

(No Model.)

C. H. LA DUE.

COMBINED STREET SWEEPER AND EXCAVATOR.

No. 460,476.

Patented Sept. 29, 1891.

FIG. 1.

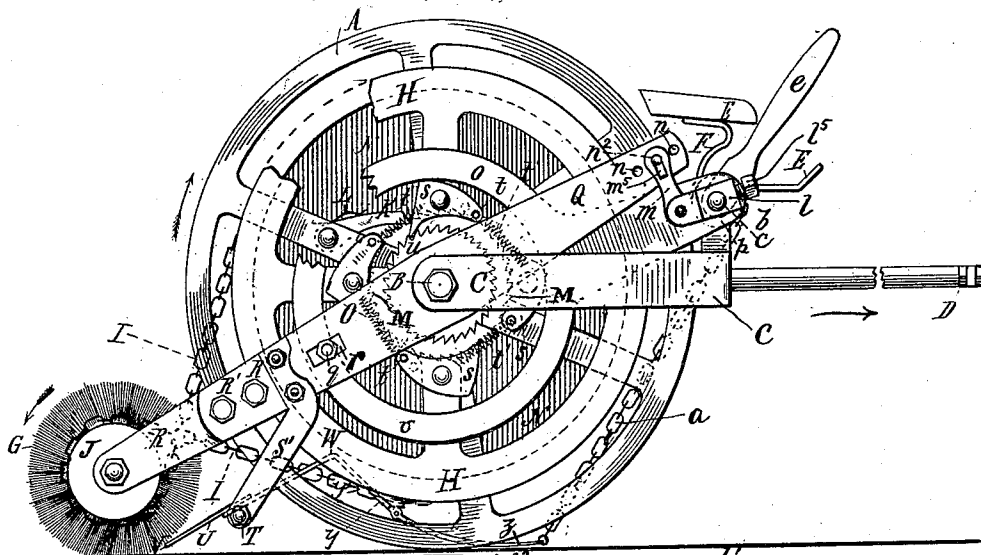
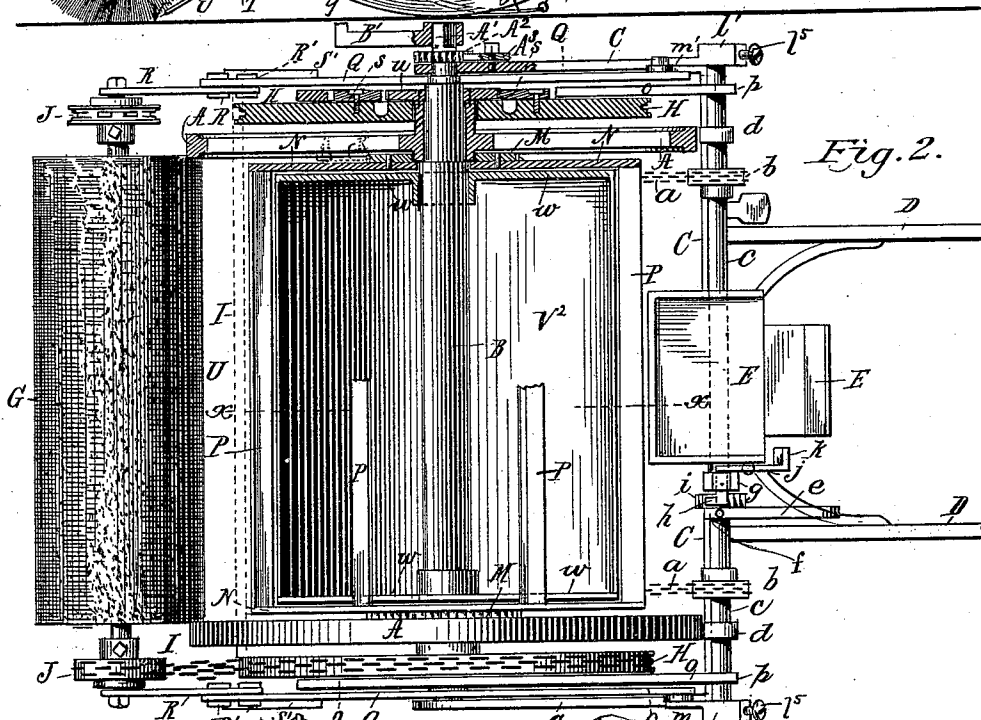


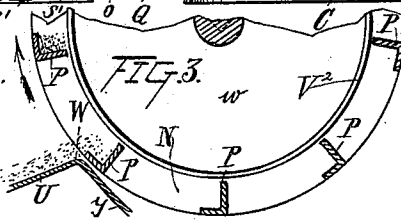
Fig. 2.



WITNESSES:

Edward C. Rowland.
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FIG. 3.



INVENTOR

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BY
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COMBINED STREET-SWEEPER AND EXCAVATOR.

SPECIFICATION forming part of Letters Patent No. 460,476, dated September 29, 1891.

Application filed February 18, 1891. Serial No. 381,961. (No model.)

To all whom it may concern:

Be it known that I, CHARLES H. LA DUE, a citizen of the United States, and a resident of New York, in the county of New York and State of New York, have invented a certain new and useful Combined Street-Sweeper and Excavator, of which the following is a specification.

My invention consists in a combined street-sweeper, snow-scraper, and earth excavator or grader, the parts being so constructed and arranged that it may be used for either of the above-stated purposes, and in the operation of the device the material, whatever its character may be, is automatically deposited in a receiver, in which it may be removed to such dumping-place as desired.

In the drawings the same reference-letters indicate the same parts in all the figures.

Figure 1 illustrates an elevation of the invention. Fig. 2 illustrates a plan and partial horizontal sectional view. Fig. 3 is a detail in section on the line *x x* of Fig. 2 of part of the bucket-frame and buckets.

A A are the wheels. They turn loosely on the shaft B, which is practically their axle.

C C C is a frame, to which the shafts D D are attached. A pole may of course be substituted for the shafts, if desired.

E is a seat for the driver set upon a spring F. G is the brush or broom. It is of the ordinary rotary form.

H H are two wheels, which I call the "broom-driving wheels" to distinguish them from the main wheels of the machine marked A. They may be simply grooved or they may be sprocket-wheels, as preferred.

I is a chain, which passes over the wheels H and also over sprocket-pulleys J, set one on each end of the broom-shaft. There are of course two such chains, one on each side of the machine, passing over the wheels H and J on each side. The wheels H are independent of the driving-wheels A and are like them set loosely on the shaft or hub of the wheels A, and to one of the spokes of the driving-wheels on each side, or at such other places as may be preferred, a pawl K, which is normally thrown inwardly by a spring L, is fastened, which engages with a ratchet-wheel M on the rotary bucket-frame N, hereinafter to

be described. Thus the forward revolution of the driving-wheels A and A imparts motion to the said bucket-frame in a manner well known.

N is the rotary annular bucket-frame just alluded to. It has circular end plates, although they may be spoked frames, wheel-like in construction, if preferred, and they turn loosely upon the shaft B. Stretching across the machine and connecting these two annular frames are a series of L-shaped buckets P P, (see Fig. 3,) constructed and arranged as shown.

Q Q are two arms, one on either side of the machine, outside of the driving-wheels A A, and which are fulcrumed on the shaft or axle B. They are spliced at R R by bolts R' R', and to the spliced-on end the broom is attached.

S' S' are depending arms bolted to the arms Q Q and connected by a cross rod or beam T, upon which is fastened an apron or scoop-plate U, the lower edge V whereof clear across the machine lies directly in front of the broom and close to the ground. It rises at the front to a ridge W, which is close to the arc described by the buckets P, so that the dirt swept up by the machine upon the scoop-plate will be received by the buckets and carried up and over into the receiver V², hereinafter to be described.

The scoop-plate U from its apex or ridge W again descends, as at Y, receding, however, from the line of travel or rotation of the buckets, and at its most forward lower edge there is attached in any suitable manner which will allow swinging or hinge-like movement, a snow and dirt lifter or excavator Z, to the front edge whereof are attached two chains *a a*, one at each side, which at their upper ends pass around two pulleys *b b*, keyed to a shaft *c*, which is supported on the frame C C C by bearings *d d*. A lever *e* is keyed by a hub *f* to the shaft *c*.

g is a lug on the frame, to which is pivoted or through which passes a pawl *h*, which engages with a toothed pinion *i*, formed on or attached to the hub of the lever *e*, and this pawl is provided with a forwardly-extending part *j*, upon the end whereof is a foot-plate *k*.

A spring (not shown) may be employed, if

necessary, to hold the pawl *h* against the ratchet-wheel *i* to overcome the weight of the pedal-arm and foot-piece.

On the ends of the shaft *c c* are two cranks *l l'*, fastened by set-screws *l'*. These cranks engage with two links *m m'*, which are pivoted at their other ends to the upper ends of the arms *Q Q*. There are holes *n n* in the upper end of each of these arms, in which a bolt *n²* may be placed, as required, for purposes of adjustment. The opening *m⁵* in each of the links *m*, through which the bolt *n²* passes, is slotted, so that the lever *e* may be pushed or dropped further forward to depress the front edge of the lifter-plate *Z* without being impeded by the pressure of the broom against the street.

Two eccentric-rings *O O* are placed one on either side of the machine. They are fulcrumed at their forward ends *p p*, upon the shaft *c*, and engage near their rearmost part with the arms *Q* by a bolt *q* moving in a slot *r* made in these arms.

Three or four pawls *S S* are pivoted to each of the large wheels *H H* on each side of the machine, their rear ends *t t* being connected by springs *t'* to the spokes of the wheel. These springs *t'* normally tend to pull the other ends of the pawls *S S* away from the toothed pinion or ratchet-wheel *u*, which is bolted to an extension of the hubs of the driving-wheels. The arrangement and location of these pawls *S S* are such relative to the eccentric-rings *O O* that they are both in the same vertical plane, so that when the broom is depressed for work and the rear ends of the arms *Q Q* are lowered—which of course, by reason of the bolts *q q*, depresses the rings *O O*—then, as the brush *G*, by its impact against the ground, carries the large wheels *H H* around in the wrong direction for a few feet, the pawls *S S* on the wheels *H H* will be brought into contact with the rings *O O*, and they will press the points of the pawls, one or the other of them, as the case may be, on each side of the machine inwardly until engagement with the teeth of the pinions is secured by them, or at least by one of them, immediately whereupon the motion of the driving-wheels *A A* is conveyed to the large wheels *H H* by the pawls, and the brush or broom *G* is then carried around in the proper direction for sweeping, and during the revolution of the parts in this direction, as the pawls *S S* successively engage with the eccentric-rings *O O*, they are pressed inwardly, and each of them in turn engages with an appropriately-located tooth on the pinions or ratchets *u*.

It will of course be understood that the teeth of the ratchets or pinions are not so undercut, but that the points of the pawls will readily engage with them, and also that the number of teeth in the pinion *u* is a multiple of four, so that they shall conform to and permit of the operation above described.

It is obvious that other forms of pawl—for

instance, a sliding pawl—may be substituted for the pivoted pawls *S S*.

V² is the receiver, into which the material is conveyed by the rotary buckets *P*. It is simply a round-bottomed or half-cylindrical device, preferably made of metal, and is supported from the axle by means of approximately half-circular plates *w w*, and they are keyed to the axle, so that upon turning it the receiver can be upset, or at least tilted, and the contents dumped.

In order that the axle may be turned, I extend it at one end, as at *A'*, and square the end, so that a wrench or lever *B'* may be applied thereto, which is made sufficiently long to give the requisite power to dump the load.

In order that the operator may exert his power more effectually, I prefer to key a ratchet-wheel *A²* upon the axle *A*, and provide a pawl *A³*, which engages with it, pivoted to the frame *C*, by which means the operator may remove the wrench or lever *B'* to take a fresh hold or one in better position as often as desired, the receiver being meantime held in its then partly-tilted position by the ratchet-wheel *A²* and pawl *A³*.

The operation of the machine has been so far set forth above that a brief general description only is now necessary. When desiring to use the machine as a street-sweeper only, the snow and earth lifter *z* and the chains *a* may be removed, and the balance of the machine constitutes a street-sweeper. The method of driving the broom has been already described, and the devices whereby the rotation of the broom may be stopped, thus saving horse-power, have been also described, excepting to say that the operator, by putting his foot upon the step *k*, will lift the pawl *h* from the toothed pinion *i*, and then the lever *e*, being operated, the arms *Q* will be rocked on the axle by the combined action of the cranks *l l'* and links *m m'*, whereby the eccentric-rings *O O* will be lifted and the pawls *S S* removed from engagement with the ratchet-wheel or pinion *u* by their retractile springs, thus stopping the rotation of the large wheels *H H* and the further turning of the broom. It has also been stated how the continuously-rotating buckets *P* catch the dirt which is swept up by the scoop-plate *U* and deposit it in the receiver *v*, and also the method of dumping the receiver *V²* has been set forth. When it is desired to employ the machine as a means to remove snow or accumulations of dirt or earth from the streets or as an excavating or grading machine, the bolts *R' R'* are loosened and the spliced extension parts *R* of the arms *Q* come away and with them the broom and all the coacting parts, including the chains *I*, and, if desired, the large sprocket-wheels *H* may also be removed by a somewhat more extensive derangement of the machine, and then the snow and earth lifter *Z* is attached to the front of the part *y* of the scoop-plate *U*, and the chains *a a* are attached to the pulleys *b b*,

and thus, as will be readily seen, the lever *e*, with the foot-controlled pawl *h* and toothed pinion *i* and shaft *c*, will give the operator complete control of the snow or earth lifter *Z*, and he can determine exactly how near to the ground or how great a dip into it he will allow to accomplish the desired work, and he may in a moment and without stopping the horse lift or depress the lifter *Z*, as occasion may require, and it will be further seen that the excavated or picked-up material will move upwardly over the plate *Z* and will be caught by the buckets *P* and be carried upwardly and deposited in the receiver by their rotation, and, when full, the plates *Z* may be considerably elevated and then the load wheeled off to the desired dumping-place.

I do not limit myself to the details of construction shown, because they may be somewhat varied and still the essentials of my invention be employed.

I claim—

1. The combination of driving-wheels, a rotary broom supported upon a frame, belt-wheels and a belt or chain, a scoop-plate upon which the broom throws the material, buckets attached to a rotary bucket-frame, and a receiver, the bucket-frame encircling the receiver, substantially as set forth.
2. The combination of driving-wheels, a rotary broom supported upon a vertically-adjustable frame, belt-wheels and a belt or chain, a scoop-plate upon which the broom throws the material, buckets attached to a rotary bucket-frame, and a receiver, the bucket-frame encircling the receiver, substantially as set forth.
3. The combination of a driving-wheel, a rotary broom supported upon a vertically-adjustable frame, belt-wheels and belt or chain, a scoop-plate upon which the broom deposits the material, buckets attached to a rotary bucket-frame which encircles a receiver, the receiver itself keyed to the axle of the machine, said axle itself, and means whereby the axle may be rotated to dump the receiver, substantially as set forth.
4. The combination of the main driving-wheels, a rotary broom supported upon an

adjustable frame and means whereby the frame may be held in such position as desired, automatically-acting pawls attached to the broom-driving wheels, and eccentric-rings operated by the elevation and depression of the broom-frame to throw the broom-driving wheels into or out of gear with the main driving-wheels, and a chain or like device which passes over the broom-driving wheels and over a pulley on the broom-shaft, substantially as set forth.

5. In a sweeping-machine, the combination of a rotary broom supported upon an adjustable frame embodying side arms or levers which are pivoted upon the axle of the machine, a rotary bucket-frame which encircles the receiver, said receiver itself, and means whereby the receiver may be overturned for dumping, substantially as set forth.

6. In a sweeping-machine, the combination of a rotary broom or sweeper, a scoop-plate upon which the sweeper deposits the material, a rotary frame of buckets which encircles a receiver, and a receiver, substantially as set forth.

7. In a sweeping-machine, the combination of a vertically-adjustable rocking frame which supports a rotary broom, belt-wheels and a belt or chain for driving the broom, and pawls operated by the rocking of the broom-frame, whereby the pawls are engaged with and disengaged from the broom-driving devices, substantially as set forth.

8. A combined street-sweeper and snow lifter or excavator comprising a rotary broom, a scoop-board upon which it deposits material, a rotary bucket-frame, a receiver, a snow-lifting plate attached to the scoop-plate, and chains extending from the snow-lifting plate to a rotatable shaft having a pawl and lever, whereby the elevation of the lifting-plate may be determined, substantially as set forth.

Signed at New York, in the county of New York and State of New York, this 12th day of February, A. D. 1891.

CHARLES H. LA DUE.

Witnesses:

PHILLIPS ABBOTT,
CHARLES A. LIEB.