Dec. 2, 1924. 1,517,772

E. M. COLE

GRADING MACHINE

Filed May 28, 1923 2 Sheets-Sheet 1

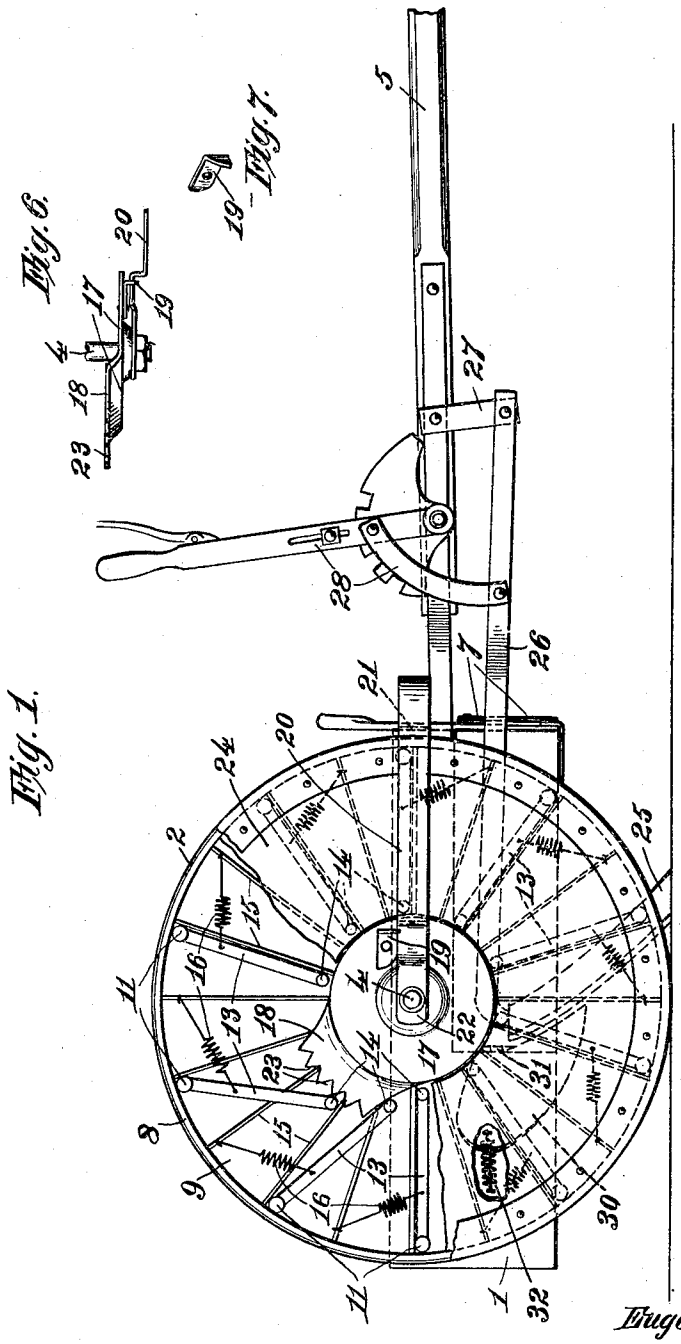


Fig. 1.

Fig. 6.

Fig. 7.

Inventor

Eugene M. Cole,

By Joshua R. H. Potts

Attorney

Dec. 2, 1924. 1,517,772

E. M. COLE

GRADING MACHINE

Filed May 28, 1923 2 Sheets-Sheet 2

Fig. 2.

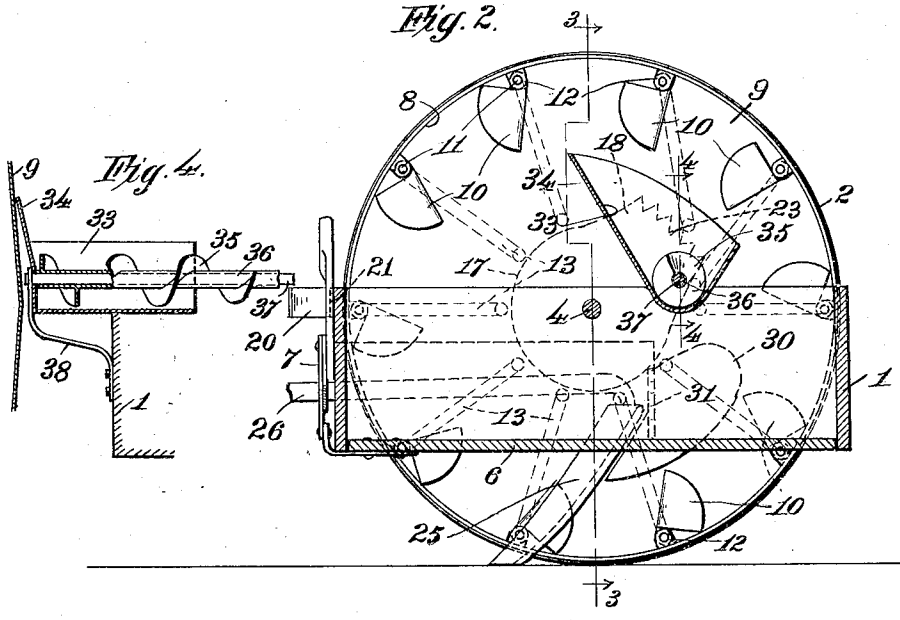


Fig. 4.

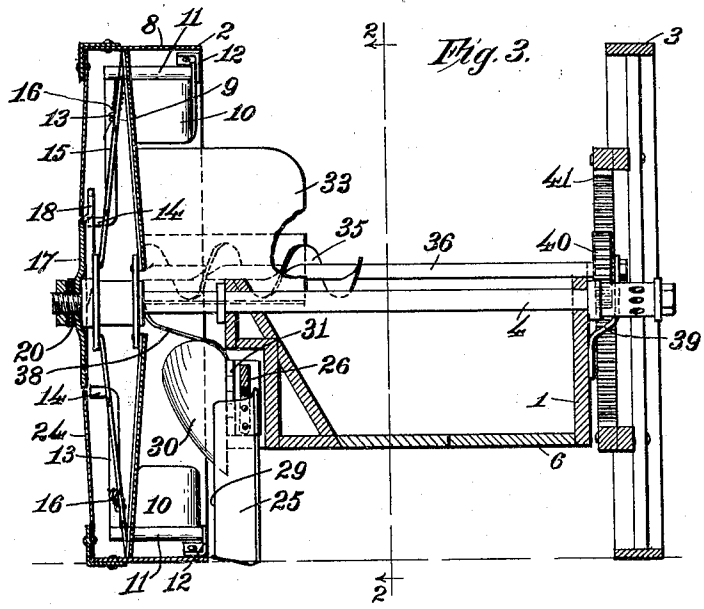
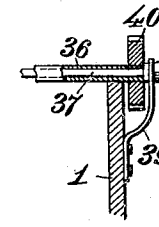


Fig. 3.

Fig. 5.



Inventor

Eugene M. Cole

By Joshua R. H. Potts

Attorney

Patented Dec. 2, 1924. 1,517,772

UNITED STATES PATENT OFFICE.

EUGENE M. COLE, OF CHARLOTTE, NORTH CAROLINA.

GRADING MACHINE.

Application filed May 28, 1923. Serial No. 642,004.

To all whom it may concern:

Be it known that I, EUGENE M. COLE, a citizen of the United States, residing at Charlotte, county of Mecklenburg, and State of North Carolina, have invented certain new and useful Improvements in Grading Machines, of which the following is a specification.

My invention relates to grading machines; and the object of my invention is to provide a grading machine adapted to be operated by one man, whereby the dirt to be removed may be plowed up and automatically loaded into a container, carried to the desired location and dumped, and the grading machine returned for further operation.

In carrying out my invention, I provide a container mounted upon wheels and equipped with means for drawing or driving the same. One of the wheels is formed with a broad rim and equipped with a plurality of buckets on or adjacent the inner surface of the rim. A plow is provided adjacent the wheel for plowing up the dirt that it is desired to remove and throw the same into the wheel where it is lifted by the buckets, as the wheel revolves, to the upper arc of the wheel, from whence the dirt is dropped into a chute or hopper. From the chute or hopper the dirt is conveyed into the container. The container is provided with a dump bottom for discharging the dirt when desired.

A further and particular object of my invention is to provide means to insure a proper and complete dumping of the several buckets into the chute or hopper. A further object of my invention is to provide in a device of the class mentioned, a plow having a mold board extending into the wheel and of such construction that neither the plow nor the buckets will become injured by the wedging of stones or clods of dirt or other objects between the same. A further object of my invention is to provide improved means for discharging the dirt from the chute or hopper into the container, to properly distribute the same. Other objects will appear hereinafter.

With these objects in view my invention consists generally in a grading machine of the character above stated in which the buckets are pivotally mounted and normally held in a load holding position, and means for automatically swinging the buckets to dumping position when they reach a position above the chute or hopper. My invention further consists in a device as mentioned in which the bucket operating device, comprises a cam and an arm on the bucket adapted to co-operate with the cam for dumping the bucket. My invention further consists in providing the cam with a serrated portion over which the bucket operating arms pass for giving a jarring action to the buckets to insure loosening and discharging all dirt therefrom. My invention further consists in a device as mentioned in which the cam will remain in fixed position to operate the buckets during a forward movement of the grading machine, and will rotate with the wheel; and thereby become inoperative, upon reverse or backing movement of the device. My invention further consists in a grading machine as mentioned in which the plow is provided with a hinged mold board extending into the wheel and spring held in operative position so that should stones, hard clods of dirt, or other objects, tend to become wedged between the wheel or buckets and the mold board, the latter will swing to permit the same to pass without injury to the device. My invention further consists in a device as mentioned in which a chute or hopper is arranged transversely of the dirt box to receive the dirt from the buckets, and a screw conveyor arranged therein for discharging the dirt into the dirt box. My invention further consists in a device as mentioned in which the said conveyor is geared to one of the wheels of the device to be rapidly driven thereby for distributing the dirt in the dirt box. My invention further consists in a device as mentioned in which the bucket containing wheel is provided with a web adjacent the outer ends of the buckets and in which the hopper or chute extends to a point adjacent said web, and is provided with a scraper to remove the dirt therefrom. My invention further consists in various details of construction and arrangements of parts, all as will be fully described hereinafter and particularly pointed out in the claims.

My invention will be more readily understood by reference to the accompanying drawings forming a part of this specification and in which—

Fig. 1 is a side elevation of a grading machine embodying my invention,

Fig. 2 is a vertical longitudinal section of a device on substantially the line 2—2 of Fig. 3,

Fig. 3 is a vertical transverse section on substantially the line 3—3 of Fig. 2, the buckets at the back of the wheel being omitted for clearness of illustration,

Fig. 4 is a detail sectional view on the line 4—4 of Fig. 2, illustrating the hopper and screw conveyor and the mounting of the conveyor shaft,

Fig. 5 is a similar detail section, illustrating the mounting at the opposite end of the conveyor shaft.

Fig. 6 is a detail plan view of the bucket operating cam and associate parts, and

Fig. 7 is a detail perspective view of a dog associated with the cam.

Referring now to the drawings, 1 indicates a dirt box or receptacle, which in the form of my invention shown in the drawings, comprises the body of the device. This is supported on wheels 2 and 3, mounted on a transverse axle 4. In carrying out my invention, I contemplate having the device either horse drawn or forming part of a tractor, but as the essential elements of the invention are the same in either case, I have illustrated the former construction only; and to this end, the device is shown as provided with a pole 5 to which the draft animal may be hitched. The box or receptacle 1 is provided with a dump bottom 6 operated by a dumping lever 7. The specific form of the dumping mechanism forms no part of my invention, and therefore, is illustrated conventionally only.

The wheel 2 is formed with a broad rim 8 and with a web 9, preferably of sheet metal and positioned a considerable distance from the inner edge of the rim. Around the inner face of the rim, between the web 9 and the inner edge of the rim, are a plurality of buckets 10, arranged at spaced intervals.

Each bucket is fixed to an oscillatory shaft 11 having a bearing in the web 9 adjacent one side of the bucket and the bearing in a bracket 12 at the inner end of the bucket adjacent the inner edge of the rim 8. The end of the shaft 11 projects a short distance beyond the web and is provided with a substantially radial extending arm 13, having its inner end bent outwardly as at 14. The wheel is also preferably provided with spokes 15 and those adjacent the arms 15 form stops for said arms when they are in normal position. Springs 16 are provided which normally hold the arms 15 against the stops. It is obvious that the wheel may be constructed so that the spokes 15 may be dispensed with and other stops provided for the arms.

Loosely mounted on the shaft 4 on the outer side of the hub of the wheel is a cam member comprising a disc 17 and a cam portion 18, the latter being offset into the path of the ends 14 of the bucket operating arms 13. A dog 19 is fixed to the cam disc 17 and normally engages a spring arm 20, one end of which is fixed as at 21 to the receptacle 1 and the other end 22 being perforated to receive the end of the shaft 4. It is obvious that with this construction, as the grading machine is moved forwardly, the dog 19 will engage the spring arm 20 and prevent rotation of the cam, but that upon a reverse or backward movement of the machine, the cam will be free to rotate with the wheel and thus not operate the buckets.

The cam portion 18 is so positioned that it will be engaged by the ends 14 of the bucket operating arms when the buckets are in proper position for dumping. To insure complete emptying of the buckets, particularly when the dirt is wet and sticky, the outer end of the cam is formed with a serrated face 23, which will give a jarring or vibratory motion to the bucket as the portion 14 of the arm 13 passes over the same. In order to prevent dirt from lodging in the wheel and interfering with the operation of the device, an outer cover plate is provided which extends from the periphery of the wheel to the disc 17 of the cam member. The bucket operating mechanism is, therefore, completely enclosed by the web 9, the plate 17, and cover 24.

Arranged adjacent the inner face of the wheel 2 is a plow 25, mounted upon a plow beam 26, the forward end of which is pivotally connected, preferably by a link 27 to the pole 5. Suitable means such as indicated at 28 is provided for raising and lowering the plow as desired, to throw the same into or out of operation. The side of the plow adjacent the wheel is straight, as indicated at 29, so that the same will not interfere with the wheel or the buckets when in either raised or lowered position. 30 indicates the mold board of the plow which is separated from the plow proper and hingedly mounted upon the body of the machine as at 31. A spring 32 normally holds the mold board in operative position. It will be noted that the mold board extends within the wheel above the buckets, so as to effectually throw the dirt into the wheel. Should large stones or heavy clods of dirt or other articles thrown into the wheel by the plow, tend to be wedged between the bucket and the mold board, the mold board will swing outwardly against the tension of the spring thereby avoiding injury to the device.

33 indicates a trough or hopper arranged in position to receive a deposit from the buckets as they reach dumping position. This hopper extends transversely of the machine from a point adjacent the web to a position within the receptacle 1. The outer wall of the hopper is preferably inclined outwardly as shown in Fig. 4, and forms a scraper for the web 9. Arranged in the bot-

tom of the hopper is a screw conveyor 35. This is formed on a sleeve 36 rotatably mounted on a stationary shaft 37, the ends of which are mounted in brackets 38 and 39, at opposite sides of the receptacle 1. The end of the sleeve 36 opposite that on which the screw conveyor is formed is provided with a pinion 40 which meshes with an internal gear 41 on the wheel 3. It is obvious that the screw conveyor will be driven at a comparatively rapid speed, so that the dirt deposit in the hopper will be quickly thrown into the receptacle 1 and properly distributed therein.

It is obvious that the device is adapted to be operated by one man, whether the device may be in the form of a horse drawn machine as illustrated in the drawings, or, if embodied in a tractor. No separate loading vehicle is required, but the dirt to be removed is plowed up, thrown into the wheel, elevated above the hopper and deposited in the latter from whence it is distributed into the receptacle which constitutes a part of the machine. When the latter is full the machine is driven to where it is desired to deposit the dirt, the dirt dumped and the machine is returned for further operation. As soon as the receptacle is full, the plow is raised by any suitable mechanism, such as indicated in the drawings, and it is held in raised position until the machine is ready for further excavating. In view of the vibration imparted into the buckets, which will also, in a measure, effect the web of the wheel, and in view of the scraping action of the end of the hopper on the web, it is obvious, that the dirt will not stick to and accumulate on the shovels and web of the wheel no matter how moist and sticky the dirt may be. By extending the mold board of the plow into the wheel above the lowermost buckets, greater efficiency and more rapid work is assured; and by having the mold board hinged as described and spring held in operative position, there is no danger of breaking the device by stones, hard clods or other matter becoming wedged between the buckets and the mold board. By having the screw conveyor revolved rapidly, the dirt is not pushed from the hopper into the receptacle, but is thrown thereinto, which prevents the device from becoming clogged with wet and sticky dirt, and more evenly distributes the dirt in the receptacle.

I claim:

1. In a grading machine, a tractor wheel, a plow adapted to throw the dirt into the said wheel, oscillatory buckets carried by said wheel for elevating the dirt, and means for swinging said buckets, to dump the same when they reach a predetermined position, substantially as described.

2. A device as set forth in claim 1 in which the bucket operating means comprises an arm fixed to the bucket and a co-operating cam adjacent the wheel, substantially as described.

3. A device as set forth in claim 1 further characterized by means for vibrating the bucket while in dumping position, substantially as described.

4. In a grading machine, a wheel and a plow for turning dirt thereinto in combination with buckets arranged within said wheel for elevating the dirt, means normally holding the buckets in dirt retaining position, a cam, an arm fixedly connected to each bucket and adapted to engage said cam when the buckets reach dumping position and means on said cam for vibrating said buckets when in dumping position, substantially as described.

5. A device as set forth in claim 4 in which said vibrating means comprises a plurality of serrations on the edge of said cam adapted to be engaged by said arms, substantially as described.

6. In a device of the class described, a container mounted upon wheels, one of said wheels having a broad rim, buckets arranged at intervals within said wheel adjacent the rim, said buckets being pivotally mounted and provided with inwardly extending arms, a cam adjacent said wheel and adapted to engage said arms when the buckets reach a predetermined position for dumping the same and means for receiving the dirt from said buckets and depositing the same in said receptacles, substantially as described.

7. A device as set forth in claim 6 in which said cam is provided with a serrated arm engaging face for vibrating buckets while in dumping position, substantially as described.

8. A device as set forth in claim 6 in which the cam is loosely mounted adjacent said wheel and adapted to rotate with the same when the device is moved backward or in reverse direction, and means to prevent rotation of the cam as the device is moved forwardly, substantially as described.

9. A device as set forth in claim 6 in which the dirt receiving and distributing means comprises a hopper into which the buckets are adapted to dump, and a screw conveyor for depositing the dirt from the hopper into the receptacle, substantially as described.

10. In a device of the class described, a container mounted upon wheels, one of said wheels having a broad rim, buckets arranged at intervals within said wheel adjacent the rim, said buckets being pivotally mounted and provided with inwardly extending arms, a cam adjacent said wheel and adapted to engage said arms when the buckets reach a predetermined position for dumping the same, a hopper into which the buckets are adapted to dump, and a screw conveyor for

depositing the dirt from the hopper into the receptacle, substantially as described.

11. A device as set forth in claim 6 in combination with a plow for throwing the dirt into said wheel and means for raising and lowering the plow, substantially as described.

12. A device as set forth in claim 10 in combination with a plow for throwing dirt into said wheel and a hinged mold board for said plow extending into said wheel, substantially as described.

13. A device as set forth in claim 10 in combination with a plow for throwing dirt into said wheel, means for raising and lowering the plow and a hinged mold board for said plow mounted upon the receptacle and extending into said wheel, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

EUGENE M. COLE.

Witnesses:

H. F. WOLFE,

E. A. BROOKS.