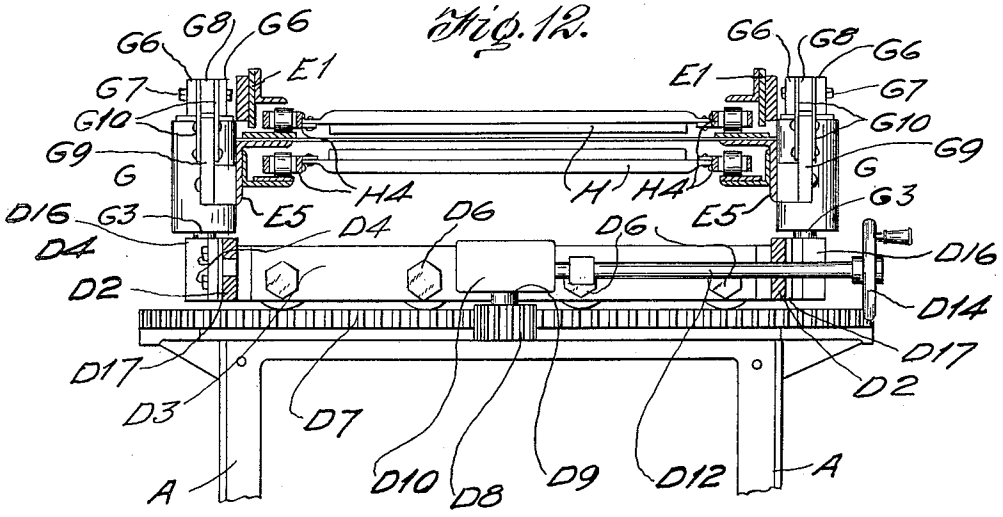
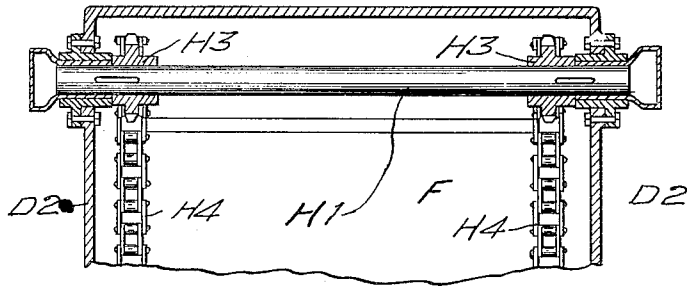


Fig. 13.



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UNITED STATES PATENT OFFICE

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CONVEYER FOR LOADING MACHINES

Application filed January 29, 1930. Serial No. 424,253.

This invention is intended especially to be applied to loading machines having at their forward end a shovel or any other means for gathering or lifting material, such as coal or ore or earth, and delivering said material to a conveyer to be carried by the conveyer rearward for discharge into a mine car or similar car or other vehicle suited to this purpose.

The object of this invention is to produce in such machines a conveyer structure which makes provision for adjustment of the rear conveyer as may be required by the height of the cars and as permitted by the head room in the mine.

Heretofore the forward part of the rear conveyer structure has been hinged on a horizontal transverse axis on which all of the conveyer rearward of that axis could turn for raising or lowering the discharge end of the conveyer. That means of adjustment has limitation. Said hinge line is necessarily low, because in most cases the over-all height of the entire machine must be low. If the rear part of the conveyer is hinged on a line low enough to meet such height requirement, the rear part of the over-hang of the conveyer may be too low to allow the car to be placed under said part, unless the hinged part of the conveyer is turned upward. But for that the head room must be taken into account.

My improvement permits raising and lowering the part of the conveyer which is to be above the car, without putting that part of the conveyer into inclined or tilted position. On the contrary, my improvement permits placing the over-hung part of the conveyer into the horizontal or approximately horizontal position and so holding it during up and down adjustment. This allows adjusting the over-hung part of the conveyer to receive a car under that part of the conveyer with a minimum space between the car and the mine roof or over-head mine timbering.

To this end, my improved conveyer structure constitutes a combination including parallel link elements and lifting means, as will be described further on.

In the accompanying drawings,

Fig. 1 is an elevation of the right hand side of the rear part of a loading machine embodying my improvement, the full length of the rear conveyer and the rear end of the forward conveyer being included;

Fig. 2 is a plan of the right hand half of the part of the machine shown by Fig. 1;

Fig. 3 is a detail side elevation of the part or section of the rear conveyer in which the parallel link mechanism is applied, that conveyer section being the middle section of the rear conveyer as shown in Fig. 1;

Fig. 4 is an upright, transverse section on the line, 4—4, of Fig. 3, looking toward the left;

Fig. 5 is an upright, transverse section on the line, 5—5, of Fig. 3, looking toward the right;

Fig. 6 is a horizontal section on the line, 6—6, of Fig. 3;

Fig. 7 is a horizontal section on the line, 7—7, of Fig. 3;

Fig 8 is a horizontal section on the line, 8—8, of Fig. 3;

Fig. 9 is a horizontal section on the line, 9—9, of Fig. 1;

Fig 10 is an upright section on the line, 10—10, of Fig 9, looking in the direction of the arrows;

Fig. 11 is an upright transverse section on the line, 11—11, of Fig. 1, looking toward the right;

Fig. 12 is an upright, transverse section on the line, 12—12, of Fig. 1, looking toward the right;

Fig 13 is a horizontal section on the line, 13—13, of Fig. 1.

Referring to Figs. 1 and 2 of the drawings, A is the body of the loading machine to which my improved conveyer is applied. A1, A1 are track wheels supporting the machine on track rails, A2. A3 are axles supported by the wheels. A4 are sprocket wheels fixed on the axles. A5 is a sprocket chain applied to the sprocket wheels, A4, for transmission of motion from the rear (left hand) axle to the forward axle, it being understood that a motor (not shown) transmits motion to the rear axle.

The rear conveyer comprises three sections coupled to each other—a forward section, D, a middle section, E, and a rear section, F.

The material carried by the conveyer is discharged from the rear section, F. Therefore we may call this the "discharge" section. The forward end, D1, of the section, D, receives material from the rear end, C, of the forward conveyer. Only said rear end is shown in Fig. 1 of the drawings. The forward end, D1, of the forward section, D, is supported and pivoted, in any suitable manner on an upright shaft, B, supported in a bearing, B1, on the body of the machine.

A bridge casting, D3, (Figs. 9 and 10) curved concentric with the shaft, B, is placed between the arms, D2, of the section, D, near the rear ends of said arms and secured to said arms by horizontal bolts, D4, extending through the arms. In said bridge pieces are rollers, D5, supported on horizontal bolts, D6, which are radial to said shaft, B. Said rollers rest on a horizontal gear segment or rack, D7, located under the bridge piece, D3, concentric with the shaft, B, and supported on the main frame, A. (Figs. 11 and 12). The gear segment or rack has at its rear edge gear teeth meshing with a gear pinion, D8, fixed on a shaft, D9, which is supported in a housing, D10, which also supports a horizontal shaft, D12. On said shaft, D12, within said housing is fixed a gear worm, D11, which engages the worm wheel, D13, fixed on the upper part of the shaft, D9. The shaft, D12, extends rightward through the right hand arm, D2, and at its outer end supports a hand wheel, D14, the turning of which by the operator causes the gear worm to turn the worm wheel and the shaft, D9, and the pinion, D8, which causes lateral travel of said pinion on the stationary gear segment, D7, whereby the arms, D2, and the receiving conveyer section, D, of the rear conveyer are turned sidewise with the upright shaft, B, as an axis. The sections, E and F, of the rear conveyer are supported by the section, D, and therefore moved in unison with the section, D, during its sidewise movements.

The forward section, D, has only the aforesaid sidewise movement. As already stated, the sections, E and F, are carried by and moved sidewise in unison with the section, D. The sections, E and F, also have upright movement, the section, E, tilting and the section, F, being carried bodily upward and downward in parallel movement, preferably in horizontal position.

To thus support the discharge section, F, the section, E, is made a parallel link or bar structure. The forward end of each arm, D2, has an upward extension, D15. At each side of the conveyer a bar or link, E1, has its forward end applied to the inner face of said extension, D15, and has its rear end applied to the inner face of the upper part of a plate, F2, which is riveted or bolted to the side plate, F1, of the section, F. On the outer face of the forward end of the link or bar, E1, and immediately at the rear of the extension, D15, is a spacing block, E3, to the outer face of which is applied a tongue, E2, which overlaps the extension, D15. Said tongue and said spacing block are riveted to the link, E1. A bolt E4, extends horizontally through said tongue, E2, and extension, D15, and the link or bar, E1. Thus a horizontal joint is made for the forward end of each link or bar, E1.

The rear end of each link or bar, E1, is applied to the inner face of the plate, F2, and a spacing block, E3, is applied to the outer face of said link or bar immediately in front of the plate, F2, and a tongue, E2, is applied to said spacing block and extends over the outer face of the adjacent part of the plate, F1. Said tongue, E2, and spacing block, E3, are riveted to the link, E1. A bolt, E4, extends horizontally through said tongue and the plate F2, and the link or bar, E1. Thus a horizontal hinge joint is formed at the rear end of each link or bar, E1.

Below and parallel to each link, E1, is a link, E5, the forward end of which overlaps the inner face of the extension, D15. To the outer face of said link and immediately at the rear of the extension, D15, a spacing block, E6, is applied to the outer face of the link, E5, and a tongue, E7, is applied to the outer face of the spacing block and made to overlap the outer face of the section, D15. Said tongue and the spacing block are riveted to the lower link, E5. A bolt, E8, extends horizontally through said tongue and the extension, F2, and the link, E5. Thus horizontal, forward joints are formed for the links, E5. The rear end of each link, E5, overlaps the lower part of the inner face of the plate, F2. A spacing block, E9, is applied to the outer face of the link, E5, immediately forward of the plate, F2. A tongue, E10, is applied to the outer face of the block, F9, and made to overlap the outer face of the plate, F2. The spacing block, E9, and the tongue, E10, are riveted to the link, E5. A bolt, E8, extends horizontally through said tongue and plate F2, and the adjacent end of the link, E5. Thus joints are formed for the rear ends of the links, E5. The forward hinges are in an approximately upright plane, and that plane is parallel to the plane of the rear hinges.

It will now be seen that the links, E1 and E5, are supported on the rear part of the forward section, D, which, as above stated, has no up-and-down movement. Therefore the forward hinges or couplings of the links, E1 and E5, are fixed. Since the upright or approximately upright planes of the forward hinges or couplings and the rear couplings are parallel to each other, upward or downward movement of said links by turning on the forward couplings will cause the rearward couplings to at all times be in a plane parallel to the plane of the forward couplings. Consequently the plates, F2, and the

section, F maintain a fixed relation to the plane of the rear couplings and the plane of the forward couplings of the links or bars. That means that the section, F, is carried upward or downward without changing relation to a horizontal plane. If said section, F, is originally put into the horizontal position, that position is maintained when said section is carried upward or downward by the parallel link section, E. Thus a car may be placed close to the rear end of the body, A, of the machine and the section, F, placed over the car in the horizontal or approximately horizontal position and at such height above said car as the mine roof or timbering above the section, F, will permit. Thus the space between the mine roof and the top of the loaded car need be only as much as will receive the section, F, when in the horizontal position. It is obvious that, if the discharge section, F, were tilted, that space would have to be larger. In other words, when the head room is low, the discharge section can not be tilted. Hence the importance of the parallel link section which serves to maintain the discharge section in the horizontal.

For raising or lowering the rear or discharge section, F, the parallel link section, E, is to be tilted by any desired means. That is preferably done by means supported on the rear part of the forward section, D, and engaging the section, E. For this purpose, the drawings show a pair of hydraulic motors, one such motor being located at each side of the section, E, and supported on the adjacent arm, D2, of the section, D. Referring to Figs. 1, 2, 3, 4, 5 and 12, G is one of said motors. G1 is an upright cylinder closed below and surrounding a piston, G2. On the lower end of the cylinder is a stem, G3, extending downward into the spaces between the bracket, D16, and a plate, D17, which is secured against the outer face of the adjacent arm, D2. Said bracket and said plate are secured to the arm, D2, by means of the bolts, D4, already described as serving to join the bridge member, D3, to the arms, D2. A bolt, G5, extends through said bracket, D16, and said stem, G3, and the plate, D17, into the adjacent arm, D2.

The upper end of the piston, G2, has a pair of upright lugs, G6. A horizontal yoke, G8, lies between said lugs. A bolt, G7, extends horizontally through said lugs and said yoke and is loose in said lugs or said yoke, or both, to permit rocking of said yoke on said bolt. At the front and at the rear of the motor, a bracket, G9, rises from the adjacent lower link, E5, in the upright plane of the yoke, G8. At each side of the upright part of said bracket is a plate, G10, riveted to said stem and overlapping the sides of the yoke, G8. A bolt, G11, extends horizontally through the plates, G10, and the yoke, G8.

It is to be observed that the motor is free from the upper link or bar, E1. (See Fig. 4.) The motor exerts lifting strain on only the lower links, E5. That is done through the yoke, G8, and the brackets, G9.

An inlet pipe, G12, on the lower part of the cylinder, G1, admits fluid under pressure into the cylinder below the piston, G2. Said pipe is connected with a source of fluid under variable pressure controlled by the operator of the machine. Such controlling means being already known, I deem it unnecessary to herein illustrate and describe the same. When the piston has been moved to raise or lower the discharge section, F, of the rear conveyer into the desired position, the controlling means is to hold the fluid used for supporting and moving the piston, G2. Thereby the link section, E, and the discharge section, F, will be held at the elevation then attained. The fluid used in these motors may be any form of gas or liquid, preferably liquid, because that is substantially incompressible. The controlling mechanism may be placed convenient to the operator of the machine, it being assumed that at the operator's seat or platform there will also be means for controlling the power used for driving the machine forward or backward and for operating the gathering mechanism at the front of the machine. Such power mechanisms forming no part of my present invention, they are therefore not herein illustrated and described.

It is to be understood that power means other than the hydraulic means above described may be substituted for the hydraulic means. It is also to be understood that manually-actuated means may be used for raising and lowering the link section, E.

An endless apron, H, is supported on the rear conveyer structure. (See Figs. 1, 2, 4, 11, 12 and 13.) Figs. 1 and 13 show the horizontal apron supporting shaft, H1, at the forward end of the forward section, D. Fig. 11 shows a similar shaft, H2, at the rear end of the discharge section, F. On the shaft, H1, are fixed sprocket wheels, H3, which receive the endless chains, H4, of the apron. On the shaft, H2, of Fig. 11, are fixed similar sprocket wheels, H3, which support said chains, H4. A sprocket wheel, H5, is fixed on the extended end of the shaft, H2, of Fig. 11 and receives motion from a source of power through a sprocket chain (not shown) for driving the shaft, H2, and the apron, H. It is to be understood that between the shafts, H1 and H2, the apron, H, is suitably supported on the sections, D, E and F.

I claim as my invention,

1. In a portable loading machine, a conveyer structure leading from the body of the machine, said conveyer structure including an approximately horizontal discharge section and a parallel link section supporting the discharge section, the parallel link section comprising links lying in superposed

approximately horizontal planes and hinged on parallel axes to the body and to the discharge section.

2. In a portable loading machine, a conveyer structure leading from the body of the machine, said conveyer structure including an approximately horizontal discharge section and a parallel link section supporting the discharge section, the parallel link section comprising links lying in superposed approximately horizontal planes and hinged on parallel axes to the body and to the discharge section, and means for applying lifting power to one of said sections.

3. In a portable loading machine, a conveyer structure leading from the body of the machine, said conveyer structure including an approximately horizontal discharge section and a parallel link section supporting the discharge section, the parallel link section comprising links lying in superposed approximately horizontal planes and hinged on parallel axes to the body and to the discharge section, and means for applying lifting power to the parallel link section.

4. In a portable loading machine, a conveyer structure leading from the body of the machine, said conveyer structure including an approximately horizontal discharge section and a parallel link section comprising links lying in superposed approximately horizontal planes and in operative relation with the discharge section for supporting the discharge section at different elevations in approximately the horizontal position, means for applying lifting power to one of said sections, and a laterally movable section supporting said parallel link section.

5. In a portable loading machine, a conveyer structure leading from the body of the machine, said conveyer structure including an approximately horizontal discharge section and a second section in operative relation with the discharge section for supporting the discharge section at different elevations in approximately the horizontal position and a third section laterally movable and having rearward-extended arms supported by the body of the machine, the forward end of the second section being coupled to the rear part of the third section, means in operative relation with said arms and the body of the machine for moving the rear end of said third section laterally, and means supported by the third section for turning the second section on the coupling by which said section is joined to the third section.

6. In a portable loading machine, a conveyer structure leading from the body of the machine, said conveyer structure including an approximately horizontal discharge section and a second section in operative relation with the discharge section for supporting the discharge section at different elevations in approximately the horizontal position and a third section laterally movable and having rearward-extended arms, the forward end of the second section being coupled to the rear part of the third section, and means supported by said arms for turning the second section on the coupling by which said section is joined to the third section.

7. In a portable loading machine, a conveyer structure leading from the body of the machine, said conveyer structure including an approximately horizontal discharge section and a parallel link section having links at each side of the conveyer, and lifting means at each side of said link section and engaging an adjacent link for lifting and supporting said section.

8. In a portable loading machine, a conveyer structure leading from the body of the machine, said conveyer structure including an approximately horizontal discharge section and a parallel link section having links at each side of the conveyer, and hydraulic lifting means at each side of said link section and engaging an adjacent link for lifting and supporting said section.

9. In a loading machine, a conveyer structure leading from the body of the machine and comprising a discharge section and a middle section and a forward section, the middle section comprised of relatively movable elements and having their rear ends coupled to the forward end of the discharge section on horizontal axes lying in an upright transverse plane, and said middle section having the forward ends of its elements coupled to the rear part of the forward section on horizontal axes which lie in a plane approximately parallel to the aforesaid plane, and means for effecting the turning of the elements of the middle section on the last-mentioned axes.

10. In a loading machine, a conveyer structure leading from the body of the machine and comprising a discharge section and a second section comprised of relatively movable elements and having their rear ends coupled to the forward end of the discharge section on horizontal axes lying in an upright transverse plane, and said second section having the forward ends of its elements coupled to another part of the machine on two horizontal axes which lie in a plane which is substantially parallel to the aforesaid plane, and means for effecting the turning of the elements of the second section on the last-mentioned axes.

11. In a loading machine, a conveyer structure leading from the body of the machine and comprising a discharge section and a second section comprised of relatively movable elements and having their rear ends coupled to the forward end of the discharge section on horizontal axes lying in an upright transverse plane, and said second section having the forward ends of its elements cou-

pled to a laterally adjustable part of the machine on two horizontal axes which lie in a plane which is substantially parallel to the aforesaid plane, and means for effecting the turning of the elements of the second section on the last-mentioned axes.

In testimony whereof I have signed my name, this 24th day of January, in the year one thousand nine hundred and thirty.

WILLIAM WHALEY.