Jan. 31, 1967 E. R. FRYER 3,300,882

EJECTOR FOR SCRAPERS

Filed Dec. 23, 1963 3 Sheets-Sheet 1

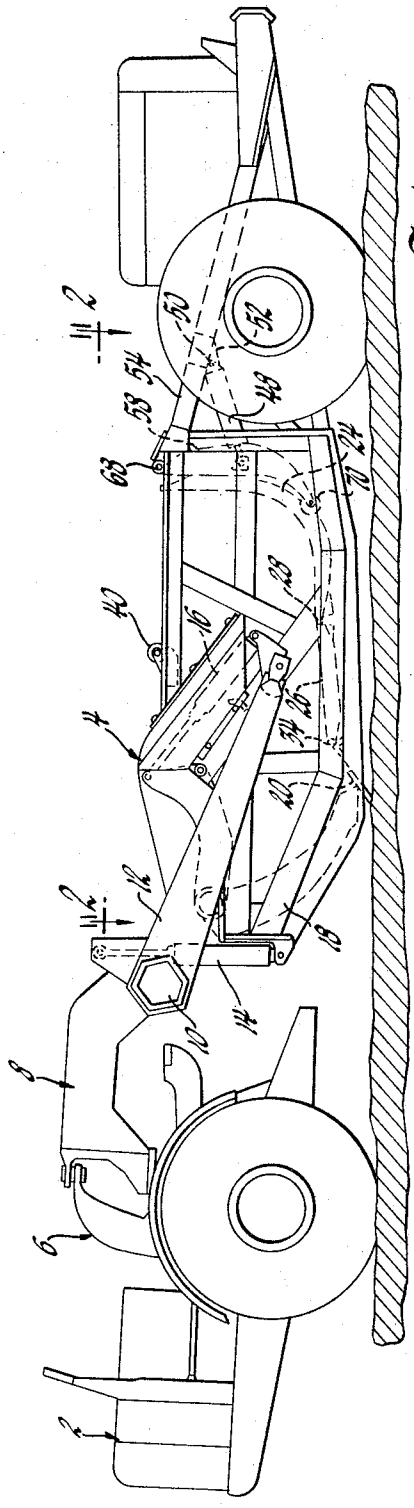


Fig. 1

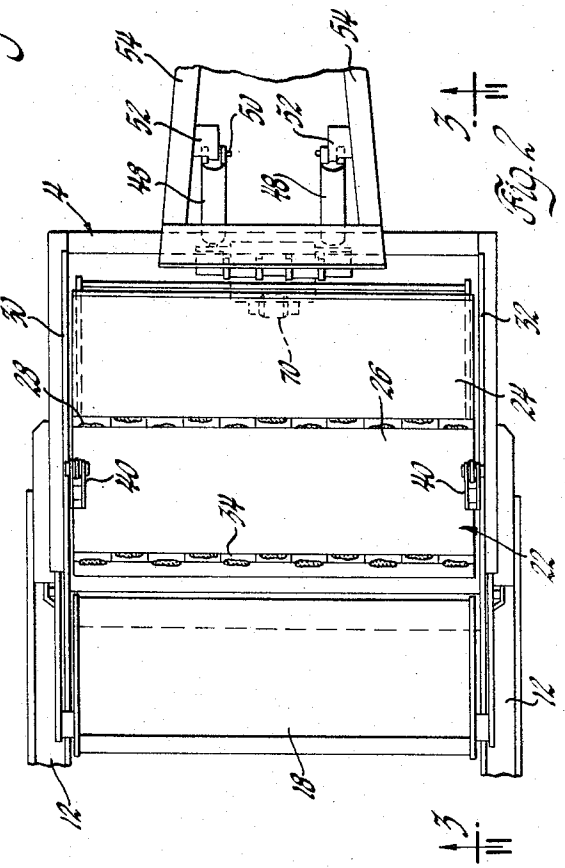


Fig. 2

INVENTOR.
Edward R. Fryer
BY
W. F. Wagner
ATTORNEY

Jan. 31, 1967 E. R. FRYER 3,300,882

EJECTOR FOR SCRAPERS

Filed Dec. 23, 1963 3 Sheets-Sheet 2

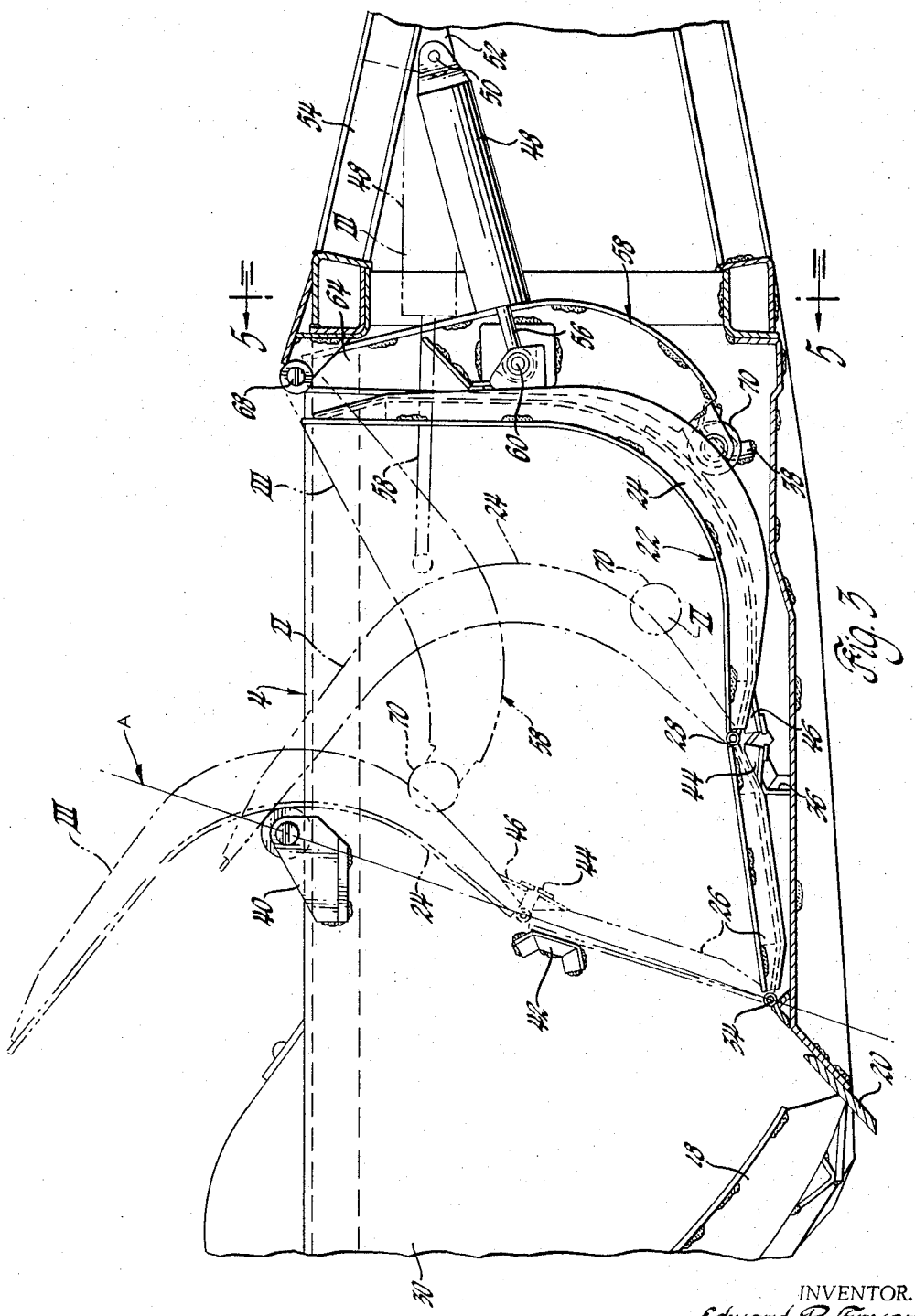


Fig. 3

INVENTOR.
Edward R. Fryer

BY

W. F. Wagner

ATTORNEY

Jan. 31, 1967 E. R. FRYER 3,300,882

EJECTOR FOR SCRAPERS

Filed Dec. 23, 1963 3 Sheets-Sheet 3

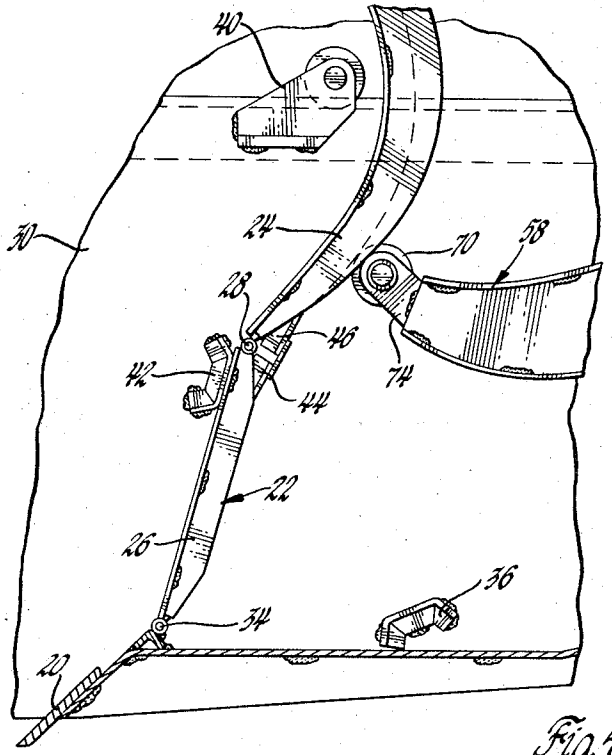


Fig. 4

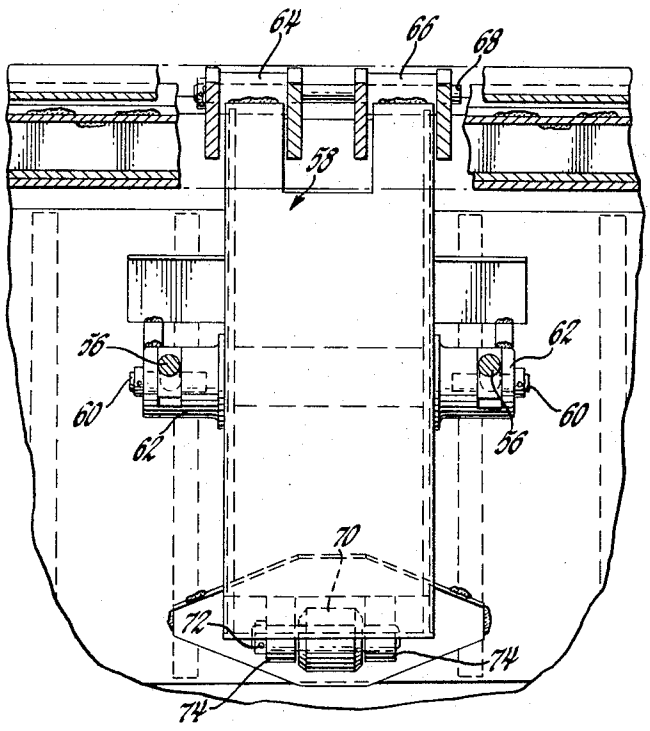


Fig. 5

INVENTOR.
Edward R. Fryer
BY
W. F. Wagner
ATTORNEY

United States Patent Office 3,300,882 Patented Jan. 31, 1967

3,300,882

EJECTOR FOR SCRAPERS

Edward R. Fryer, Euclid, Ohio, assignor to General Motors Corporation, Detroit, Mich., a corporation of Delaware

Filed Dec. 23, 1963, Ser. No. 332,791
8 Claims. (Cl. 37—129)

This is a continuation-in-part of my application, Serial Number 206,577, filed July 2, 1962, now abandoned.

This invention pertains to an ejector plate for a scraper vehicle and more particularly to an ejector plate having a plurality of sections that are progressively moved to discharge a load from a scraper bowl.

Scraper vehicles have commonly used ejector constructions that may be broadly classified as being either of the roll-out or push-out variety. The roll-out ejector is characterized by the fact that it is hinged to the scraper bowl frame adjacent the rear of the cutting edge on a fixed transverse pivot axis, with means being provided for pivoting the ejector forwardly and rearwardly in the bowl. On the other hand, the push-out type ejector includes a plate which is reciprocated along the floor of the bowl from the rear of the latter towards the bowl cutting edge. The chief drawback of the above described ejectors is that in each case, the operating means used for activating the ejector must have sufficient power not only to eject the load from the bowl but to raise or translate the entire bowl load during the initial movement of the ejector. This requirement has often dictated that the operating means be made much larger than necessary in order to supply the excess force needed during the initial ejecting action.

The present invention obviates the above-mentioned problem by providing an ejector plate having a plurality of sections which are pivotally interconnected and progressively actuated so as to provide a gradual ejecting action of the bowl load. Thus, the load is ejected at a substantially uniform rate and the ejector is moved in stages so as to require less power than is ordinarily necessary for ejecting a comparable load.

Broadly stated, the ejector plate made in accordance with the invention comprises at least two sections which are mounted in a scraper bowl unit between the side walls thereof. One section of the ejector plate is pivotally mounted to the side walls about a fixed transverse axis while another ejector section is pivotally interconnected with the rear of the first section about a movable transverse axis. Operating mechanism is disposed to the rear of the ejector plate and is connected thereto so that upon actuation, one section of the ejector plate is pivoted about the movable axis followed by a pivotal movement of both sections about the fixed transverse axis for rapping contact with stop members secured to the side walls.

A more complete understanding of the present invention can be obtained from the following description when taken in conjunction with the accompanying drawings in which:

FIGURE 1 shows a twin-engine overhung scraper vehicle incorporating the present invention.

FIGURE 2 is a view taken on the lines 2—2 of FIGURE 1.

FIGURE 3 is an enlarged fragmentary view of the scraper bowl taken on a vertical section and illustrating ejector action while discharging a load.

FIGURE 4 is a fragmentary view similar to that of FIGURE 3 and shows the ejector plate returning to the retracted position.

FIGURE 5 is a fragmentary view taken on lines 5—5 of FIGURE 3.

Referring now to the drawings and particularly FIGURE 1, a rubber-tired twin engine scraper vehicle is shown comprising the usual prime mover 2 suitably joined to a transportable bowl frame 4 by a hitch arrangement 6 and a draw bar 8. The latter is fixed to the conventional transversely extending torque tube 10 which at each end rigidly carries a rearwardly extending pull arm 12. The rearward end of each pull arm is provided with a socket pivotally connected to ball members carried on the side of the bowl frame 4. A single-acting hydraulic jack 14 is provided between a bracket fixed to the torque tube and the bowl frame for raising the latter from a digging to a carry position, while a double-acting jack 16 is provided on each side of the bowl frame for raising and lowering an arcuately shaped apron 18. The apron serves to open and close the mouth of the bowl in cooperation with a transversely extending cutting edge 20 fixed to the lower portion of the bowl. The jacks 16 are double-acting so as to maintain the apron in any selected position, and to provide a positive force for closing the apron upon the cutting edge to retain all loaded material within the bowl.

An ejector plate, generally indicated by the numeral 22, is disposed within the bowl 4 and includes a rear section 24 and a front section 26, both of which are pivotally interconnected about a movable transversely extending pivot axis 28. As seen in FIGURES 2 and 3, the ejector plate 22 extends transversely between the side walls 30 and 32 of the bowl frame with the forward end of the front section pivotally connected about a fixed transverse pivot axis 34 that is located adjacent the cutting edge 20. It will be noted that the front and rear sections are respectively formed as flat and arcuately shaped members in order to retain the maximum amount of material within the bowl. Furthermore, each ejector section, when in the normal or load-retaining position as shown in full lines, rests on support members 36 and 38 which are welded to the lower portion of each side wall of the bowl. Thus, when the ejector 22 is in this position, any load in the bowl is supported by the bowl frame through the support members. For limiting forward ejecting movement of the ejector plate 22, stop members 40 and 42 are fixed to the bowl with the former taking the form of a roller assembly and being welded to the upper portion of each side wall. The stop member 42 is rigidly secured to the side wall intermediate the top and bottom thereof so as to be in the direct path of the ejector section 26 as the latter moves forwardly about pivot axis 34. Additionally, adjacent the ejector section interconnection 28, cooperating stop members 44 and 46 are rigidly mounted to the underside of the respective ejector sections. These stop members serve to limit rearward movement of section 24 relative to section 26 and thereby prevent the latter from moving independently of the forward section as will be more fully explained in conjunction with the operation of the ejector plate.

The ejector operating mechanism is positioned in the rear of the bowl frame as shown in FIGURES 1 through 3, and comprises a pair of hydraulic jacks 48, each of which is pivotally connected at point 50 to a support bracket 52 which is rigidly secured to and laterally extends from one of a pair of rearwardly converging frame arms 54. Each jack 48 comprises the usual cylinder that houses a reciprocable piston fixed to an elongated piston rod 56 and is of the double-acting type in which pressurized fluid is pumped into one end and vented from the other end of the cylinder for extending or contracting the jack in a manner which is conventional. As illustrated in FIGURES 3 and 5, the terminal portion of each piston rod 56 is connected to an operating lever 58 by a transverse pivot pin 60 rigidly fixed in a pivot housing 62. The pivot housings are aligned on a common trans-

verse axis intermediate the ends of the lever and protrude laterally from opposite sides of the latter.

In order to facilitate the forward movement of the ejector, the operating lever **58** is located midway between the side walls **30**, **32** and includes a bifurcated upper portion comprising a pair of arms **64** and **66** pivotally connected to the bowl frame about a transverse pivot pin **68**. At the lower or free end of the operating lever, a roller **70** is provided for rotation about a transverse pin **72** suitably fixed between a pair of depending arms **74**. The roller engages the rear wall of the ejector section **24** and rolls therealong during forward pivotal movement of the operating lever so as to progressively urge the ejector sections forwardly in a manner to be now described below.

Assuming the bowl is loaded and the ejector is in the full line position shown in FIGURE 3, when the jacks **48** are extended, the operating lever **58** and ejector plate **22** moves through the position indicated by Roman numerals II and III. Thus, as the jacks **48** are activated, the operating lever moves from the full line position towards position II during which movement the rear ejector section **24** is pivoted about the transverse pivot axis **28** independently of the front ejector section **26**. The independent movement of the rear section continues until such time that the upper face portion of this section contacts the roller assembly **40**. It should be apparent that during this movement, the load tends to be rolled out of the bowl with only the rear portion of the load being elevated rather than the entire load which is supported by the combined sections of the ejector. When the rear section reaches position II, further forward pivotal movement of this section about pivot axis **28** is restrained by the roller assembly **40** so as to, in effect, transfer pivotal action to axis **34**. Thus, as the operating lever continues to pivot forwardly towards position III, the section **24** lifts the movable pivot axis **28** so as to simultaneously raise section **26** about the fixed pivot axis **34**. During this movement, both ejector sections pivot forwardly about the fixed pivot axis **34** with the inner or face wall of section **24** riding on the roller assembly **40**. When the operating lever and both sections of the ejector plate reach position III, the ejector plate **22** is fully extended and is arrested from any further forward movement by the roller assembly **40** and the stop member **42**. In this connection it should be noted that the stop member **42** is located forwardly of a line A passing through the pivot axis **34** and the point about which the roller **40** rotates. Thus, the ejector section **26** can be moved to a position substantially vertical to assure that the entire load is discharged from the bowl. More importantly, by positioning the stop member **42** in the path of the ejector section **26**, the latter receives a severe rapping action when the ejector is pivoted into position II due to the high angular velocity of the section **26** as it rotates forwardly about the pivot axis **34**. The significance of this rapping action is that it provides a "kick-out" of the material in the final stage of the ejection operation and assures that the ejector surface is cleaned even in instances where the scraper is working in clay or wet soil.

Once the load is discharged from the bowl as described above, the jacks **48** are contracted to return the operating lever **58** to its original position as shown in full lines of FIGURE 3. As the jacks shorten and the operating lever pivots rearwardly, the ejector plate **22** follows a reverse path and assumes positions corresponding to those taken during the ejecting movement. It is conceivable, however, that due to some foreign material lodging about the pivot pin **34**, the section **26** could be restrained from rearward pivotal movement and thereby cause section **24** to pivot rearwardly about pivot axis **28** to be lowered into a position which would make it impossible for the bowl to receive a load. To allow for this contingency, the cooperating stop members **44** and **46** are provided to limit the rearward pivotal movement of the rear section **24** about the pivot axis **28** to the position shown in FIGURE 4. Thus, further rearward movement of the operating lever causes the section **24** to transfer its entire weight through the stop members **44**, **46** to the pivot axis **34** and thereby break through the obstruction to permit the entire ejector plate **22** to return to the full line position of FIGURE 3.

Various changes and modifications can be made in the above-described ejector plate construction without departing from the spirit of the invention. It should be understood that such changes and modifications are contemplated by the inventor and he does not wish to be limited except by the scope of the appended claims.

I claim:

1. A scraper bowl comprising a transportable bowl frame including transversely spaced longitudinally extending side walls, a transversely extending ejector plate including a front section and a rear section both of which are interconnected about a first transverse pivot axis, support means in the form of a second transverse pivot axis connecting the forward end of the front section to the side walls, an ejector operating lever pivotally connected at one end to the bowl frame and having the other end contacting said rear section, a first stop member connected to the side walls at an upper portion thereof and forwardly of the first pivot axis, a second stop member connected to the side walls and located between said first stop member and said support means, and a fluid operated jack having one end pivotally connected to the bowl frame and the other end pivotally connected to the lever to pivot the latter forwardly about its bowl frame connection so as to independently rotate the rear section forwardly about the first pivot axis until said rear section contacts the first stop member whereafter the rear section moves upwardly along said first stop member and simultaneously raises the front section forwardly about the second pivot axis for rapping contact with said second stop member.

2. A scraper bowl comprising a transportable bowl frame including transversely spaced longitudinally extending side walls, a cutting edge extending transversely between the lower forward portions of the side walls to form a bowl mouth, a transversely extending ejector plate including a front section and a rear section both of which are interconnected about a first transverse pivot axis, support means adjacent the cutting edge and in the form of a second transverse pivot axis connecting the forward end of the front section to the side walls, an ejector operating lever pivotally connected at one end to the bowl frame and having a roller at the other end supported for engagement with said rear section, first stop member connected to the side walls at an upper portion thereof and forwardly of the first pivot axis, a second stop member connected to the side walls and located between said first stop member and said support means, and a fluid operated jack having one end pivotally connected to the bowl frame and the other end pivotally connected to the lever to pivot the latter forwardly about its connection with the bowl frame so as to independently rotate the rear section forwardly about the first pivot axis until said rear section contacts the first stop member whereafter the rear section moves upwardly along said first stop member and simultaneously raises the front section forwardly about the second pivot axis for rapping contact with said second stop member.

3. A scraper bowl comprising a transportable bowl frame including transversely spaced longitudinally extending side walls, a transversely extending ejector plate including a flat front section and an arcuately shaped rear section both of which are interconnected about a first transverse pivot axis, support means in the form of a second transverse pivot axis connecting the forward end of the front section to the side walls, an ejector operating lever pivotally connected at one end to the bowl frame and having the other end contacting said rear section, a

first stop member connected to the side walls at an upper portion thereof, a second stop member connected to the side walls between the first stop member and the support means, and a fluid-operated jack having one end pivotally connected to the bowl frame and the other end pivotally connected to the lever to pivot the latter forwardly about its bowl frame connection so as to independently rotate the rear section forwardly about the first pivot axis until said rear section contacts the first stop member whereafter the rear section moves upwardly along the first stop member and simultaneously raises the front section forwardly about the second pivot axis for rapping contact with the second stop member.

4. A scraper bowl comprising a transportable bowl frame including transversely spaced longitudinally extending side walls, a transversely extending ejector plate including a front section and a rear section both of which are interconnected about a first transverse pivot axis, support means in the form of a second transverse pivot axis connecting the forward end of the front section to the side walls, an ejector operating lever pivotally connected at one end to the bowl frame and having the other end contacting the rear section at a point located substantially in a plane passing through the first and second pivot axes when the ejector plate is in the fully retracted load-retaining position, said first and second pivot axes and said point of lever engagement with the rear section being substantially equidistantly spaced from each other in said load-retaining position of the ejector plate, a first stop member connected to the side walls at an upper portion thereof and forwardly of the first pivot axis, a second stop member connected to the side walls and located between said first stop member and said support means, and a fluid operated jack having one end pivotally connected to the bowl frame and the other end pivotally connected to the lever between the ends thereof to pivot the lever forwardly about its bowl frame connection so as to independently rotate the rear section forwardly about the first pivot axis until said rear section contacts the first stop member whereafter the rear section moves upwardly along said first stop member and simultaneously raises the front section forwardly about the second pivot axis for rapping contact with said second stop member.

5. A scraper bowl comprising a transportable bowl frame including transversely spaced longitudinally extending side walls, a cutting edge extending transversely between the lower forward portions of the side walls to form a bowl mouth, a transversely extending ejector plate including a front section and a rear section both of which are interconnected about a first transverse pivot axis, support means adjacent the cutting edge and in the form of

a second transverse pivot axis connecting the forward end of the front section to the side walls, an ejector operating lever pivotally connected at one end to the bowl frame and having a roller at the other end supported for engagement with the rear section at a point located substantially in a plane passing through the first and second pivot axes when the ejector plate is in the fully retracted load-retaining position, said first and second pivot axes and said point of roller engagement with the rear section being substantially equidistantly spaced from each other in said load-retaining position of the ejector plate, a first stop member connected to the side walls at an upper portion thereof and forwardly of the first pivot axis, a second stop member connected to the side walls and located between said first stop member and said support means, cooperating stop means connected to the front and rear section for limiting pivotal movement of the rear section about the first pivot axis in a rearward direction only, and a fluid operated jack having one end pivotally connected to the bowl frame and the other end pivotally connected to the lever to pivot the latter forwardly about its connection with the bowl frame so as to independently rotate the rear section forwardly about the first pivot axis until said rear section contacts the first stop member whereafter the rear section moves upwardly along said first stop member and simultaneously raises the front section forwardly about the second pivot axis for rapping contact with said second stop member.

6. The apparatus of claim 5 wherein the distance between the second stop member and the support means is no greater than the distance between the latter and the first transverse axis.

7. The apparatus of claim 5 wherein said first transverse axis moves across a straight line connecting the support means and the point about which the roller rotates when the ejector is moved to the fully extended position.

8. The apparatus of claim 5 wherein said cooperating stop means are fixed to the front and rear section adjacent the first transverse axis.

References Cited by the Examiner

UNITED STATES PATENTS

2,323,428	7/1943	Spencer	37—126
2,458,274	1/1949	Kadz	37—126
2,773,320	12/1956	Fryer et al.	37—126

ABRAHAM G. STONE, *Primary Examiner.*

WILLIAM A. SMITH III, *Examiner.*