Nov. 13, 1923. 1,474,314

P. BURKE

EXCAVATOR

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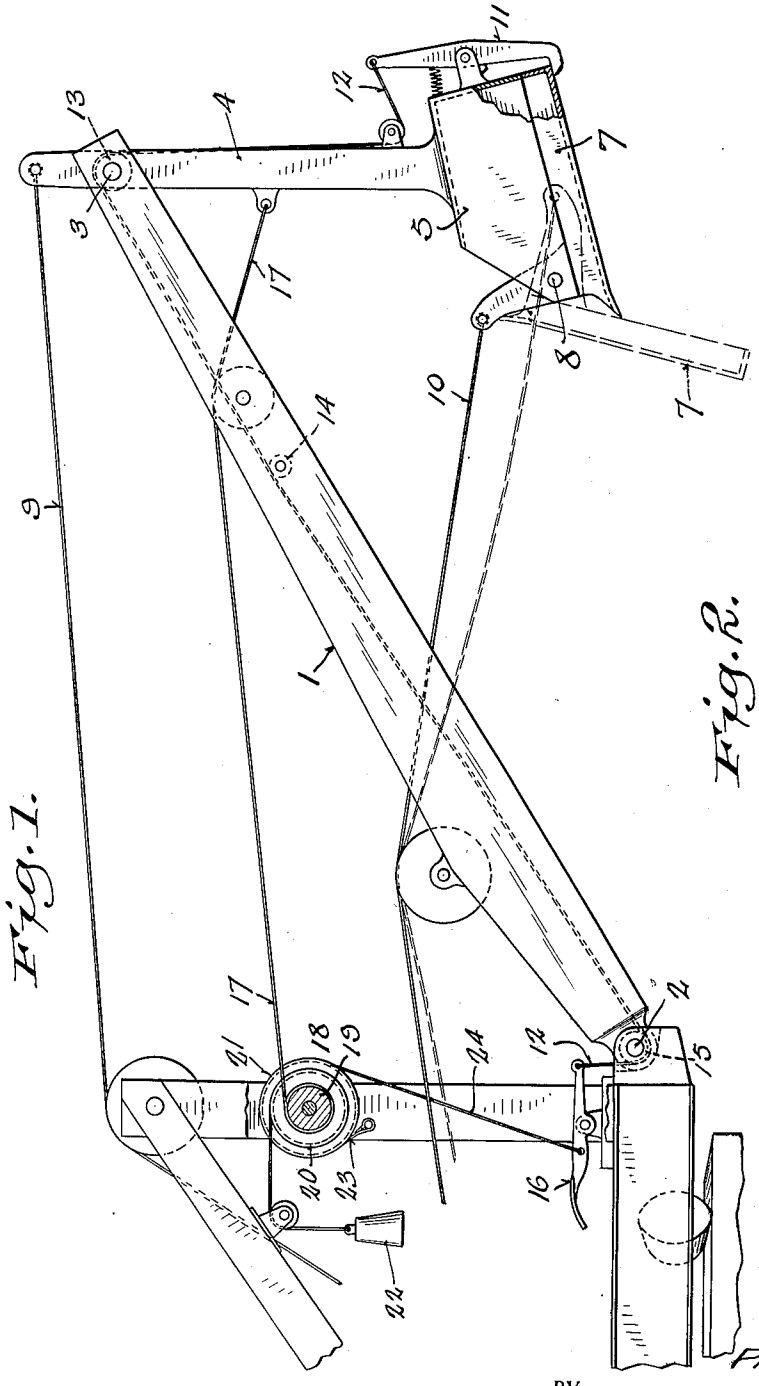



Fig. 1.

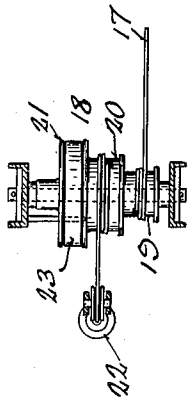



Fig. 2.

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# UNITED STATES PATENT OFFICE.

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## EXCAVATOR.

Application filed November 27, 1922. Serial No. 603,536.

*To all whom it may concern:*

Be it known that I, PAUL BURKE, a citizen of the United States of America, and a resident of the city of Green Bay, Brown County, Wisconsin, have invented certain new and useful Improvements in Excavators, of which the following is a specification.

My invention relates particularly to excavators of the type known as modified drag line where the bucket or dipper that does the excavating is carried by a handle which is mounted on a boom and is operated toward the machine by the pull of the drag line. The handle and boom are so mounted and connected that the dipper may be raised and lowered and swung from side to side so that the dipper can assume a variety of positions.

One of the objects of my invention is to permit of the use of this type of excavator in connection with a dipper having a hinged door adapted to be closed by the drag line. Where such a dipper is used in connection with the type of excavator referred to, unless restraining means are used to limit the outward swinging of the dipper handle relative to the boom, the paying out of the drag line after the digging operation is completed will result in movement of the dipper handle outward without opening the door until a position of equilibrium is attained. The operator thus has no control over the point at which dumping will start. It is one of the objects of my invention to provide means whereby the operator may definitely predetermine the point at which dumping shall start.

Carrying further the operation described, a complete slacking of the drag line results in dumping the dipper contents, the release of which effects a progressive reduction in the weight of the dipper so that by the time dumping is completed the dipper and dipper handle will have moved a certain distance beyond their position at the moment of starting dumping. It is thus impossible to confine the dumping of material to a restricted area, which is objectionable, especially when loading into wagons, etc. It is one of the objects of my invention to permit dumping of the dipper contents at a predetermined point.

It is a further object of my invention to produce a construction which will permit the dipper or the bottom thereof to be jarred or slammed by pulling on the drag line so that adhesive material, such as clay or gumbo and the like will be cleared therefrom without changing the elevation or position of the dipper and dipper handle.

It is a further object of my invention to provide simple and effective means for the release of the latching mechanism which are substantially unaffected by the angular movement of the dipper handle and (or) boom and to provide means that will make said latch releasing mechanism coact with the means employed to restrain the boom from outward movement, thus simplifying manual control.

In the accompanying drawings:

Figure 1 is a side elevation of a power operated modified drag line excavator embodying the principles of my invention; and

Figure 2 is a plan view of the automatic drum, part thereof being shown solid and part in section.

As is illustrated, the excavator is of the form in which the boom 1 is rotatably mounted on a pivot 2 and carries a pivot 3 on which is mounted a dipper handle 4. The dipper handle 4 carries a dipper 5 comprising a body portion 5 and a hinged bottom 7 which is carried by the pivot 8.

The dipper handle is raised and extended outwardly by the hoisting line 9 and the dipper is operated through the digging cycle by the drag line 10 which is attached to the upper end of the door 7 as shown. The door 7 is held normally closed by the latch 11 and this in turn is operated by the trip line 12 which passes over the sheaves 13, 14, and 15 and is dead-ended on the lever 16. This lever I have shown in the form of a pedal but it may be adapted for either manual or pedal control.

The dipper handle is also provided with a holding line 17 which is attached to the lower portion of the dipper handle as shown and is dead-ended on an automatic drum 18. This automatic drum is shown more in detail in Fig. 2 and consists of three drums 19, 20, and 21, the hoisting line 17 being wound around drum 19 and a counterweight 22 being supported by drum 20 and drum 21 being used as a brake drum, friction being put thereon by the brake band 23 which is operated by the line 24 which is connected to the lever 16.

The entire mechanism is customarily mounted either on a pivot or a turntable so that it may be swung in a horizontal plane

and is operated by a steam engine or any other prime mover.

In operation the boom is first raised and the dipper extended by pulling on the hoisting line and paying out on the drag line, the bottom having been previously closed to assume the position shown by the full lines in Fig. 1. The dipper is then lowered to contact with the material to be excavated by paying out on the hoisting line 9 and the digging is done by slacking off on the hoisting line and drawing the bucket toward the machine by the drag line 10. As soon as the dipper is full or has completed its cycle, it, together with the handle and boom, are raised by hoisting on the hoisting line while keeping tension on the drag line, the boom is swung around to the place at which the material is desired to be dumped, the operator depresses the lever 16 which operates to release the latch and simultaneously clamps the brake band around the brake drum and therefore locks the holding line against movement. This releases the latch, the door opens and assumes the position shown in dotted lines in Fig. 1, and allows the material to be deposited free of the dipper. By reason of the locking of the drum and holding line it is impossible for the dipper handle to move and it retains its position while dumping. If it were not for this line the weight of the dipper, the dipper handle and boom acting on the hoisting line would operate to lower the boom and extend the dipper handle and the material would not be deposited where desired. If the material is of a sticky nature and does not promptly clear from the bucket, the door may be reciprocated or even caused to slam violently against the dipper by intermittent pulls on the drag line.

After the material is dumped, tension is put on the drag line so that the door is again made to assume the position shown in full lines in Fig. 1, the lever is released, which releases the tension on the holding line, and allows the latch to assume its normal position, holding the door closed. The hoisting line is then paid out until the dipper is in contact with the earth and the cycle is repeated.

It will be noted that the holding line is never slack, being kept taut by the counterweight acting on the automatic drum as shown.

If desired, variations of form or mechanism may be used, as for example, I may dispense with the latch and rely upon the tension of the drag line to keep the door closed, I may substitute a drum over which the holding and latch lines are wound for the lever, the door of the dipper may be located on the outwardmost end thereof instead of on the bottom as shown, and other variations may be made to accomplish the results which are desired to be accomplished, and I do not want to be understood as limiting my invention to the specific form of mechanism shown excepting in those claims wherein it is so distinctly claimed and described.

Having fully described my invention, I claim:

1. A device of the class described comprising a boom, a dipper handle pivotally mounted thereon and carrying a dipper, a hoisting line attached to the dipper handle, a dipper door pivotally connected to the dipper, a drag line operatively connected to the dipper door, a latch, and means for simultaneously releasing the latch and preventing motion of the dipper handle.

2. A device of the class described comprising a boom, a dipper handle pivotally mounted thereon and carrying a dipper, a hoisting line attached to the dipper handle, a dipper door pivotally connected to the dipper, a drag line operatively connected to the dipper door, and a holding line attached to the dipper handle.

3. A device of the class described comprising a boom, a dipper handle pivotally mounted thereon and carrying a dipper, a hoisting line attached to the dipper handle, a dipper door pivotally connected to the dipper, a drag line operatively connected to the dipper door, a latch, a holding line, a latch line, and a lever for simultaneously operating the holding line and latch line.

4. A device of the class described comprising a boom, a dipper handle pivotally mounted thereon and carrying a dipper, a hoisting line attached to the dipper handle, a dipper door pivotally connected to the dipper, a drag line operatively connected to the dipper door, a latch, a holding line, a latch line and an automatic drum on which the holding line is wound, means for keeping the holding line taut, a brake band for braking the automatic drum, sheaves mounted on the boom substantially coincident with the pivotal centers thereof and over which the latch line passes, and a lever for simultaneously locking the brake and releasing the latch.

PAUL BURKE.