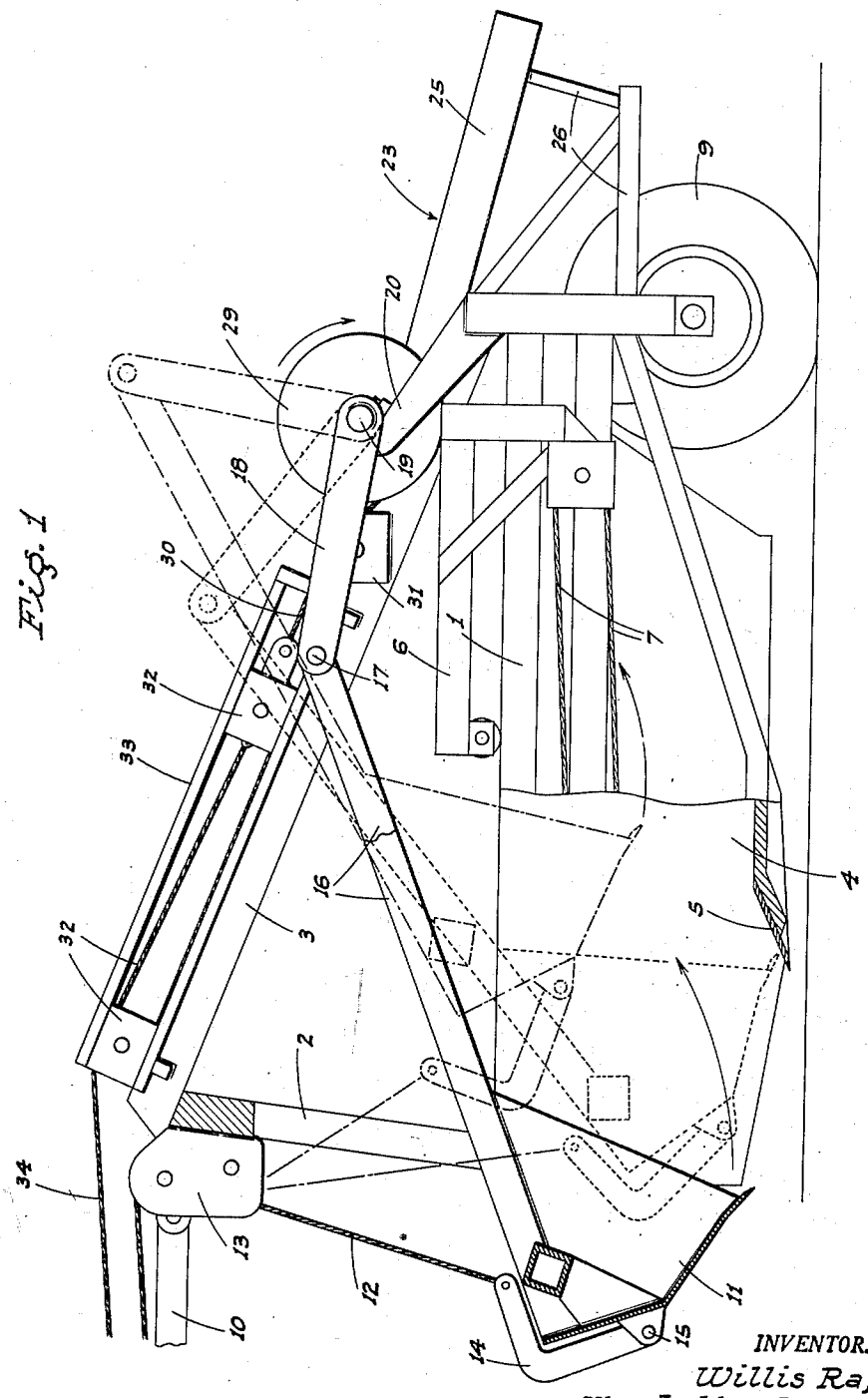
Jan. 9, 1951 W. RAPP ET AL 2,537,910

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Fig. 1



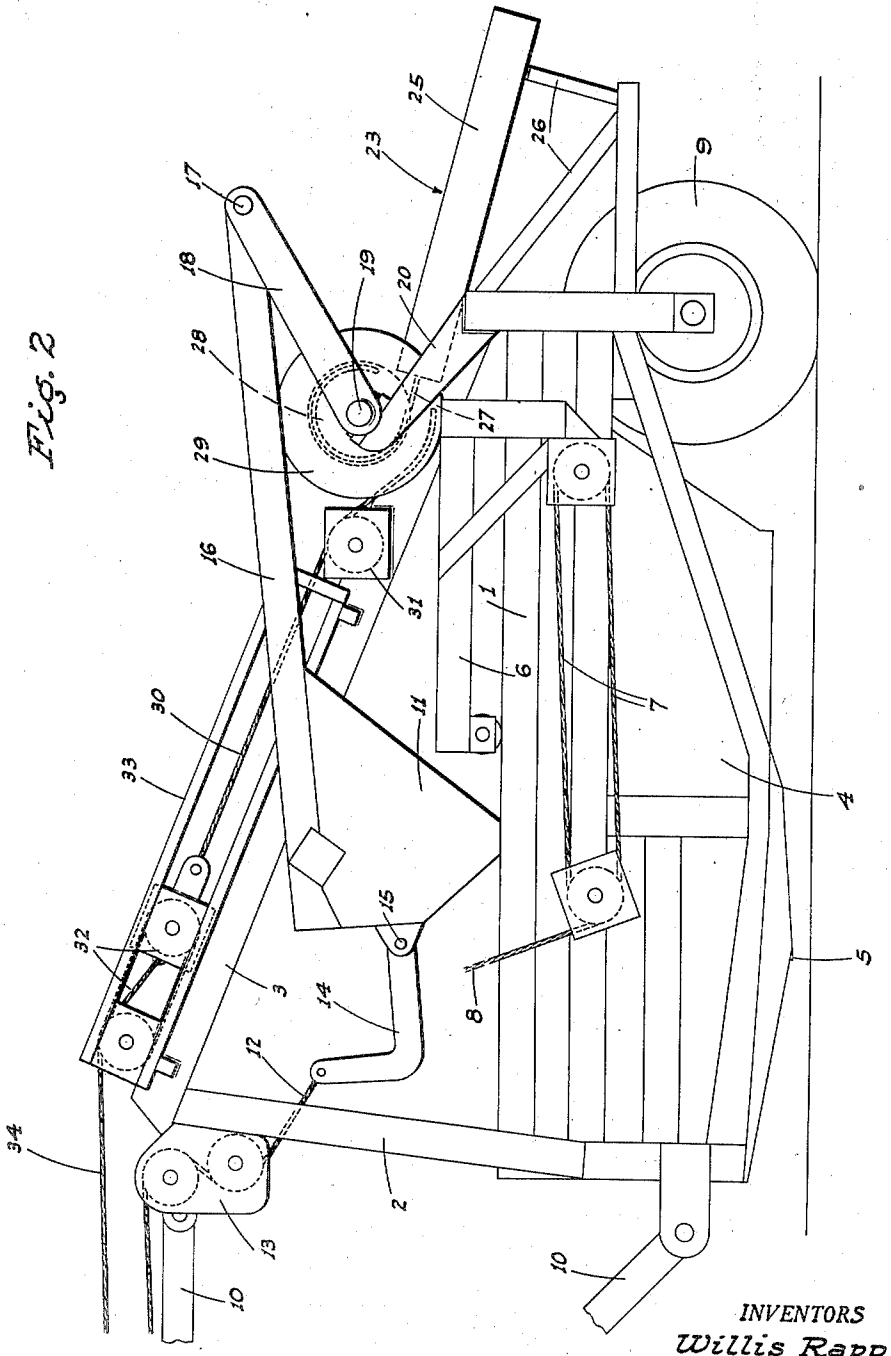
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Fig. 2



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Fig. 3

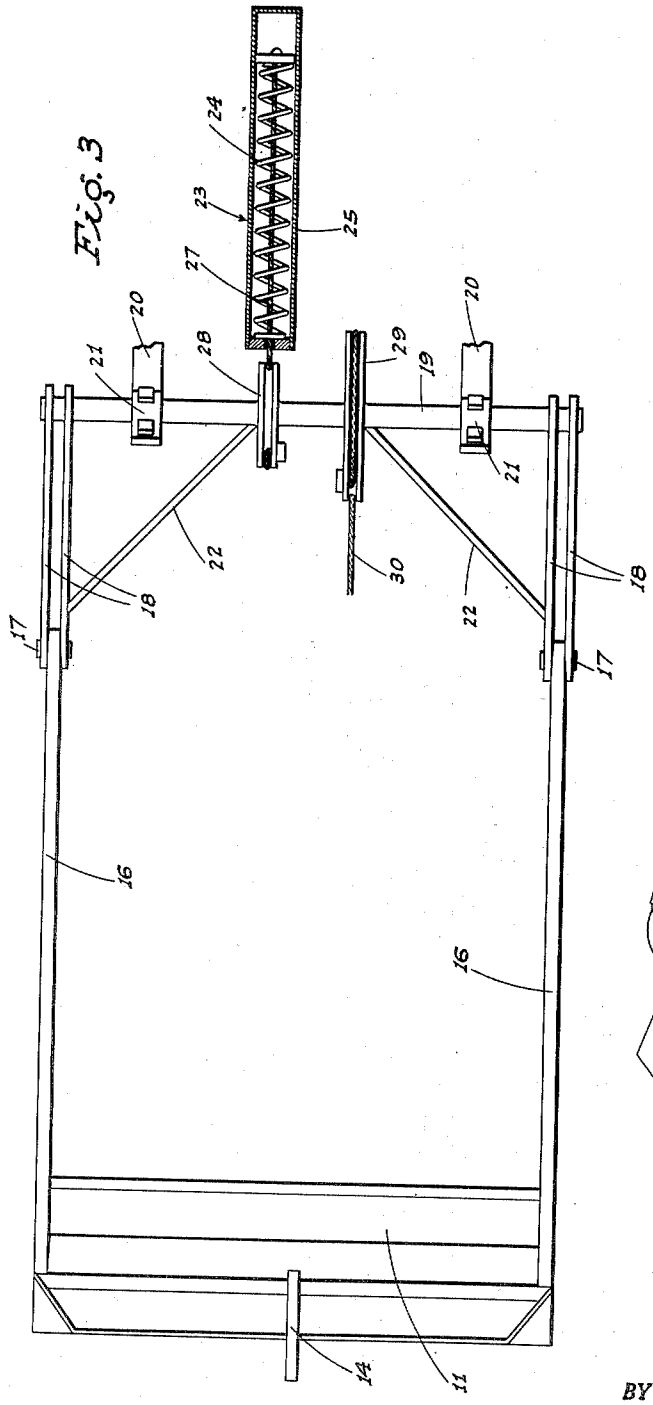
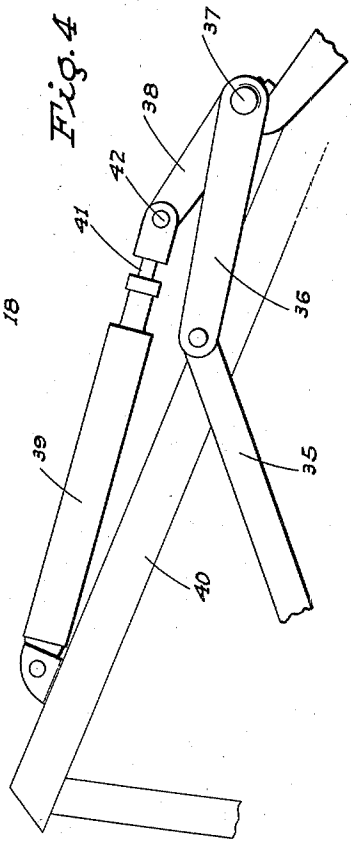


Fig. 4



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LOADING APRON FOR SCRAPERS

Willis Rapp and Julian D. Rapp, Turlock, Calif.

Application August 12, 1946, Serial No. 690,010

11 Claims. (Cl. 37—126)

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This invention relates in general to improvements in an earth working scraper of the carry-type which includes a forwardly opening bowl having a digging blade at its front lower edge, and a vertically movable apron disposed in vertically adjustable cooperative relation to said blade and the bowl at its forward end, the apron being closed to retain the load for carrying, and at selective open positions for loading or unloading of the bowl.

It is the purpose of this invention to provide the apron with a further function; to-wit to assist in loading the bowl, and this is accomplished by mounting the apron for powered retraction toward and into the bowl from an advanced position. In other words, the apron is mounted and actuated so that a rearward hoeing action can be imparted thereto. In this manner the bowl can be loaded with greater facility than otherwise, and a full load introduced into the bowl without the use of a pusher tractor, as now commonly used to assist the lead tractor in loading the scraper.

The invention has as a further object the provision of novel mounting and actuating mechanism for the apron so as to accomplish the action described in the previous paragraph; such mechanism including a power operated cross shaft on the scraper frame rearwardly of the apron, cranks on opposite ends of the shafts, and side arms connecting between the cranks and adjacent ends of the apron; the latter being flexibly, and vertically adjustably, suspended from the scraper frame.

A further object of the invention is to provide a practical loading apron for scrapers, and one which will be exceedingly effective for the purpose for which it is designed.

These objects are accomplished by means of such structure and relative arrangement of parts as will fully appear by a perusal of the following specification and claims.

In the drawings:

Fig. 1 is a side elevation, partly in section, showing the invention as embodied in a carry-type, earth working scraper; the apron being shown, in full lines, in its advanced position. In this figure the apron is shown in its closed position in dotted lines, and in partially retracted position in broken lines.

Fig. 2 is a similar view, but shows the apron in its fully retracted position.

Fig. 3 is a plan view of the apron and its mounting and actuating mechanism, detached.

Fig. 4 is a fragmentary side elevation illustrating a modified form of the actuating mechanism.

Referring now more particularly to the characters of reference on the drawings, and at present to Figs. 1–3, inclusive, the invention is here shown as embodied in a carry-type, earth working scraper having a main frame, indicated generally at 1, which main frame includes, at the front, a forwardly opening arch 2. A longitudinal stabilizing beam 3 connects between the top

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of the arch and the rear end portion of the main frame; said beam 3 being disposed at a rearward and downward slope.

The main frame 1 supports an earth carrying bowl 4, which is open at its forward end, and provided at its forward lower edge with a transversely extending digging blade 5. As is customary in this type of scraper, it is provided with a rear endgate unit, shown in part at 6; such unit including a push-out gate normally disposed in the rear of the bowl, but movable forwardly therethrough to discharge the load over the digging blade 5. The rear endgate unit is adapted to be advanced by a cable system 7, including a pull reach 8, which in use is reeved forwardly to the tractor and connected to one drum of the power winch (not shown) thereon.

The scraper is supported, adjacent its rear end, by a pair of transversely spaced rear wheels 9, and is provided, at the forward end, with a hitch unit, shown in part at 10, adapted for coupling to a tractor. In the type of scraper shown, the hitch unit 10 is preferably wheel-supported, and includes the means by which the scraper is raised or lowered.

The apron assembly of the scraper embodies the invention, and comprises the following:

A transversely extending apron 11 is normally disposed in cooperative relation to the forward or open end of the bowl 4; said apron being flexibly suspended, centrally of its ends, from the top of the arch 2 by means of a cable 12 which extends upwardly over a direction changing sheave unit 13, and thence extends forwardly to connection with another drum of the power winch on the tractor. At its lower end the cable 12 is connected to the apron by means of an L-shaped link 14. The cable 12 connects to one end of said link, while the other end is pivoted, as at 15, to the apron at the front of the latter; the link extending upwardly with one leg projecting rearwardly in overhanging relation to the apron when the latter is advanced, as in Fig. 1, but projecting forwardly from the apron when the latter is retracted, as in Fig. 2.

The apron includes a pair of rigid, transversely spaced side arms 16 which extend rearwardly therefrom in parallel longitudinal planes disposed inwardly of corresponding legs of arch 2.

At their rear ends the side arms 16 are pivotally connected, as at 17, with the outer ends of a pair of corresponding cranks 18 fixed on a cross shaft 19 journaled atop the main frame 1 by means including shaft supporting beams 20 and bearings 21 carried by the latter.

Diagonal braces 22 extend between the cross shaft 19 and the cranks 18, whereby to prevent lateral deflection of said cranks.

The cranks 18 are normally maintained in a forwardly projecting position, as shown in Fig. 1, by means of a spring motor, indicated generally at 23, connected to the cross shaft 19 and comprising:

A compression spring 24 is housed in a longi-

tudinally extending tube 25 mounted in connection with the main frame 1 at the rear thereof and rearwardly of the cross shaft 19 on a supporting frame 26. The spring 24 is loaded, and connected to a cable 27 in a manner pulling rearwardly on said cable; the forward end portion of the latter being wound about a pulley 28 fixed on the cross shaft 19. With the cranks 18 in their normal forwardly projecting position, the apron 11 is advanced, and by reason of its mounting and suspension may be vertically adjusted at the will of the tractor operator.

Also, through the medium of the hereinafter described actuating mechanism, the apron 11 can be actuated to move through a longitudinal path to retract said apron from its advanced position in front of the bowl rearwardly into the bowl a substantial distance. Such mechanism comprises:

A relatively large-diameter pulley 29 is fixed on the cross shaft 19 adjacent the pulley 28, and a cable 30 is fixed to and wound about said pulley 29 in reverse direction to the winding of cable 27 on pulley 26. The cable 30 leads forwardly over a direction-changing sheave 31 and connects to the movable block of a block and tackle system 32, which movable block runs in a longitudinal guideway 33 mounted on the longitudinal stabilizing beam 3. The block and tackle system 32 includes a forwardly extending pull reach 34, which is adapted to lead to and connect with a separate drum of the power winch on the tractor.

It will be seen that upon forward motion of the pull reach 34, the block and tackle system 32 will shorten, pulling on the cable 30, and which causes the pulley 29 to rotate in a clockwise direction, swinging the cranks 18 upwardly and rearwardly. When this occurs the side arms 16 move in a rearward longitudinal path, retracting the apron 11. As the apron 11 is flexibly suspended by the cable 12, the operator can selectively and independently control the elevation of said apron at any point in its path of longitudinal movement. With the described arrangement a hoeing action can be imparted to the apron 11, whereby to scoop dirt from in front of the digging blade 5 rearwardly into the bowl 4, and after such hoeing action, and upon relief of the pull reach 34, the spring motor 23 acts to advance the apron to its advanced or starting point.

For carrying and unloading operations the apron 11 may be used in a substantially conventional manner, i. e. closed relative to the digging blade 5 when the bowl is in carrying position, and opened relative to said blade when the loading is being discharged from the bowl by the rear endgate unit 6.

However, during the loading operation, with the scraper either traveling or standing still, the unique hoeing action of the apron 11 is employed to facilitate loading of the bowl. To so employ the apron to facilitate the loading operation, it is reciprocated by selective and independent control of the cables 12 and 34 by the tractor operator in a manner to cause said apron to move from an advanced and lowered position rearwardly over the digging blade 5 and thence into the bowl with a raising motion, until said apron reaches its fully dumping position, as shown in Fig. 2. Thence, the apron is moved forwardly while remaining raised, and when it reaches its advanced point is dropped for a further return or hoeing operation.

With the above described loading apron, carry-type scrapers can be loaded effectively and rapidly, and a full load can be accumulated in the bowl 4 without the use of a pusher tractor, as previously mentioned.

In the embodiment of Fig. 4, the apron is similarly mounted by means including side arms 35, cranks 36, and a cross shaft 37. In this embodiment, however, the cross shaft is reversibly actuated by a different arrangement which comprises the following:

A radial lever 38 is fixed on the cross shaft 37 between the cranks 36, and normally extends at a forward and upward incline. A double acting fluid pressure actuated cylinder 39 is pivotally connected to the longitudinal stabilizing beam 40 and extends rearwardly; the normally retracted piston rod 41 of said cylinder being pivotally connected, as at 42, to the upper end of the lever 38. Upon operation of the cylinder 39 to extend the rod 41, the lever 38 is swung in a direction to cause rearward swinging of the cranks 36, which results in a hoeing action being imparted to the apron. The cylinder 39 is of course incorporated in a fluid pressure supply system (not shown) which includes a control valve adjacent the tractor operator.

From the foregoing description it will be readily seen that there has been produced such a device as substantially fulfills the objects of the invention, as set forth herein.

While this specification sets forth in detail the present and preferred construction of the device, still in practice such deviations therefrom may be resorted to as do not form a departure from the spirit of the invention, as defined by the appended claims.

Having thus described the invention, the following is claimed as new and useful, and upon which Letters Patent are desired:

1. Apron mounting and actuating mechanism for a scraper having a main frame, a frame supported bowl open at its front end, and an apron cooperating with the bowl adjacent said end; the mechanism comprising means suspending the apron from the main frame for longitudinal reciprocation, and means operative to reciprocate said apron between an advanced position and a retracted position; said reciprocating means including side arms extending rearwardly from the apron, cranks connected to the side arms, and power means connected with said cranks and operative to positively swing the same back and forth.

2. Apron mounting and actuating mechanism for a scraper having a main frame, a frame supported bowl open at its front end, and an apron cooperating with the bowl adjacent said end; the mechanism comprising means suspending the apron from the main frame for longitudinal reciprocation, and means operative to reciprocate said apron between an advanced position and a retracted position; said reciprocating means including side arms extending rearwardly from the apron, cranks connected to the side arms, there being a shaft on which the cranks are fixed, and power means to rotate the shaft.

3. Apron mounting and actuating mechanism for a scraper having a main frame, a frame supported bowl open at its front end, and an apron cooperating with the bowl adjacent said end; the mechanism comprising means suspending the apron from the main frame for longitudinal reciprocation, and means operative to reciprocate said apron between an advanced position and a retracted position; said reciprocating means in-

cluding side arms extending rearwardly from the apron, cranks connected to the side arms, there being a shaft on which the cranks are fixed, and power means to rotate the shaft, said power means including a fluid pressure actuated power cylinder.

4. Apron mounting and actuating mechanism for a scraper having a main frame, a frame supported bowl open at its front end, and an apron cooperating with the bowl adjacent said end; the mechanism comprising means suspending the apron from the main frame for longitudinal reciprocation, and means operative to reciprocate said apron between an advanced position and a retracted position; said reciprocating means including side arms extending rearwardly from the apron, cranks connected to the side arms, there being a shaft on which the cranks are fixed, and power means to rotate the shaft, said power means including a cable actuated pulley on the shaft.

5. Apron mounting and actuating mechanism for a scraper having a main frame, a frame supported bowl open at its front end, and an apron cooperating with the bowl adjacent said end; the mechanism comprising means vertically adjustably supporting the apron from the main frame for longitudinal reciprocation, side arms extending rearwardly from the apron, a cross shaft on the main frame to the rear of the front end of the bowl, cranks on said shaft pivotally attached to adjacent ends of the side arms, and power means connected to the shaft operative to impart limited and reversible rotation thereto to cause the cranks to swing rearwardly and forwardly, selectively.

6. Apron mounting and actuating mechanism for a scraper having a main frame, a frame supported bowl open at its front end, and an apron cooperating with the bowl adjacent said end; the mechanism comprising means vertically adjustably supporting the apron from the main frame for longitudinal reciprocation, side arms extending rearwardly from the apron, a cross shaft on the main frame to the rear of the front end of the bowl, cranks on said shaft pivotally attached to adjacent ends of the side arms, and power means connected to the shaft operative to impart limited and reversible rotation thereto to cause the cranks to swing rearwardly and forwardly, selectively; said power means including a spring motor arranged to rotate the shaft in one direction.

7. Apron mounting and actuating mechanism for a scraper having a main frame, a frame supported bowl open at its front end, and an apron cooperating with the bowl adjacent said end; the mechanism comprising means vertically adjustably supporting the apron from the main frame for longitudinal reciprocation, side arms extending rearwardly from the apron, a cross shaft on the main frame to the rear of the front end of the bowl, cranks on said shaft pivotally attached to adjacent ends of the side arms, and power means connected to the shaft operative to impart limited and reversible rotation thereto to cause the cranks to swing rearwardly and forwardly, selectively; said power means including a fluid pressure actuated power cylinder arranged to so rotate the shaft.

8. Apron mounting and actuating mechanism for a scraper having a main frame, a frame supported bowl open at its front end, and an apron cooperating with the bowl adjacent

said end; the mechanism comprising means vertically adjustably supporting the apron from the main frame for longitudinal reciprocation, side arms extending rearwardly from the apron, a cross shaft on the main frame to the rear of the front end of the bowl, cranks on said shaft pivotally attached to adjacent ends of the side arms, and power means connected to the shaft operative to impart limited and reversible rotation thereto to cause the cranks to swing rearwardly and forwardly, selectively; said power means including a spring motor arranged to rotate the shaft in one direction, and a cable actuated pulley on the shaft arranged to rotate the latter in the other direction.

9. Apron mounting and actuating mechanism for a scraper having a main frame, a frame supported bowl open at its front end, and an apron cooperating with the bowl adjacent said end; the mechanism comprising means vertically adjustably supporting the apron from the main frame for longitudinal reciprocation, side arms extending rearwardly from the apron, a cross shaft on the main frame to the rear of the front end of the bowl, cranks on said shaft pivotally attached to adjacent ends of the side arms, a pair of pulleys fixed on the shaft, cables connected to and wound in reverse relation on said pulleys, a pull spring connected to one cable, and pull means connected to the other cable.

10. Apron mounting and actuating mechanism for a scraper having a main frame, a frame supported bowl open at its front end, and an open apron cooperating with the bowl adjacent said end; the mechanism comprising a vertically adjustable cable disposed adjacent and supported by the forward end of the main frame, means flexibly connecting the lower end of the cable with the apron, cranks mounted on the main frame adjacent the rear end thereof, power means operative to positively swing the cranks back and forth, and side arms on the apron projecting rearwardly therefrom and being pivoted to the cranks.

11. Apron mounting and actuating mechanism for a scraper having a main frame, a frame supported bowl open at its front end, and an apron cooperating with the bowl adjacent said end; the mechanism comprising a vertically adjustable cable disposed adjacent and supported by the forward end of the main frame, a bell crank, one end of the bell crank being connected with the lower end of the cable, the other end of the bell crank being pivoted to the apron, cranks mounted on the main frame adjacent the rear end thereof, power means operative to positively swing the cranks back and forth, and side arms on the apron projecting rearwardly therefrom and being pivoted to the cranks.

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