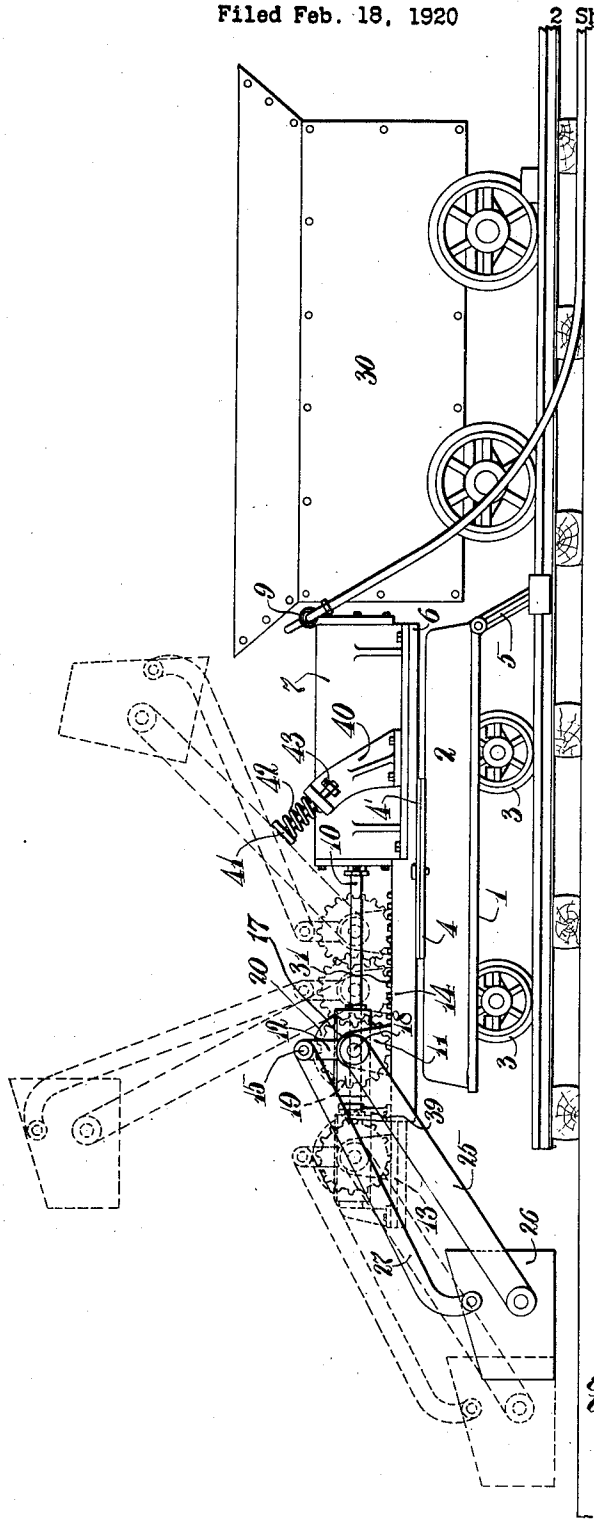
Mar. 3, 1925. 1,528,540

E. G. GARTIN

LOADER

Filed Feb. 18, 1920 2 Sheets-Sheet 1

Fig. 1.



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Atty.

Mar. 3, 1925. 1,528,540

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Filed Feb. 18, 1920 2 Sheets-Sheet 2

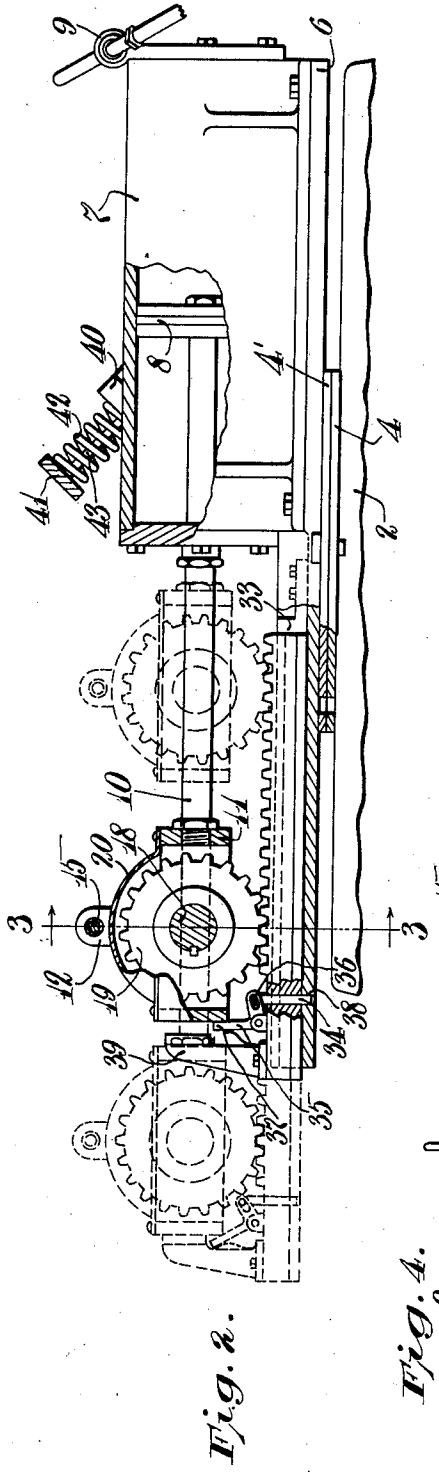


Fig. 2.

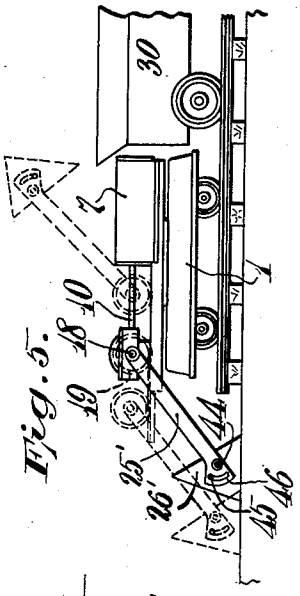


Fig. 5.

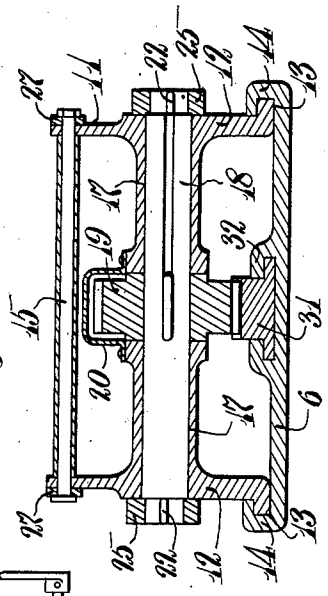


Fig. 3.

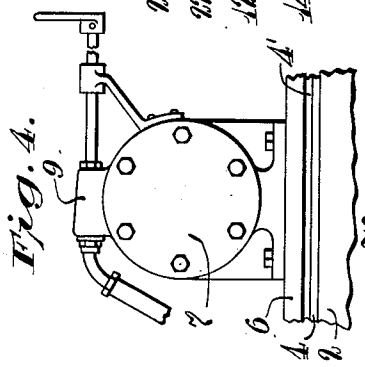


Fig. 4.

Inventor:
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Patented Mar. 3, 1925. 1,528,540

UNITED STATES PATENT OFFICE.

ELMER G. GARTIN, OF CLAREMONT, NEW HAMPSHIRE, ASSIGNOR TO SULLIVAN MACHINERY COMPANY, A CORPORATION OF MASSACHUSETTS.

LOADER.

Application filed February 18, 1920. Serial No. 359,618.

To all whom it may concern:

Be it known that I, ELMER G. GARTIN, a citizen of the United States, residing at Claremont, in the county of Sullivan and State of New Hampshire, have invented certain new and useful Improvements in Loaders, of which the following is a full, clear, and exact specification.

My invention relates to loaders.

Its object is to provide an improved loading machine. Another object of my invention is to provide an improved and simplified form of loader adapted for general use. A further object of my invention is to provide an improved type of loader in which the moving parts will be reduced to a minimum number. A further object of my invention is to provide an improved loader in which a wide range of angular movement of the loading mechanism will be possible. Further objects of my invention will appear in the course of the description thereof.

In the accompanying drawings I have shown, for purposes of illustration two forms which my invention may assume in practice.

In these drawings,—

Fig. 1 is a side elevation of the illustrative embodiment of my improved loading machine showing in full lines the parts in position for filling the scoop and, in dotted lines, the parts in other positions.

Fig. 2 is a view partially in section and partially in elevation with parts broken away showing the details of construction of my improved loading mechanism.

Fig. 3 is a transverse section through the loading mechanism on line 3—3 of Fig. 2.

Fig. 4 is a rear end elevation of the cylinder and control mechanism therefor.

Fig. 5 is a fragmentary elevational view of an illustrative embodiment of my loader provided with a different type of bucket mounting.

I have shown, in Fig. 1, my loader arranged upon a truck 1 consisting of a truck body 2 mounted on the usual wheels 3—3 and provided upon its upper surface with a turntable 4, the truck body being provided at its rear end with a member generally indicated by 5 whose function is to permit forward feeding of the truck while holding it against backward movement.

My improved loading mechanism consists generally of three parts: the bucket, the dumping and loading mechanism for the bucket, and the motor, herein a fluid pressure motor, which is employed to actuate the loading and dumping mechanism of the bucket. Arranged adjacent the rear end of a platform member 6, which is secured to the upper member 4′ of the turntable, is a cylinder generally indicated by 7 in which there is reciprocable a piston 8 which is acted on by fluid pressure admitted alternately to opposite ends of the cylinder through a suitable port system under control of a valve 9. The piston 8 actuates a piston rod 10 which carries at its forward end a combined cross head and bearing member 11. This member has two side members 12—12, which are slidable, as indicated at 13, in guides 14 formed upon the base member 6 and a cross rod 15 is arranged between the tops of these members as a brace and for a purpose hereinafter described. Bearings 17 are provided in the opposite sides of the cross head member and in these is rotatably mounted a shaft 18 to which is keyed at about the middle of its length a pinion 19, the pinion and shaft being enclosed above by means of a cover member 20 held in position on the cross head member. In order to cause a swinging and dumping action of my bucket, there are secured at the outer ends of the shaft 18 by any suitable means, here shown as keys 22, the power arms 25 which swing and advance and retract the loader bucket 26. Cooperating with the power arms 25 are what may be termed dumping rods 27 which are pivoted on the cross rod 15 outside of the side members 12, these dumping rods being connected to the top of the bucket member 26 substantially in vertical alinement with the pivot of the arms 25. As indicated in Fig. 1, rotation of the power arm 25 about the axis of the shaft 18 will cause the bucket to maintain substantially its initial position for a considerable portion of its travel but thereafter will cause a rapid tipping thereof in such manner as to dump it into any suitable container, herein illustrated by way of example as a car 30. It will be obvious that this is not the only possible construction which will accomplish the desired function. In Fig. 5 I have shown another form of connection between the pinion shaft 18 and the bucket, or material moving element. In this figure I have shown the arms

25′ secured as before to the shaft 18, and have shown them secured at 44 to a bucket 26′ and having a second connection, by means of the bolt 45 and arcuate slot 46, therewith, whereby the bucket may be adjusted. In this case I am able to dispense with the arms 27 entirely.

The pinion 19 cooperates with a rack 31 which is mounted in guides 32 formed centrally in the base member 6, these guides being adapted to permit sliding of the rack therein. The guides 32 are provided at their rear end with an abutment member 33 adapted to limit the rearward travel of the rack and the rack is provided at its front end with a pin lock 34 which is controlled by a bell crank lever 35 having a slotted connection in its horizontal arm with a pin 36 arranged in the top of pin 34 and so arranged that its vertical arm 37 will be struck by the front end of the cross head member. The pin 34 is adapted to cooperate with a hole 38 formed in the bottom of the rack guide to prevent forward movement of the rack except at the time when the pin is retracted. This pin occupies the hole 38 at the time when the rack at its rearward end abuts the stop member 33. Arranged at the extreme forward end of the rack is a stop member 39 adapted to be engaged by the cross head at the forward end of its travel, and, the locking pin 38 having been released, to cause the rack to be carried forward with the cross head. It will thus be understood that the pinion during a portion of the piston stroke will roll upon the rack 31 but during the remainder of the forward stroke will no longer rotate, but both rack and piston will move forward together in fixed relationship. Arranged in suitable position adjacent the cylinder 7 to be struck by the bucket arm 25 at its extreme rearward movement are buffer supports 40 relative to which a cross arm 41 may move, this movement being resisted by springs 42 which are held in position with respect to the bumper supports by means of bolts 43 slidably fitted in the heads of the latter and secured to the cross arm 41.

The operation of my improved loading mechanism is as follows: Assuming the parts to be in the position indicated by the right dotted position of the pinion and cross head in Fig. 2, compressed air or other suitablle operating fluid admitted to the right hand end of the cylinder 7 will cause the piston 8 to move forward, thereby causing, by means of the piston rod 10, the forward movement of the cross head 11. As the rack at this time is held fixed at the right hand end of its guide by the locking pin 34 cooperating with the hole 38, the pinion will be rotated and will roll along the face of the rack in such manner as to swing the bucket, which is initially at its extreme rearward or dumping position about the axis of the pinion as a pivot and cause it, at approximately the moment when the cross head reaches the position shown in full lines in Fig. 2 to occupy the lower or loading position shown in full lines in Fig. 1. Upon movement of the piston 8 beyond the position shown in full lines in Fig. 2 the cross head will by impinging on the vertical arm 37 of the bell crank 35, lift the pin 34 from its socket 38 and free the rack for forward movement. At the moment when the pin clears its socket, the cross head comes firmly against the stop member 39 and picking up the rack moves it bodily forward, accordingly forcing the bucket into the pile of material to be loaded, further lowering of the bucket being prevented by the locked position of the parts in the front end of the rack. When the rack has reached the forward end of its motion and the piston 8 is at the left hand end of the cylinder, the operator, by shifting the valve 9, will admit air to the left hand end of the cylinder 7 and exhaust the right hand end thereof, thereby causing a reversal of movement of the piston. It will be noted that the bucket 26 is now heavily loaded and that it has a powerful leverage as compared with the pinion 19 on the shaft 18, the weight of the bucket and its load providing a very strong turning moment in a counter-clockwise direction. Accordingly the pinion 19 in order to roll along the rack 31 would have to overcome this turning moment and as the rack is free to slide, it will be obvious that the first motion that will result will be the return of the rack to the first position shown in full lines in Fig. 2. Thereafter, further motion of translation of the rack being impossible, the force exerted by the pressure admitted to the piston 8 and transmitted to the cross head will cause the pinion to roll along the rack and elevate the load in such manner as to dump it at the appropriate time by the cooperation of the arms 25 and 27. After the dumping of the bucket, the position of the valve 9 will be reversed and the operation repeated. It will be understood that the weight of the bucket 26 combined with its leverage due to the length of the arm 25 will be sufficient to cause rearward movement of the rack 31 prior to rolling of the pinion 19 upon the rack even if the machine is operated out of reach of the material to be loaded.

In the event that I use the bucket attachment means shown in Fig. 5, it will be obvious that the general operation will be the same, save that the bucket 26′ will not pivot about its attachment to the arms 25′; instead dumping without such action.

From the foregoing description of my improved construction it will be obvious that I have provided an extremely simple

mechanism for the purpose of mechanically loading a suitable carrier with any material capable of being handled by means of a shovel. The moving parts are few in number, of great strength, and are positive in operation.

While I have in this application specifically described two forms which my invention may assume in practice, it will be understood that these forms of the same are shown for purposes of illustration and that the invention may be modified and embodied in other forms without departing from its spirit or the scope of the appended claims.

What I claim as new and desire to secure by Letters Patent is:

1. In a loading machine, a bodily movable supporting frame, a material moving element, and means for giving the said element a rectilinear forward and rearward movement and a swinging movement over the machine to dumping position, comprising a pair of cooperating forwardly and rearwardly movable members one of which is angularly movable with respect to the other, a pivoted arm connected to said last mentioned member adapted to be swung during relative movement of said members, and a common power means for causing both simultaneous and relative movement of said members.

2. In a loading machine, a frame adapted for transportation and movement relative to the material to be loaded, a material moving element, and means for giving the said element a forward and rearward movement and a swinging movement over the machine to dumping position comprising a pair of cooperating forwardly and rearwardly movable members which are movable simultaneously or one independently of and angularly relative to the other, said independently movable member having a range of movement greater than that of the other, and a pivoted arm connected to said material moving element and in non-rotative relation to one of said movable members.

3. In a loading machine, a frame adapted for transportation and movement relative to the material to be loaded, a material moving element, and means for giving said element a forward and rearward movement and a swinging movement over the machine to dumping position comprising two cooperating movable parts one of which has a preliminary motion of translation accompanied by angular movement about an axis within said part with respect to the other, which is followed by a common movement of translation by both of said parts and a pivoted arm connected to the material moving element and rigidly to said first mentioned part.

4. In a loading machine, a frame adapted for transportation and movement relative to the material to be loaded, a material moving element, and means for giving said element a forward and rearward movement and a swinging movement over the machine to dumping position comprising a plurality of cooperating members the first of which is adapted to roll along the other while the other lies stationary, and both of which are adapted thereafter to partake of simultaneous translation and a pivoted arm connected to said material moving element and rigidly to said rotating member.

5. In a loading machine, a frame, a material moving element, and means for giving said element a forward and rearward movement and a swinging movement over the machine to dumping position comprising a rack, holding means therefor, a pinion, an arm connecting said pinion with said material moving element, and means for causing said pinion to rotate along said rack, said means causing release of said holding means and thereafter causing simultaneous movement of said pinion and said rack.

6. In a loading machine, a frame, a material moving element, and means for giving said element a forward and rearward movement and a swinging movement over the machine to dumping position comprising a pair of forwardly and rearwardly movable members one of which has a greater range of movement than the other, means to lock the second mentioned member during the initial movement of said first mentioned member, means for releasing said lock at the completion of the movement of said first mentioned member, and means whereby said members are thereafter moved together and a pivoted arm connected to the material moving element and to said first mentioned element.

7. In a loading machine, a frame, a material moving element and means for giving said element a forward and rearward movement and a swinging movement over the machine to dumping position comprising an arm connected to said material moving element, a shaft to which said arm is connected, a pinion on said shaft, a rack with which said pinion cooperates, means for initially holding said rack stationary, means to move said pinion relative to said rack, and means to release said rack when the pinion reaches the end thereof whereby said pinion moving means may move both said rack and said pinion simultaneously.

8. In a loading machine, a frame adapted for transportation and movement relative to the material to be loaded, a material moving element, and means for giving said element a forward and rearward movement and a swinging movement over the machine to

dumping position comprising a rack slidable in said frame, a pinion adapted to cooperate with said rack, an arm connecting said pinion to said material moving element, a cross head in which said pinion is journaled, and means for causing movement of said cross head whereby said pinion is first rotated in moving along said rack and thereafter said pinion and said rack are given a simultaneous motion of translation.

9. In a loading machine, a frame, a material moving element, and means for giving said element a forward and rearward movement and a swinging movement over the machine to dumping position comprising a rack slidable with respect to said frame, means for holding said rack in fixed position, a pinion cooperating with said rack, a cross head in which said pinion is journaled, an arm connecting said material moving element with said pinion, an arm connecting said material moving element with said cross head, and means for moving said cross head to cause said pinion to roll along said rack and subsequently cause said cross head to release said locking means and move said rack and pinion simultaneously.

10. In a loading machine, a frame, a material moving element, and means for giving said element a forward and rearward movement and a swinging movement over the machine to dumping position comprising a rack slidable with respect to said frame, means for holding said rack in fixed position, a pinion cooperating with said rack, an arm connecting said material moving element with said pinion, a cross head in which said pinion is journaled, guides for said cross head in said frame, and means for moving said cross head to cause said pinion to roll along said rack and subsequently cause said cross head to release said locking means and to move said rack and pinion simultaneously.

11. In a loading machine, a bodily movable supporting frame, a material moving element, and means for giving said element a rectilinear forward and rearward movement and a swinging movement over the machine to and from dumping position comprising a pair of cooperating forwardly and rearwardly movable members, one of which is angularly movable with respect to the other, and a pivoted arm rigidly connected to said last mentioned member, said members cooperating during simultaneous movement to effect the rectilinear movements of the material moving element and during relative movements to swing said element.

12. In a loading machine, a bodily movable supporting frame, a material moving element, and means for giving said element filling and withdrawing movements and dumping and return movements comprising a pair of cooperating forwardly and rearwardly movable members adapted to move simultaneously and one of which is also angularly movable while the other is stationary, a pivoted arm rigidly connected to one of said members, and means whereby that member which is movable while the other is stationary controls the movement in one direction of said other.

13. In a loading machine, a bodily movable supporting frame, a material moving element, and means for giving said elements filling and withdrawing movements and dumping and return movements comprising a pair of cooperating forwardly and rearwardly movable members adapted to move simultaneously and one of which is also angularly movable while the other is stationary, a pivoted arm rigidly connected to one of said members, and means whereby that member which is movable while the other is stationary controls the movement in one direction of the other, the opposite movement of said last mentioned member being controlled by the weight of the material moving element.

14. In a loading machine, a frame adapted for transportation and movement relative to the material to be loaded, a material moving element, and means for giving said element forward and rearward movements and a swinging movement to and from dumping position comprising a pair of cooperating members adapted for simultaneous movements and one for angular movements independently of the other, and a pivoted arm rigidly conected to said material moving element and to one of said movable members, said members when moving simultaneously moving in the same direction.

15. In a loading machine, a bodily movable supporting frame, a material moving element, and means for giving said element forward and rearward movements and swinging movements to and from dumping position comprising a pair of cooperating forwardly and rearwardly movable members, one of which is angularly movable with respect to the other, and a pivoted arm rigidly connected to said last mentioned member and to said material moving element, said member which is movable with respect to the other having an initial sole movement which is followed by a common movement of said members during movement from dumping position to filled position of said material moving element and said sequence of movements being reversed on the dumping movement of said material moving element.

16. In a loading machine, a bodily movable suporting frame, a material moving element in the form of a shovel, a sliding member, and a rotatable member cooperating therewith and supported thereby, said mate-

rial moving element having an arm rigidly connected to said rotatable member.

17. In a loading machine, a bodily movable supporting frame, reciprocating cooperating gear and rack elements, and a material moving element rigidly connected to said gear element, said material moving element being adapted to reciprocate with said gear and rack elements and to rotate with said gear element.

18. In a loading machine, a bodily movable supporting frame, a material moving element, reciprocating cooperating gear and rack elements, arms rigidly connecting said material moving element with said gear element, and means to reciprocate the gear and rack elements and to rotate said gear to load and unload said material moving element.

19. In a loading machine, a bodily movable supporting frame, a material moving element, a pair of cooperating movable members adapted to give said material moving element a rectilinear forward and rearward and an angular swinging movement, both movable simultaneously to cause said first mentioned movement and one stationary and the other angularly movable to cause said last mentioned movement, means to hold the former element stationary, and a pivoted arm rigidly connected to one of said cooperating members and said material moving element.

20. In a loading machine, a bodily movable supporting frame, a material moving element, and means for giving said element a rectilinear forward and rearward movement and a swinging movement over the machine to dumping position comprising cooperating forwardly and rearwardly movable members, one of which is angularly movable relative to the other, a pivoted arm rigidly connected to said first mentioned member, and a single power means to cause said movements.

21. In a loading machine, a bodily movable supporting frame, a material moving element in the form of a shovel, means for giving the said element a rectilinear forward and rearward movement and a swinging movement over the machine to dumping position, comprising a pair of cooperating members in the form of a gear and rack, said rack being adapted to move rearwardly and forwardly on said supporting frame, means to hold said rack stationary and to release the same to permit movement thereof, said gear being adapted to mesh with said rack, and an arm rigidly connected to said gear and to said material moving element, and a single power means for causing both simultaneous and relative movement of said gear and rack.

22. In a loading machine, material moving means, means for actuating the same including a plurality of relatively movable elements one of which is secured to said material moving means, and means carried by one of said elements for positively preventing movement therebetween.

23. In a loading machine, a bodily movable supporting frame, cooperating gear and rack elements, a material moving element, means rigidly connected to said gear element for supporting said material moving element, and a common means for effecting simultaneous and independent movement of said gear and rack elements.

24. In a loading machine, a bodily movable supporting frame, a material moving element, a pair of cooperating movable members adapted to actuate said material moving element, and a common means for effecting simultaneous and independent movement of said movable members.

25. In a loading machine, a bodily movable supporting frame, a material moving element, a pair of cooperating movable members adapted to actuate said material moving element, means for effecting simultaneous and independent movement of said movable members, and a single power means to cause said movements.

26. In a loading machine, a bodily movable supporting frame, a material moving element, cooperating gear and rack elements adapted to actuate said material moving element, means to move said gear and rack elements simultaneously, and means to lock said rack element against movement for effecting an angular movement of said gear element.

27. In a loading machine, a bodily movable supporting frame, a material moving element, cooperating gear and rack elements adapted to actuate said material moving element, means to lock said rack element against movement, and means movable with said gear element to release said locking means.

28. In a loading machine, a bodily movable supporting frame, a material moving element, cooperating gear and rack elements adapted to actuate said material moving element, means to lock said rack elements against movement, and means movable with said gear element to release said locking means for effecting simultaneous movement of said gear and rack elements.

29. In a loading machine, a bodily movable supporting frame, a material moving element, and means for actuating said material moving element including cooperating gear and rack elements, a crosshead movable with said gear element, and means for effecting movement of said elements including a piston and cylinder, the former being connected to said crosshead.

In testimony whereof I affix my signature.

ELMER G. GARTIN.