

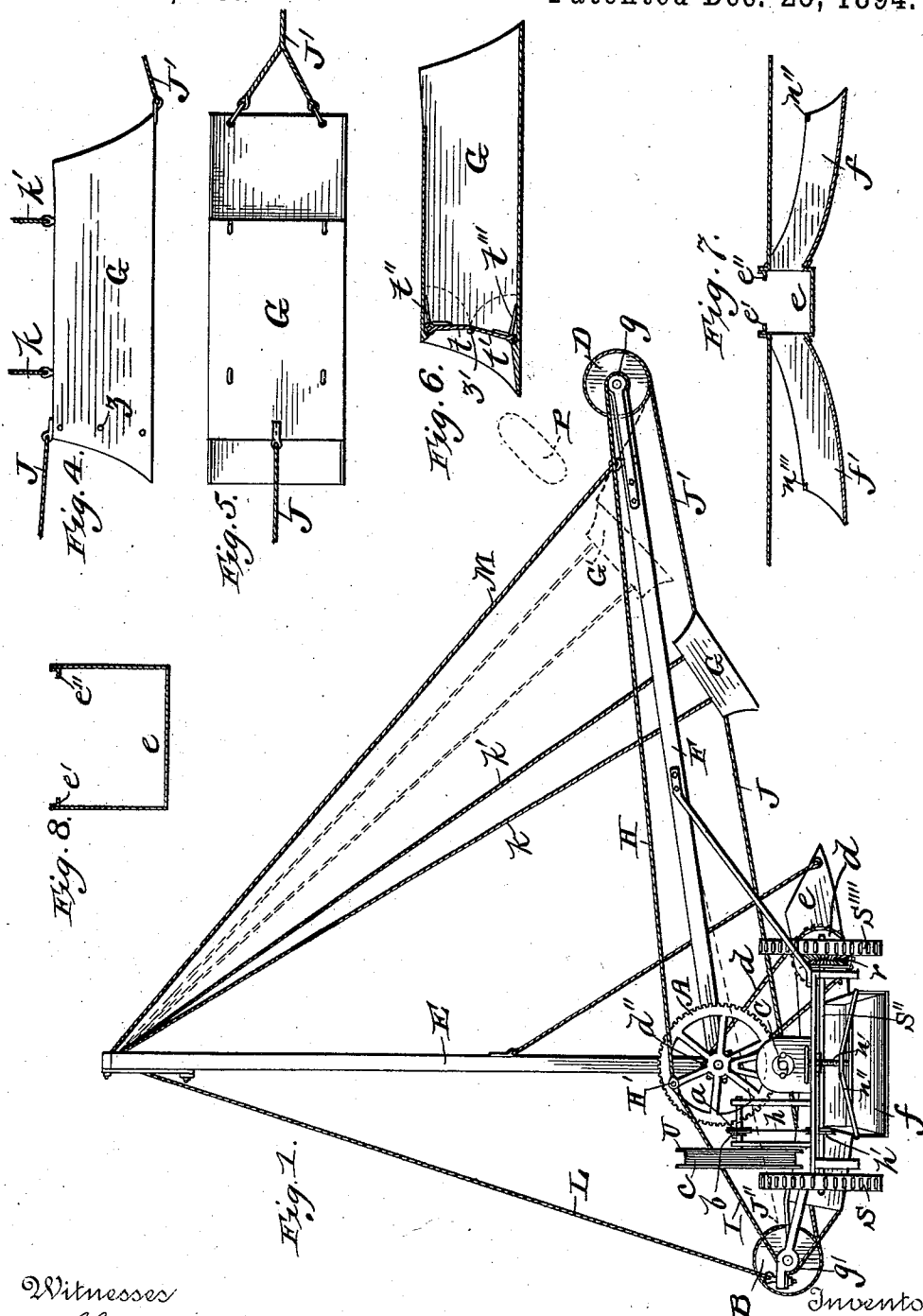
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3 Sheets—Sheet 1.

W. G. PRICE.
MACHINE FOR BUILDING EMBANKMENTS.

No. 531,385.

Patented Dec. 25, 1894.



Witnesses

Everance.
W. Harvey Muzzey.

Inventor
William G. Price
By *Maximilian M. Lawrence*
Attorneys

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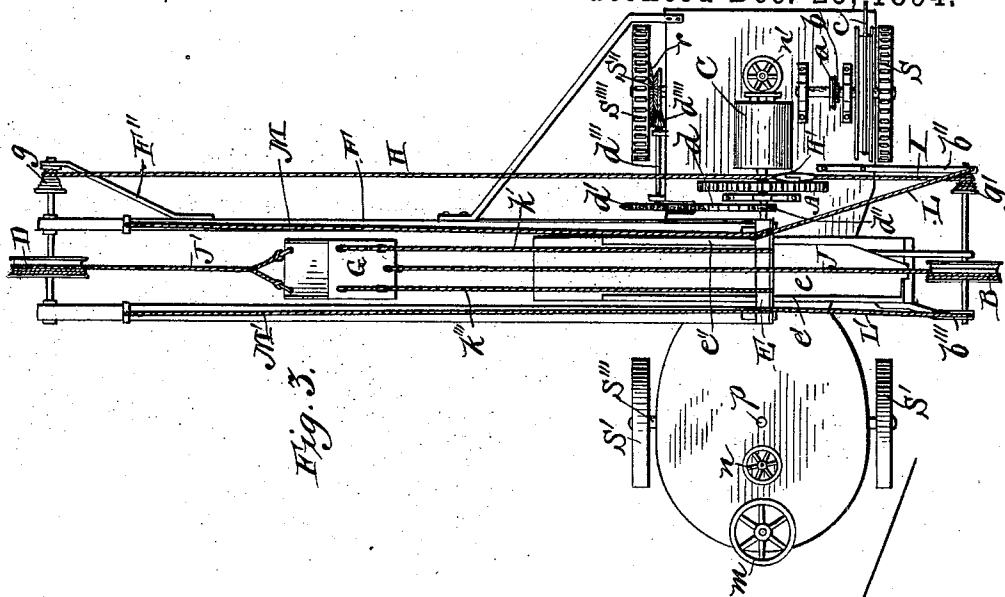


Fig. 3.

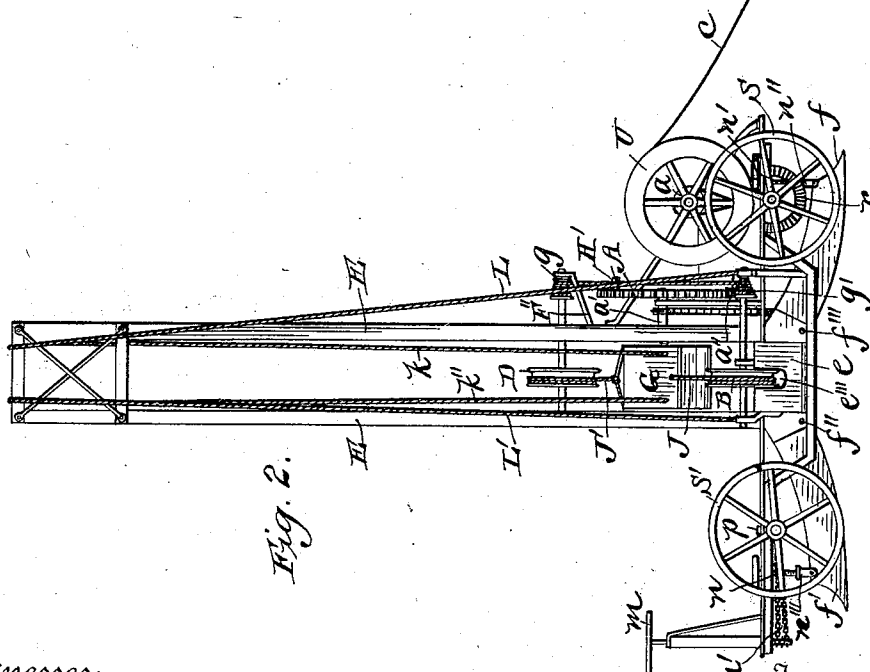


Fig. 2.

Witnesses

Governance.
W. Harvey Muzzey

Inventor
William G. Prier
by
Merritt F. Lawrence
Attorneys

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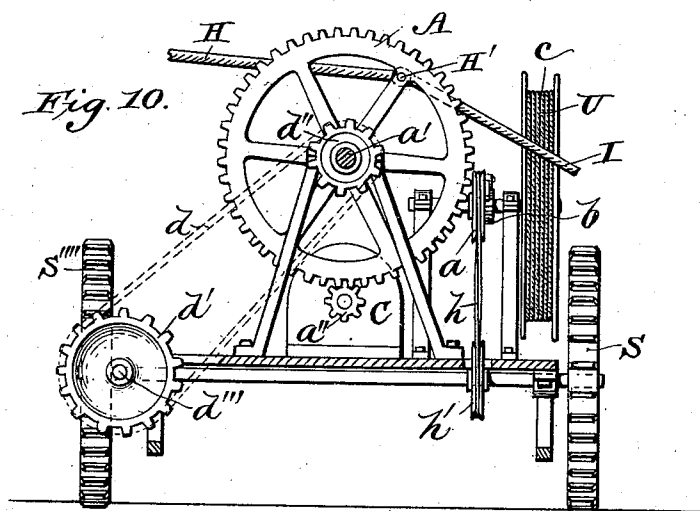
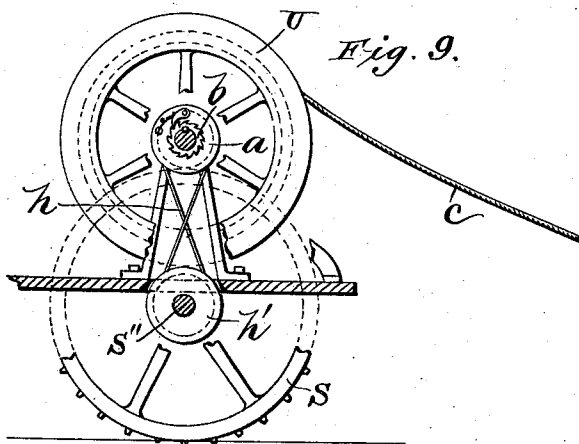
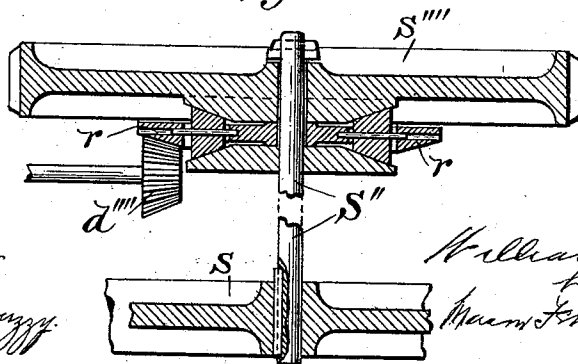


Fig. 11.



Witnesses

George

W. Harvey Muzzey

Inventor

William L. Price

by
Marion F. Smith
Attorneys

UNITED STATES PATENT OFFICE.

WILLIAM G. PRICE, OF SIOUX CITY, IOWA.

MACHINE FOR BUILDING EMBANKMENTS.

SPECIFICATION forming part of Letters Patent No. 531,385, dated December 25, 1894.

Application filed March 22, 1894. Serial No. 504,701. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM G. PRICE, a citizen of the United States, residing at Sioux City, in the county of Woodbury and State of Iowa, have invented certain new and useful Improvements in Machines for Building Embankments; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to that type of machines for building embankments which excavate the earth from a borrow pit and deposit it on the embankment being constructed, the borrow pit being close to the embankment and extending parallel with it.

The great difficulty to be overcome in machines of this kind is that of transporting the material from the borrow pit to the embankment. A machine having a carrier long enough for this purpose, would be too heavy to move about on wheels. I overcome this difficulty by constructing a machine which carries the earth only a short distance and then throws it, in a body of a cubic foot or more, through the air, to the embankment. The energy required to transport earth in this way will not be as great as is required by the methods now in use, when the distance it has to be thrown is not over one hundred feet.

My invention consists of a double scraper on wheels which scrapes up the earth when the wheels are moving in either direction forward or backward, and of a throwing scraper or bucket, which picks up the earth after the first scrapers have lifted it from the ground, and throws it to the embankment.

In the accompanying drawings: Figure 1 represents an end elevation of a machine for building embankments constructed in accordance with my invention. Fig. 2 is a side elevation of the same; Fig. 3, a plan of the same. Fig. 4 is a side elevation of the throwing bucket. Fig. 5 is a plan of the same. Fig. 6 is a vertical central section of the same. Fig. 7 is a vertical section through the double scraper, and trough in which the throwing bucket swings. Fig. 8 is a vertical cross section of the trough through which the throwing bucket swings. Fig. 9 represents a detail side elevation of the reel operating mechanism.

Fig. 10 represents a rear elevation of the gearing for connecting the motor with the wheel of the wagon, and Fig. 11 represents a detail horizontal section of a portion of said gearing.

The operating devices are carried on a four wheeled wagon which is propelled preferably by an electric motor C, the current being carried to the motor by an insulated cable c from the generating plant, which for building levees would be placed on a barge on the river close to the location of the proposed levee; or the electric motor can be dispensed with and a vertical boiler and engine can be used in place of it.

In the drawings, C is an electric motor mounted on the wagon and the electric current is transmitted to this motor from the generating plant, through an insulated cable which is wound on the reel U. As the machine moves along the borrow pit the cable c unwinds from the reel and lies on the ground, and when the machine comes back along the borrow pit the reel U winds up the cable again. The reel U is turned by the belt h which passes around the pulley a on the reel shaft and around the pulley h' on the wagon axle S''. The pulley a is smaller than the pulley h' so that the reel U tends to revolve faster than the wheel S, but when the cable c is wound up taut the belt h slips, but always keeps the cable taut. The pulley a is connected with the reel shaft by a ratchet and pawl mechanism b which will turn the reel only when the machine is moving in one direction. When the machine is moving away from the generating plant and the cable has to unwind, the ratchet and pawl do not engage, but when the machine is moving in the opposite direction the pawl does engage and turns the reel and thus winds up the cable.

The shaft of the electric motor turns the pinion wheel a'' and this turns the spur wheel A which is carried by the shaft a'. The sprocket wheel d'' turns the sprocket chain d which turns the sprocket wheel d' and shaft d'''. The pinion wheel d''' turns the spur wheel r, which is connected with, and turns the axle S'' and wheel S'''. The wheel S is keyed to the axle S'' and the wheel S''' turns loose on the axle, and the driving mechanism is constructed in the usual way to allow of

one wheel turning faster than the other as is necessary when the machine is traveling around a curve.

The scrapers f and f' are hinged at f'' and f''' , and are supported by the trusses n'' and n''' and screws n and n' . The machine is guided or steered by the wheel m , and chain m' which is connected with the axle S''' so as to turn it around the king bolt p , the wheels S' being loose on the axle. As the machine moves along, the scraper f or f' is lowered so as to scrape up the earth and force it into the bucket trough e . The wheel A carries the pin H' to which are connected the ropes H and I . These ropes pass around the pulleys g and g' which together with the pulleys B and D form differential pulleys by means of which the speed of the throwing bucket is made differential. The throwing bucket G is suspended by the ropes k k' k'' k''' and is connected to the pulleys B and D by the ropes J and J' . The throwing bucket is open at one end, and closed at the other by the gates t and t' . These gates can open inward but are prevented from opening outward by the lugs z and z' . The springs t'' and t''' hold the gates shut when they are not forced open.

The mast E is supported by the guy ropes L and the boom F which carries the pulley D is supported by the ropes M and M' and by the brace R .

As the wheel A revolves, it pulls the ropes H and I back and forth so as to cause them to alternately unwind, and wind up on their pulleys g and g' . This motion of the pulleys g and g' causes the ropes J and J' to alternately unwind and wind up again on their respective pulleys B and D , and sets in motion the throwing bucket G which passes through the trough e of the scraper, and is thus filled with earth, which passes in through the gates t and t' . As the bucket starts out again toward the pulley D the gates are closed by the springs t'' and t''' and the earth is carried until the bucket reaches the end of its journey, as shown in dotted lines at G' . The earth moving with a high velocity, passes out of the bucket and on to the embankment. It is shown in flight at P . The spool g increases in size as the rope I winds off of it and the spool g' increases in size as the rope H winds upon it. The effect of this construction is to cause the throwing bucket G to move slowly through the trough e and very rapidly when near the other end of its flight. The distance the earth will be thrown will depend on the velocity of the bucket G and the velocity of the bucket depends on the speed with which the whole machine moves along. The faster the machine moves along the more earth will be taken up by the scraper and the farther it will be thrown by the moving bucket. The trough e has two longitudinal lugs e' and e'' riveted to it which serve to hold the bucket G down while it is passing back and forth

through the trough. The top of the bucket passes under these lugs. The trough e can be extended so as to support the throwing bucket throughout its whole path, and the supporting ropes k k' k'' k''' can be dispensed with if desired.

Two or more plows can be attached to the forward ends of the scrapers to more readily loosen the earth so as to allow it to pass readily into the scrapers.

The end of the trough e nearest the pulley B is closed except a slot e''' which is left open for the rope J to pass through. The pulley B is supported by the lugs b'' and b''' , and the pulley D is given additional support by the brace F'' .

To reverse the direction in which the machine is moving it is only necessary to reverse the electric motor, and the throwing bucket continues to work just the same, whichever direction the machine is moving.

The length of the rope J is made just so that when the bucket has reached the end of its swing as at G' the rope J will have all run off its reel and be held by a knot at its end as shown by dotted lines J'' , in which position it is strained to stop the motion of the bucket and the motion of the pulley B . The rope J' is attached to the pulley D in the same manner.

The motion of the pin H' causes the throwing bucket to move slowly at each end of its swing and rapidly in the middle of its swing, but the effect of the conical spools g and g' is to make the point of highest speed of the bucket considerably nearer the pulley D and gives the motor the greatest leverage to haul the bucket when it is passing through the trough and being filled with earth. As the earth is thrown out of the bucket the gates t and t' open and admit air to take the place of the earth. When the borrow pit is so far from the embankment that the earth cannot be thrown the whole distance at once, it will be thrown part way and then afterward it will be again scraped up and thrown the remaining distance to the embankment.

The operation of the machine is as follows: The motor on the wagon is first started and thus moves the wagon forward, which movement causes the scraper f' to scoop up the earth in the borrow pit. As the machine continues to move forward the earth is forced from the scraper f' into the bucket trough e from which it is removed by the swinging bucket G as before described and thrown to the embankment which is being constructed. When the wagon reaches the end of its travel the motor is reversed and the wagon moves backward and the scraper f scoops up the earth instead of the scraper f' . The wagon is guided in its movements backward and forward by the wheel m , and all the time it is moving, the swinging bucket is throwing the earth from the bucket trough onto the embankment and thus the earth is distributed

evenly along the entire length of the said embankment. The swinging bucket is actuated with an eccentric movement as before described, so that the earth is thrown therefrom when it reaches the end of its outward movement.

What I claim as my invention is—

1. In a machine for building embankments the combination of a traveling wagon which carries a scraper, a stationary earth receptacle on said wagon, an oscillating bucket, means for pivotally supporting the bucket on the machine, said bucket in operating passing through the earth receptacle and removing the earth therefrom, and means for oscillating the bucket, substantially as described.

2. In a machine for building embankments, the combination of a scraper provided with a trough and an oscillating bucket adapted to remove the scraped earth from the trough of the scraper, substantially as described.

3. In a machine for building embankments the combination of a movable wagon carrying a double scraper which is provided with an open ended trough and an oscillating throwing bucket which moves at approximate right angles to the movement of the scraper and is adapted to remove the scraped earth from the trough of the scraper and throw it in the direction of the embankment, substantially as described.

4. In a machine for building embankments the combination of a movable wagon carrying a double scraper which is provided with an open ended trough and an oscillating throwing bucket which moves at approximate right angles to the movement of the scraper and is adapted to remove the scraped earth from the trough of the scraper and throw it in the direction of the embankment, said bucket being provided with an automatically operating gate which is adapted to be opened as the bucket is moved in one direction and closed

as it moves in the opposite direction, substantially as described.

5. In a machine for building embankments the combination of an oscillating bucket, the wheel A, pin H' on said wheel, pulleys B and D, ropes J and J' connected to bucket and passing about said pulleys B and D, differential pulleys *g* and *g'*, ropes H and I connected to wheel A and passing about the differential pulleys, substantially as described.

6. In a machine for building embankments the combination of a traveling wagon, a mast mounted thereon, a boom extending from said mast, an oscillating bucket, pulleys B and D, differential pulleys *g* and *g'*, ropes J and J' connected to the scraper and passing about the pulleys B and D and ropes H and I passed about the differential pulleys and connected with means for operating said ropes, substantially as described.

7. In a machine for building embankments the combination of a traveling wagon, a scraper having a trough provided with guiding lugs, an oscillating bucket adapted to work in said trough and remove the dirt from the same and throw it in the direction of the embankment, substantially as described.

8. In a machine for building embankments the combination of a traveling wagon, an oscillating bucket having an open front end and its rear end closed by automatically operating gates, springs for returning the gates to their normally closed position, the construction and operation being such that as the bucket swings backward the gates are partially opened and as the bucket swings forward the gates are closed, substantially as described.

In testimony whereof I hereunto affix my signature in presence of two witnesses.

WILLIAM G. PRICE.

Witnesses:

I. A. HARVEY,
O. B. TALLEY.