ABSTRACT: A power transfer mechanism for excavator bucket operation by fluid actuator means effective upon a working point, to which a rocker arm is journaled from a dipper arm pivot located above the turning axis of the bucket and to which a coupling member is journaled from a bucket pivot located below the turning axis of the bucket. A bucket front portion is tiltable during bucket opening and closing with respect to a turning point shaft in radial alignment with semicircular formed guide slot means of a box-formed housing of the bucket back portion. A housing cover provides access to parts including fluid actuator means protected in the box-formed housing and used to effect tiltable movement of the front portion with respect to the back portion of the bucket.
BUCKET ACTUATED MEANS FOR EXCAVATOR

The present invention relates to a hydraulically operated heavy excavating machine having a bucket journaled to a swing boom and pivotable dipper arm. A front portion of the bucket is able to be lifted up with respect to a backwall and under hydraulic actuation of the excavating machine.

Hydraulic excavating machines are provided with buckets when loading work is to be carried out by means of a lifting or tipping motion around a linkage point on a dipper arm for unloading into a vehicle standing below the loading bucket. It often occurs that the loading surface under such circumstances is considerably above the ground level. Because of the dumping angle, an exact determination of the unloading location cannot be achieved safely by the operator, so that the load material may damage the sidewalks of the truck or loadable vehicle and difficulties are encountered in loading the vehicle entirely evenly.

To make possible a better aimed unloading, scoops have been developed comprising a bottom which is a trap door capable of being opened for unloading. Such scoops which are actuated by means of a swing boom and dipper arm serve for excavating of deep dregings and also for obtaining material along vertical walls. Grasping work cannot be carried out with the trap door. Also, such scoops are cumbersome to actuate since in most cases they are rigidly secured to the dipper arm. An object of the present invention is to provide power transfer mechanism for excavator bucket operation which overcomes the foregoing disadvantages, drawbacks and difficulties.

A further object of the invention is to provide a loading bucket for a hydraulically operable heavy excavating machine which is usable for taking up and unloading load materials in such a way that in addition the two main portions of which the bucket consists are movable as to each other and can be used for grasping purpose.

A further object according to this invention is to provide a loading bucket pivotally connected to a dipper arm swingably journaled to the beam of the excavator in such a way that the power transfer of the hydraulic cylinder, which actuates the bucket, is effected by means of a link swingably journaled to the dipper arm above the turning point of the bucket and by means of a coupling member connecting the interengaging pivot portion of the hydraulic cylinder and link to a coupling pivot point below the bucket-turning point. The loading bucket is thus pivotally movable at a lower end of the dipper arm journaled to the excavator as a swinging arm carried by the overarching beam.

These and other objects and advantages of the invention will appear more clearly from the following specification in connection with the accompanying drawings in which an embodiment is shown as follows:

FIG. 1 is a side view of the excavating machine provided with a hydraulically actuated loading bucket having features in accordance with the present invention;

FIG. 2 is a side view of the bucket of the present invention in an open condition;

FIG. 3 is a fragmentary perspective view of the bucket actuating cylinder mechanism having a box formed housing therewith.

Further in accordance with the present invention the sidewalks forming the side limits of the backwall consists of an inner sidewalk, an outer sidewalk and bands interconnecting these inner and outer sidewalks for protective accommodation on all sides of the swing actuating mechanism of the bucket front portion in the form of a box-shaped housing, surrounding the hydraulic actuated cylinder means. The present invention makes it possible to load surfaces that are located high above the ground level with a minimum falling distance of the load material. The operator can thus more easily distribute the load material evenly on a loading surface than with previously customary tilttable load buckets with excavating machines and thus there is achieved a better utilization of the loading surface.
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cylinder actuator means 19, 20. The actuator means 19, 20 is enclosed within the box-formed housing of the bucket back portion 15 including sidewalks 18 and interconnecting band 25. A pivot pin 26 journals the actuator means 19, 20 at a lower end thereof between the sidewalks and is parallel to bolt 22 and shaft 17.

It is, of course, to be understood, that the present invention is, by no means, limited to the particular arrangements shown in the drawings, but also comprises any modifications within the scope of the appended claims.

I claim:

1. A bucket-actuating means for an excavating machine having a body relative to which a cantilever beam is journaled to move up and down and a dipper arm is pivotally connected to said cantilever beam at one end thereof movable to and fro with respect to said body, comprising: a bucket back portion and bucket front portion journaled at an upper pivot permitting opening and closing movement relative to each other, a pivot means interconnecting said bucket back portion and said dipper arm in a location below said upper pivot of said back and front portions, actuating means journaled to said dipper arm and having a force transmitting end point, a rocker arm pivotally journaled above said pivot means to said dipper arm and said end point of said actuating means, a coupling member pivotally joined between said end point and said bucket back portion below both said pivot means and said upper pivot, said actuating means at said force transmitting end point thereof causing arm and coupling member movement for tilting said back portion about said pivot means, said bucket back portion having sidewalks forming side boundary thereof including an inner sidewalk, and an outer sidewalk and band means interconnecting said inner and outer sidewalks which are box forming for all around protective accommodation of the pivot actuation of said bucket front portion.

2. The bucket-actuating means according to claim 1, in which for opening and closing said bucket front portion relative to said bucket back portion an actuator is provided and is enclosed by said box forming sidewalks and band means.

3. The bucket-actuating means according to claim 1, in which an assembly opening is provided between said box forming sidewalks and a removable lid covers said assembly opening.

4. The bucket-actuating means according to claim 2, in which a bolt is provided transversely of said actuator and crescent-formed opening means in at least one of said sidewalks receive said bolt which transmits movement to effect opening and closing of said bucket front portion relative to said bucket back portion.

5. The bucket-actuating means according to claim 4, in which said upper pivot journaling said bucket front portion to said bucket back portion is radially aligned with said crescent-formed opening means.

6. The bucket-actuating means according to claim 5, in which a bellcrank interconnects said bolt and said upper pivot.

7. The bucket-actuating means according to claim 6, in which a pin journals said actuator between said box forming sidewalks and is mounted transversely of said sidewalks below both said bolt and said upper pivot.

8. The bucket-actuating means according to claim 7, in which said pin is parallel to both said bolt and said upper pivot within said box forming sidewalks.

9. The bucket-actuating means according to claim 8, in which said arm, said coupling member and said bucket back portion are pivotally movable in a triangular relationship that is over center with respect to said pivot means and always to one side of said pin.