March 11, 1969 W. H. EIGER 3,431,659

SELF-LOADING SCRAPER BOWL

Filed July 5, 1966 Sheet 1 of 3

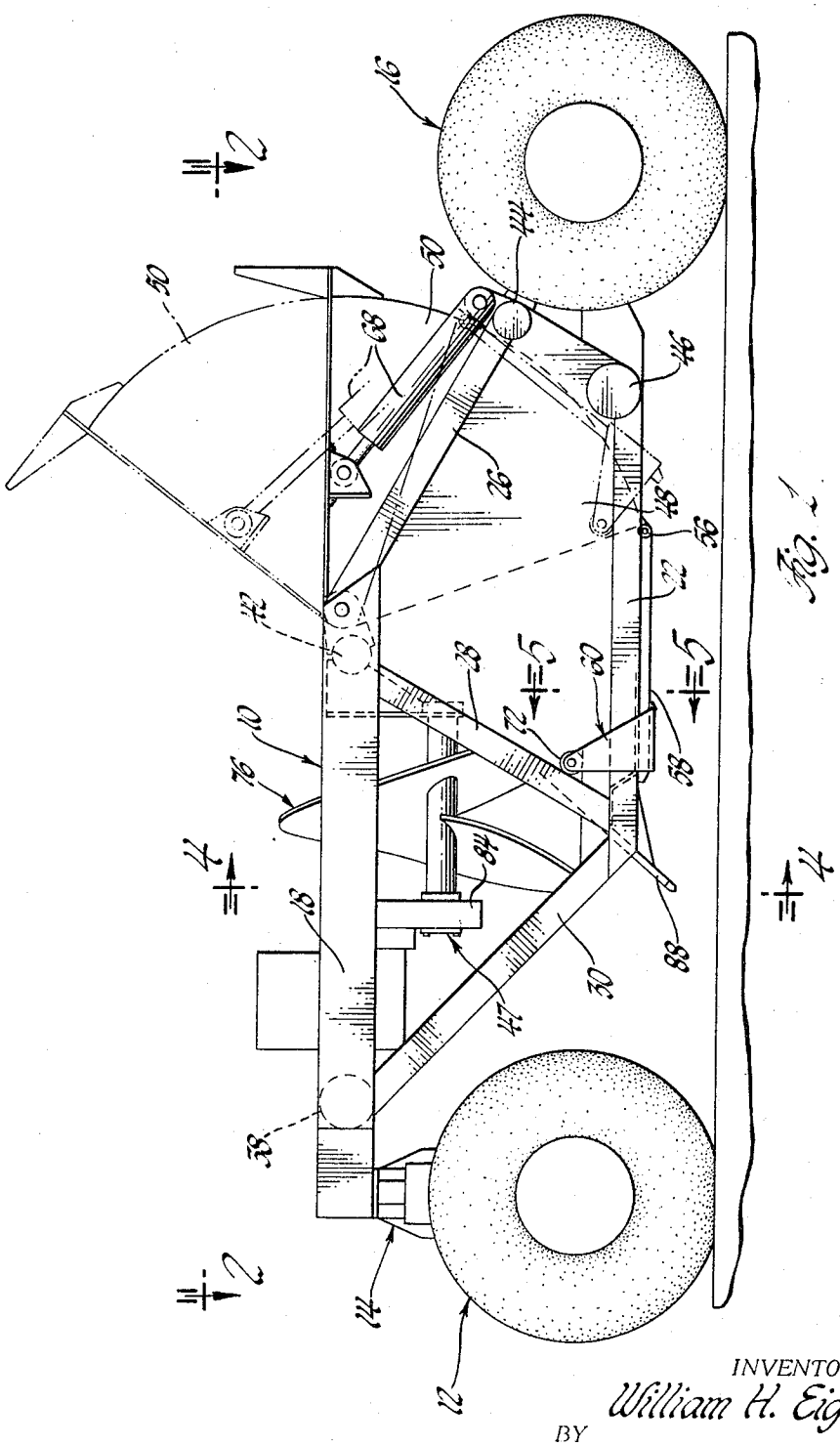


Fig. 1

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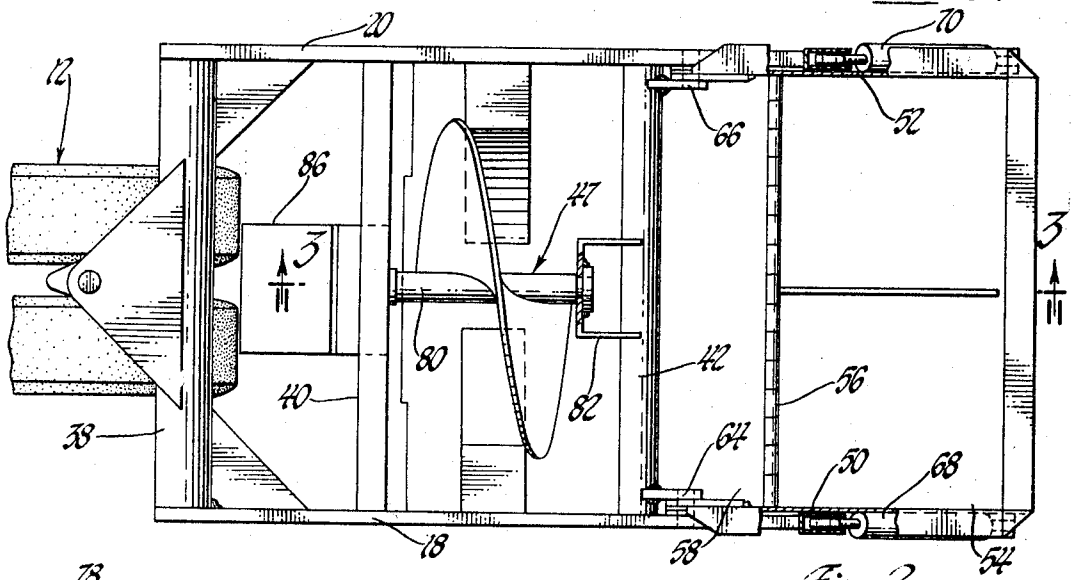


Fig. 2

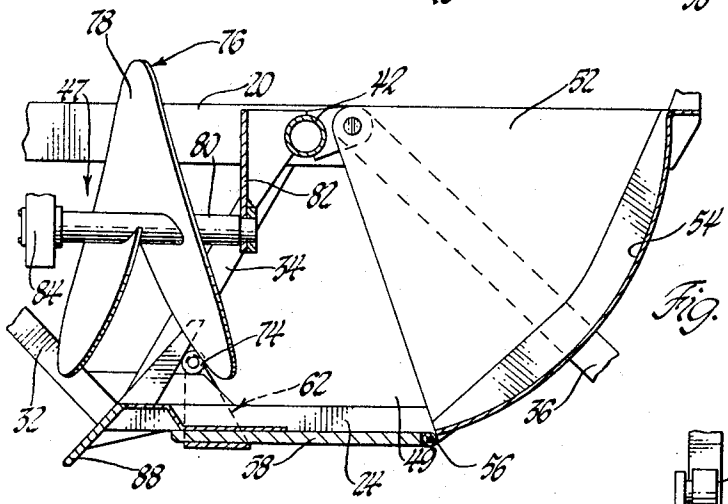


Fig. 3

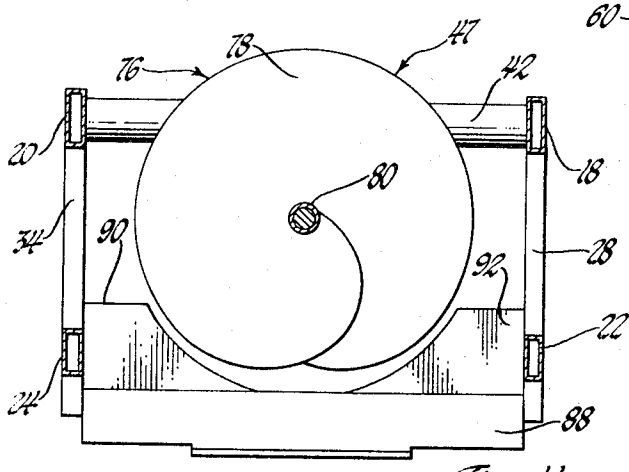


Fig. 4

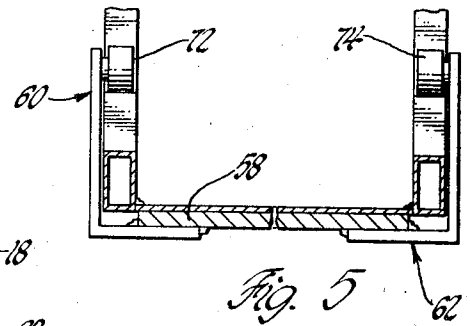


Fig. 5

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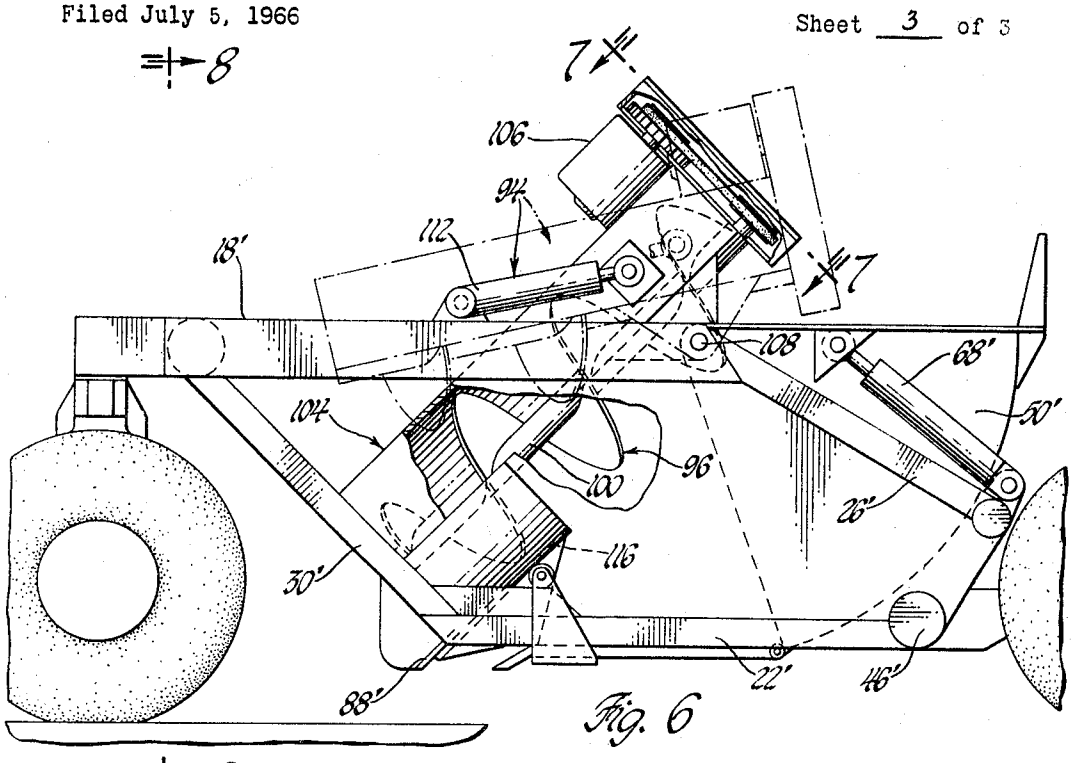


Fig. 6

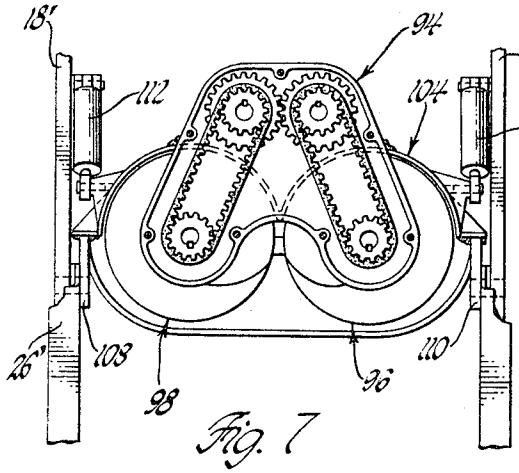


Fig. 7

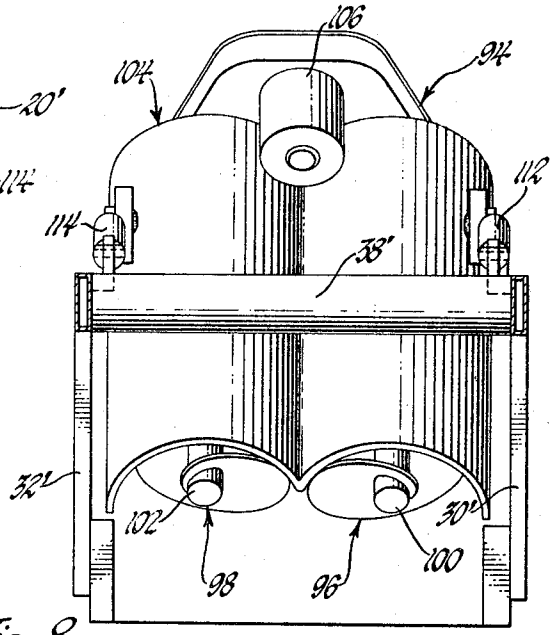


Fig. 8

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3,431,659

SELF-LOADING SCRAPER BOWL

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Filed July 5, 1966, Ser. No. 562,663
U.S. Cl. 37—4 2 Claims
Int. Cl. E02f 3/62, 3/85; B60p 1/40

ABSTRACT OF THE DISCLOSURE

A scraper bowl movable between a dig and carry position and having a pair of side walls, a floor portion and a rear wall portion extending between the side walls for retaining earth material. A transverse cutting blade is located forwardly of the floor portion and a pair of counter-rotating screw devices are located in the bowl for moving earth material toward the rear wall portion. The screw devices are located adjacent to the cutting blade and supported for rotation about substantially parallel axes extending longitudinally of the bowl.

This invention concerns a scraper and more particularly a self-loading scraper characterized in that the bowl is equipped with a powered material conveying device for facilitating the loading of material into the bowl.

One form of self-loading scraper that has gained wide acceptance in the earth moving field is the so-called elevating scraper which has a chain and paddle device that picks up dirt as it flows off the scraper blade and carries it up and back into the bowl. The elevating scraper has certain advantages over the conventional scraper in that the paddle wheel action breaks up clogs and pulverizes material as it is carried into the bowl thus facilitating compaction. One drawback in this type of scraper, however, is that it has difficulties in handling large boulders or materials such as gumbo mud and ripped rock without damaging the elevating drags.

Accordingly, a principal object of the present invention is to provide a scraper bowl having a powered device of simple and durable construction for conveying earth material and rock of relatively large size toward the rear of the bowl.

Another object of this invention is to provide an auger type conveying device that cooperates with the usual cutting blade of a scraper bowl for loading material into the latter.

A further object of this invention is to provide a scraper bowl with an auger-type loader that can sweep and propel dirt into the bowl and be able to operate in and load materials of a type found to be difficult to handle by the typical elevating scraper.

A still further object of this invention is the provision of a scraper bowl equipped with a conveying device for moving earth material toward the rear of the bowl and having a material flow control element associated therewith for directing cut material toward the conveying device.

Other objects and advantages of the present invention will be more apparent from the following detailed description when taken in conjunction with the drawings in which:

FIGURE 1 is an elevation side view of a scraper bowl incorporating one form of the material conveying device made in accordance with the present invention;

FIGURE 2 is a plan view of the scraper bowl of FIGURE 1;

FIGURE 3 is a sectional view taken on line 3—3 of FIGURE 2 and shows in detail the auger-type loader which forms a part of the material conveying device of FIGURES 1 and 2;

FIGURE 4 is a sectional view taken on line 4—4 of FIGURE 1;

FIGURE 5 is an enlarged sectional view taken on line 5—5 of FIGURE 1 and showing the floor portion of the bowl;

FIGURE 6 shows a scraper bowl equipped with a modified form of the material conveying device of FIGURES 1 through 5;

FIGURE 7 is a sectional view taken on line 7—7 of FIGURE 6; and

FIGURE 8 is a view taken on line 8—8 of FIGURE 6.

Referring to the drawings and more particularly to FIGURES 1 through 4 thereof, a transportable scraper bowl **10** is shown comprising a pair of front wheels **12** which are pivotally mounted to the bowl for movement about a vertical axis through a hydraulic cylinder arrangement **14** which provides for the movement of the scraper bowl between a dig and carry position in the conventional manner. The rear end of the scraper bowl **10** is supported by a pair of rotatable wheels **16** with a rigid body structure consisting of transversely spaced longitudinal beams **18, 20, 22, 24**; strut members **26, 28, 30, 32, 34, 36**; and cross beam members **38, 40, 42, 44, 46** serving to interconnect the front and rear wheels and also support a material conveying device generally indicated by the numeral **47**.

The material retaining portion of the scraper bowl **10** is formed in part by side plates **48, 49** and a pair of triangularly shaped side walls **50** and **52**. The side walls are interconnected by a transversely extending and curved back wall **54** which in turn is pivotally connected along a horizontal axis by a piano type hinge **56** to a flat floor portion **58** that extends forwardly and terminates at the opposite sides thereof with roller supporting brackets **60** and **62**. The vertex portions of the side walls **50** and **52** are connected by pivotal connections **64** and **66** to the cross beam **42**. Also, a pair of double-acting hydraulic jacks **68** and **70** are provided outboard of the side walls **50** and **52** and respectively pivotally connected thereto at one end while the opposite end extends downwardly for pivotal connection with the cross beam member **44**. Thus, upon expansion of the jacks **68, 70**, the material retaining portion of the bowl, except for the side plates **48, 49**, can be raised to the position indicated in phantom lines thereby causing the floor portion **58** to be translated rearwardly along the beams **22** and **24** which serve as guide tracks for the rollers **72** and **74**. This action permits the material within the bowl to be ejected in a manner as explained in more detail in my copending patent application Serial No. 562,583, filed July 5, 1966, entitled "Ejector for Scraper Bowl" and assigned to the assignee of this invention.

As best seen in FIGURES 2 and 3, the material conveying device **47** consists of an auger-type earth loader **76** comprising a heavy gauge sheet metal element **78** helically wound about and rigidly attached to a shaft **80**, one end of which is rotatably supported in a bracket **82** fixed with the cross beam **38**. The opposite end of the shaft **80** extends into and is supported by a gear housing **84** which contains a suitable gear drive powered by a motor **86** secured to the cross beam **40**. The motor **86** can be an hydraulic or electric motor or any other type conventionally used as motive power.

As seen in FIGURE 4, the earth loader **76** is circular in configuration with the lower peripheral edge thereof located adjacent to a cutting blade **88** which extends transversely between the side beams **22** and **24** and is fixedly secured thereto. Thus, material cut by the cutting blade **88** flows toward the earth loader **76** which when being drivingly rotated causes the material to be conveyed rearwardly into the bowl. A pair of material

flow control plates **90** and **92** are attached to the bowl structure and located adjacent to the earth loader. The plates **90** and **92** are curved in form so that cut material at the outer ends of the cutting blade **88** is directed into the rotating earth loader.

As should be apparent, the helix angle of the earth loader **76** can be varied without materially affecting the operation of the conveying device **47**. However, the angle should be sufficiently large so that large boulders and ripped rock and the like can be readily accommodated between the earth loader **76** and the cutting blade **88**.

During operation and as seen in FIGURES 3 and 4, the earth loader is driven in a counterclockwise direction which causes a sweeping action adjacent to the cutting blade **88**. This causes the cut earth material to be forced into the bowl and as it accumulates therein to be driven a certain amount upwardly until the bowl portion is completely filled. Thereafter, operation of the earth loader **76** can be discontinued and the latter can serve as an apron to close the mouth of the bowl and retain the material therein.

FIGURES 6, 7 and 8 illustrate a modified form of the invention associated with the scraper bowl illustrated in FIGURES 1–5. Accordingly, parts corresponding to those of the aforedescribed scraper bowl are identified by corresponding numerals but primed. The modified material conveying device is generally indicated by the numeral **94** and consists of a pair of auger-type earth loaders **96** and **98** supported for counter-rotation by inclined and parallel shafts **100** and **102**, respectively. In this case, the conveying device **94** is housed within a shroud **104**, the rear end of which supports the drive motor **106** and appropriate gearing for rotating the earth loaders. The opposite sides of the shroud **104** are connected by pivotal connections **108** and **110** to the scraper bowl for rotation about a transverse horizontal axis so that the device can be moved between the full line and the dotted-line position indicated in FIGURE 6. A pair of double-acting hydraulic jacks **112** and **114** are pivotally connected between the bowl structure and the shroud **104** so as to provide the aforementioned movement of the material conveying device **94**.

In operation, earth material cut by the cutting blade **88'** is picked up by the counter-rotating loaders **96** and **98** and driven upwardly along an inclined wall **116** fixed to the bowl. It will be noted that in this form of the invention, the bowl can be initially filled in the conventional manner with the material conveying device **94** located in the raised position. Thereafter, as the power required to fill the bowl increases beyond an acceptable point, the material conveying device **94** can be lowered to the full line position of FIGURE 6 so as to aid the bowl loading by elevating and propelling the earth material toward the rear of the bowl in a heaped form.

It will be understood that the scraper bowl illustrated in the drawing is intended to be driven by a separate prime mover such as a tractor which can be attached to the front ends of the bowl. Another form of scraper arrangement that can be utilized with the invention is the so-called overhung tractor type in which the tractor is connected by a gooseneck to pull arms which in turn support the trailing bowl. This, of course, will be understood by those skilled in the art and it is emphasized that the invention resides in the particular arrangement and type of material conveying device combined with the cutting blade and bowl portion of a scraper as described above.

Various changes and modifications can be made in this construction without departing from the spirit of the invention. 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 adapted to be moved between a dig and carry position, said bowl having an open front end and comprising a pair of side walls, a floor portion and a rear wall portion extending between the side walls for retaining earth material, a transverse cutting blade located forwardly of the floor portion, a material conveying device including a pair of counter-rotating screw devices supported by the bowl for moving earth material toward the rear wall portion, said screw devices located adjacent to the cutting blade and supported for rotation about substantially parallel axes extending longitudinally of said bowl, means supporting the material conveying device on said bowl for movement about a transverse horizontal axis, hydraulic cylinder means pivotally connected at one end to the bowl and at the other end to the material conveying device for raising the latter about said transverse horizontal axis, and a shroud carried by said material conveying device for substantially closing the front end of the bowl when the material conveying device is in the lowered position.

2. A scraper bowl adapted to be moved between a dig and carry position, said bowl having an open front end and comprising a pair of side walls, a floor portion and a rear wall portion extending between the side walls for retaining earth material, a transverse cutting blade located forwardly of the floor portion at the open end of said bowl, an inclined wall fixed to the bowl above the cutting blade and serving as an extension of the latter, a material-conveying device including a pair of counter-rotating screw devices supported within the bowl for moving earth material along said inclined wall toward the rear wall portion, said screw devices located adjacent to the cutting blade and supported for rotation about substantially parallel axes extending longitudinally of said bowl, means supporting the material-conveying device on said bowl for movement about a transverse horizontal axis, a pair of hydraulic cylinders pivotally connected at one end to the bowl and at the other end to the material-conveying device for raising the latter about said transverse horizontal axis, and a shroud carried by said material-conveying device for substantially closing the front end of the bowl when the material-conveying device is in the lowered position.

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U.S. Cl. X.R.

37—126; 198—213