

Dec. 12, 1939.

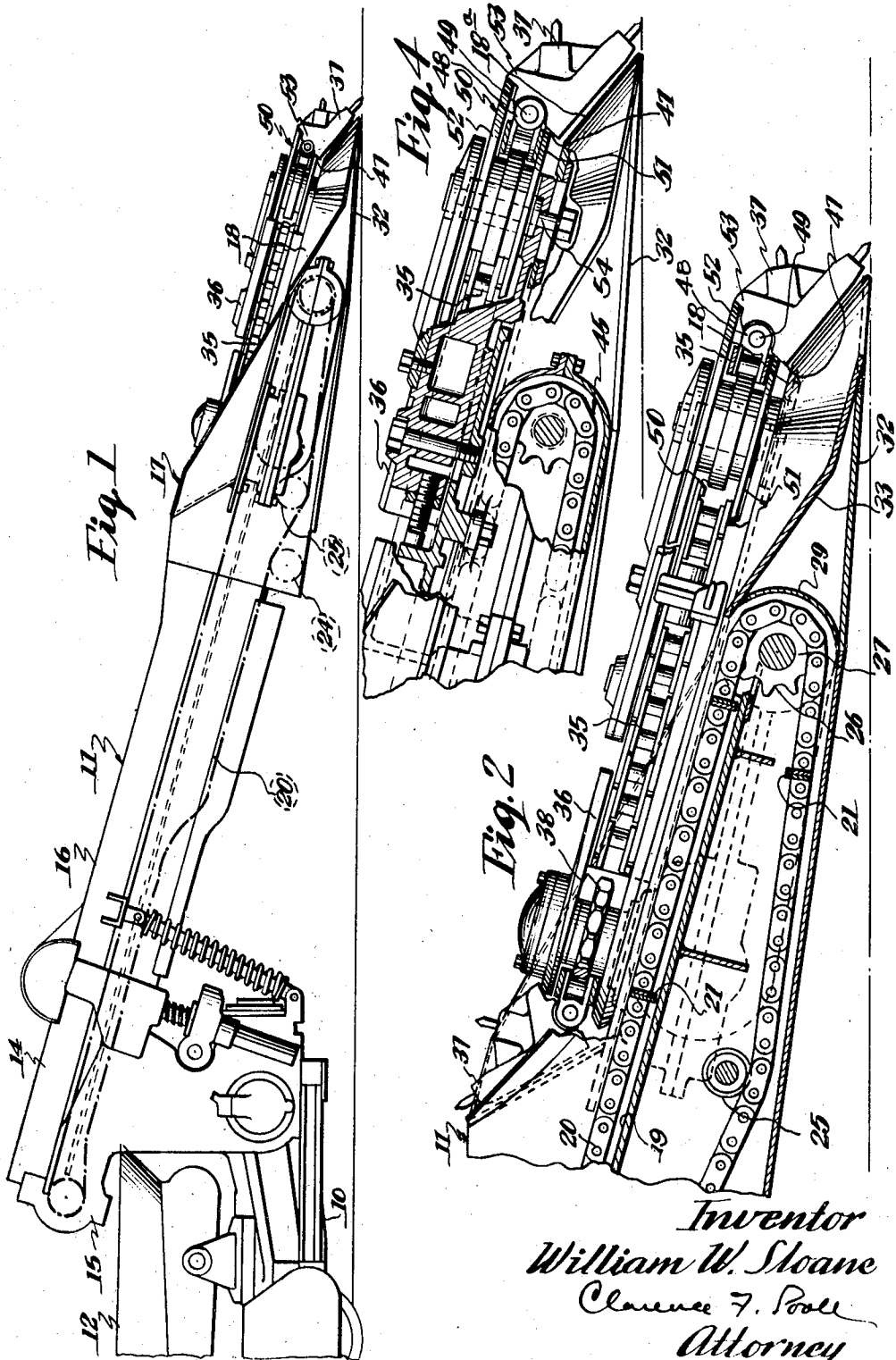
W. W. SLOANE

2,183,383

LOADING MACHINE

Filed May 7, 1936

2 Sheets-Sheet 1



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2 Sheets-Sheet 2

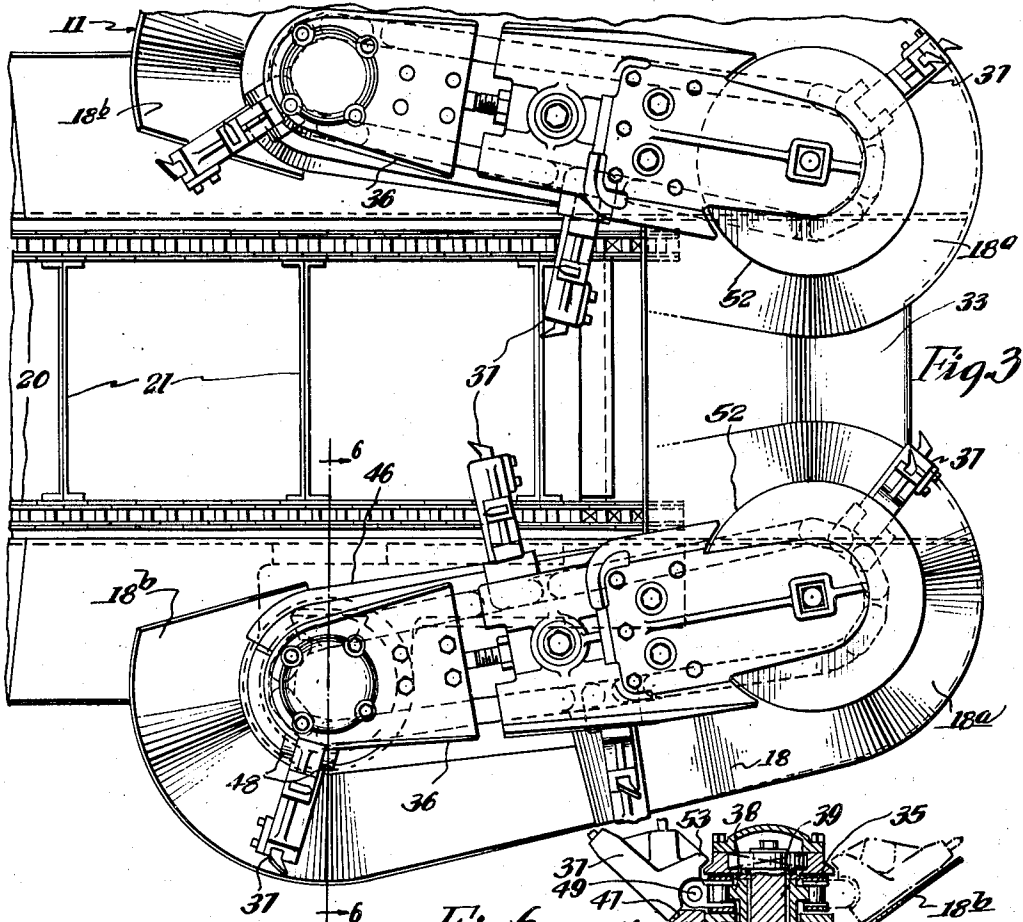


Fig. 3

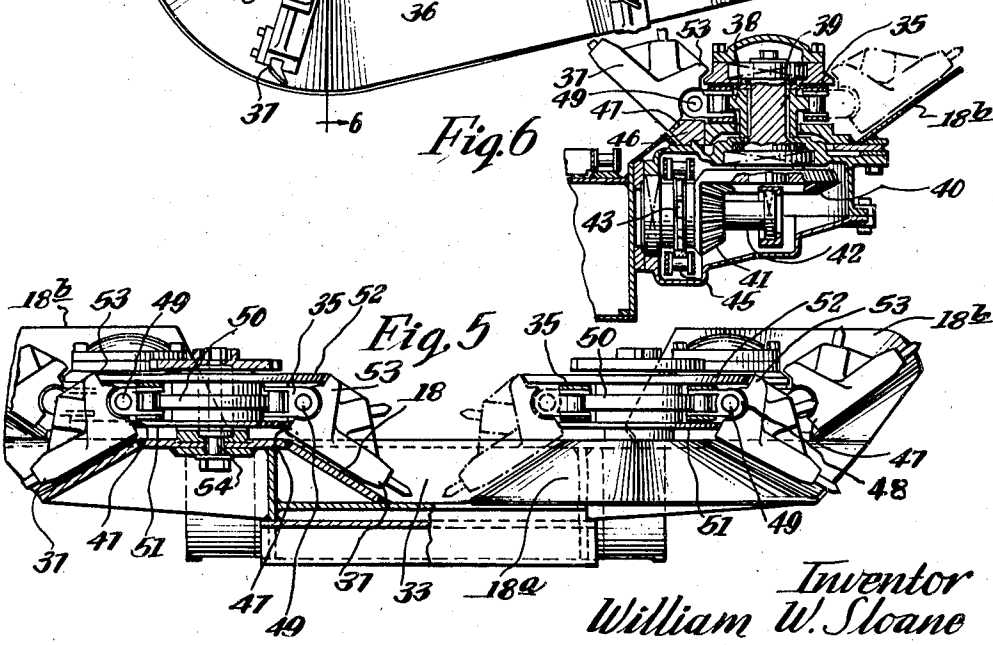


Fig. 5

Fig. 6

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UNITED STATES PATENT OFFICE

2,183,383

LOADING MACHINE

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Application May 7, 1936, Serial No. 78,433

10 Claims. (Cl. 198—8)

This invention relates to improvements in load-
ing machines of the type adapted to gather and
load loose material such as coal from the
ground and more particularly to gathering heads
including gathering chains for initially picking
up the loose material and loading it onto a flight
conveyer for discharge into mine cars or the like.

More specifically the present invention is an
improvement in the form of gathering head dis-
closed in a prior application, Serial No. 50,861,
filed by Frank Cartlidge, November 21, 1935,
now Patent No. 2,135,882.

The principal objects of my invention are to
provide a more efficient gathering element of the
character described, especially designed to load
material such as coal in a more efficient manner
than formerly.

In carrying out my invention, I provide gath-
ering elements which are mounted on aprons
which extend along the conveyer in parallel re-
lation with respect thereto to the forward end
thereof, which aprons are inclined forwardly and
laterally towards the ground forwardly of the
conveyer at a steeper angle than the angle of
the conveyer. I also provide means for positively
raising the gathering elements at their rearward
turning point and positively depressing the
gathering elements at their forward turning point
to cause them to follow the inclination of the
aprons. The arrangement is such that the pe-
ripheral speed of the gathering elements at their
forward and rearward turning points is reduced
which permits an increased gathering speed with-
out increasing the speed of the gathering elements
at their upper and lower turning points. This
arrangement of aprons and gathering elements
also permits a relatively straight conveyer to be
utilized which will take up less vertical dimen-
sions than formerly without increasing the dis-
tance material must be moved from the forward
end of the aprons to the conveyer and without
decreasing clearance between the underportion
of the conveyer and the ground.

My invention may be more clearly understood
with reference to the accompanying drawings
wherein:

Figure 1 is a view in side elevation of the front
portion of a loading machine, illustrating one
form in which my invention may be embodied;

Figure 2 is an enlarged fragmentary view of the
gathering element in substantially longitudinal
section with certain parts broken away in order
to illustrate more clearly certain details of my
invention;

Figure 3 is a fragmentary plan view of the

gathering element drawn to the same scale as
Figure 2, with certain parts broken away and
shown in section in order to illustrate more
clearly certain details of my invention;

Figure 4 is a detail side view of the forward
end of the gathering and loading element with
certain parts broken away and shown in sub-
stantially longitudinal section;

Figure 5 is a front end view of the gathering
and loading element with certain parts broken
away and shown in section in order to more
clearly illustrate certain details of my invention;
and

Figure 6 is a sectional view on reduced scale
taken substantially along line 6—6 of Figure 3.

In the drawings my invention is shown as being
embodied in a loading machine of the track-
mounted type, the main elements of which are
essentially the same as shown in a prior applica-
tion, Serial No. 682,248, filed by Frank Cartlidge,
July 26, 1933, which issued as Patent No. 2,066,-
137, December 29, 1936. In the form shown, the
loading machine consists generally of a wheeled
truck or main frame having a horizontally
and vertically swingable gathering and loading
element mounted at the forward end thereof
and extending forwardly therefrom, and a dis-
charge conveyer extending from beneath the
rear end of said loading element and upwardly
and rearwardly therefrom. Said discharge con-
veyer is arranged to overhang the rearward end
of said main frame (not shown) for discharging
material into suitable receiving means, such as
mine cars or the like.

The gathering and loading element may, as
usual, comprise an elevating conveyer frame
pivotally supported for movement about a
horizontal transverse axis between a pair of par-
allel spaced upright supports. Said sup-
ports are disposed at the forward end of said
main frame and pivotally movable with respect
thereto about a vertical axis to permit said con-
veyer frame to be moved in a horizontal plane.
The mechanism for effecting swinging movement
of said supports and for pivotally swinging said
conveyer frame about its axis of pivotal connec-
tion to said upright supports may be similar to
that disclosed in the aforementioned application
of Frank Cartlidge, Serial No. 682,248, now Patent
No. 2,066,137, and is not herein shown or de-
scribed since it forms no part of my present
invention.

The elevating conveyer frame includes a
trough-like conveyer section and a forward
gathering section connected thereto in a suit-

able manner. Said forward gathering section has a pair of aprons 18, 18 extending along and laterally beyond opposite sides of the conveyer trough section. Said aprons also extend forwardly and downwardly from the forward end of the conveyer in planes inclined at a steeper angle with respect to the ground than the conveyer. The form of the forward end of each of said aprons is such that a forward end 18a thereof is formed in substantially the form of a semi-frusto-conical section whose base and top, as herein shown, are inclined in planes substantially parallel to the plane of the conveyer. The rear ends 18b, 18b of said aprons are flared upwardly along their outer sides in the form of reverse semi-frusto-conical sections, but cut away on their inner sides, as will hereinafter more fully appear.

The two aprons 18, 18 are joined together at their forward ends by an inclined plate 33 extending rearwardly along said aprons upwardly to the forward end of the conveyer. Said plate is cut back between the semi-frusto-conical front end sections 18a, 18a of said aprons and merges with said aprons at the delivery edge onto the conveyer, as shown in Figures 2 and 3.

A plate 19 forms the bottom of the elevating conveyer section 16, along which the material is moved by the conveyer. The moving parts of the conveyer consist in a pair of parallel-spaced endless chains 20, 20 having material engaging flights 21, 21 carried therebetween at suitable intervals. The lower run of said chains extends downwardly beneath the plate 19 over adjustable idler rollers 24, 24 for taking up excessive slack in said chains, under idler rollers 25, 25 and around sprockets 26, 26 on a transversely extending shaft 27 immediately forwardly of the front margin of the plate 19. From thence said chains move upwardly over said plate to and around suitable drive sprockets (not shown) disposed at the rear end of the conveyer frame 14.

Immediately in front of the sprockets 26, 26 is a curved plate 29 substantially conforming to the form of the chains 20, 20 as they round said sprockets, and terminating at the delivery edge of the aprons 18, 18 and the plate 33, which edge is herein shown as being forwardly of the shaft 27. A bottom plate 32 extends across the bottom of the forward end of the conveyer frame and terminates at the forward ends of said aprons and the plate 33, and forms a shoe for supporting the gathering and loading element when it is engaged with the ground.

The means for gathering material and moving it onto the conveyer consists in a pair of endless chains 35, 35 orbitally guided in chain guides, generally indicated by reference characters 36, 36. Said chains have gathering arms 37, 37 extending laterally therefrom and pivotally mounted to swing upwardly and downwardly with respect thereto. Said gathering arms, as herein shown, are mounted between suitable spaced lugs 48, 48 extending laterally from certain links of said chain at suitable intervals along said chain on pivotal pins 49, 49.

Each of the chain guides 36 is mounted on the apron 18 in a suitable manner and extends along opposite sides of the conveyer from points disposed forwardly of the forward end thereof and in rearwardly diverging paths so that said gathering arms swing in paths extending forwardly beyond the forward end of said apron at their lower turning point, and move laterally away

from the conveyer as they move rearwardly therealong.

It will be observed that the plate 19 of the elevating conveyer is substantially parallel with, but below the portion of the aprons 18, 18 along which the chain guides 36 are mounted.

Each endless chain 35 is driven from a sprocket 38 mounted on a shaft 39 disposed perpendicular to a rearward portion of the chain guide 36 and journaled therein. A bevel gear 40 is keyed on the lower end of the shaft 39 and is driven from a bevel gear 41 on a transversely extending shaft 42. A sprocket 43 is keyed on said shaft and is driven from the transversely extending shaft 27 by means of a chain and sprocket drive, generally indicated by reference character 45.

The means for releasing or clearing the material on the conveyer from the gathering arms includes a lifting cam 46 which extends along the inside of each chain guide from a point adjacent the forward end of the conveyer, to and partially around the point where the gathering arms turn away from the conveyer. Said lifting cam is adapted to engage a heel 47 depending from each gathering arm, so as to raise said arms gradually to a maximum as they pass around their rearward turning point. The upper semi-frusto-conical section 18b of the apron has its inner edge substantially in line with the cam 46, and extends inwardly around the rearward turning point of the gathering arms to form an auxiliary support for said arms after they leave said cam surface. From thence, the outer margins of the apron 18 bend downwardly toward the front end sections 18a, 18a, so that the arms may swing from their elevated angles to a depressed angle with respect to the ground when they reach their forward turning point.

Suitable means are provided for positively guiding the gathering arms to their depressed angle at their forward turning points, which herein include rollers 50, 50 forming direction-changing devices about which the gathering chains 35, 35 turn at the forward end of the chain-guiding members 36, 36. Each of said rollers is rotatably mounted on a stud shaft 54 mounted at its ends in the forward end of the chain guide 36 and disposed perpendicular to the plane surface of the apron 18. Each roller is provided with a lower flange 51 which has a downwardly and inwardly inclined periphery which is adapted to engage the heel 47 of the gathering arm 37. Each roller is also provided with an upper flange 52 of greater diameter than flange 51 and having an inwardly and downwardly inclined periphery which is adapted to engage a projection 53 extending upwardly from said gathering arm.

Thus, when the gathering arms are passing around their respective rollers 50, 50 and are engaged with the flanges 51 and 52, they will be positively pivoted in a downward direction with respect to their respective supporting chains to swing in a path that conforms to the contour of the front apron sections 18a, 18a.

The forward ends of the gathering arms are thus elevated as they approach their upper turning point to assist in releasing the material on the conveyer, and are depressed at their lower turning point to travel along and gather material from the ground. Accordingly, a relatively straight inclined conveyer may be utilized having a relatively flat angle relative to the ground without increasing the distance from the forward end of the apron 18 to the conveyer, and

said gathering arms may have a more positive engagement with the material it is desired to pick up. Also, the effective length of the gathering arms is decreased at their upper and lower turning points, where their speed is the greatest, which permits a greater chain speed and gathering capacity than formerly without increasing the speed of the arms at their upper and lower turning points.

While I have herein shown and described one form in which my invention may be embodied, it will be understood that the construction and arrangement of the various parts may be changed or altered without departing from the spirit and scope thereof. Furthermore, I do not wish to be construed as limiting myself to the precise construction illustrated, excepting as it may be limited in the appended claims.

I claim as my invention:

1. In a loading machine, a gathering and loading element comprising an elevating conveyer, an apron extending along each side of said conveyer and forwardly therefrom to the ground, the forward ends of each of said aprons being in the form of semi-frusto-conical sections, gathering means on each of said aprons including laterally projecting gathering arms, and means for positively deflecting said gathering arms downwardly towards the ground at their forward turning points to conform to the contour of said aprons.

2. In a loading machine, a gathering and loading element comprising an inclined endless conveyer, a pair of aprons, each of which extends along one side of said conveyer and beyond the forward end thereof, the forward ends of said aprons being in the form of spaced-apart semi-frusto-conical sections adapted to engage the ground, the space between said front end sections of said aprons being joined by a plate inclined upwardly from the ground in a rearward direction and converging into said aprons and having a delivery edge at the forward end of the conveyer so as to form an upwardly inclined channel between said aprons to the delivery edge of the conveyer, and gathering means extending along each of said aprons at opposite sides of said conveyer and including laterally projecting gathering arms arranged to conform to the contour of said aprons and move material along said channel and onto said conveyer.

3. In a loading machine, an elevating conveyer, an inclined apron extending along and forwardly of said conveyer and having a forward end inclined at a greater angle with respect to the ground than the rearward portion thereof, an endless chain movable along said apron adapted to gather and discharge material onto said conveyer, gathering arms pivotally mounted on said chain for vertical movement relative to its normal plane of travel, means for positively raising said arms as they approach their upward turning point away from said conveyer, and means for pivoting said gathering arms downwardly about their axes of pivotal connection to said chains for positively depressing said arms during their lower turning movement toward said conveyer to cause said arms to conform to the inclination of the forward end of said apron and positively position the forward ends of said arms adjacent the ground forwardly of said apron.

4. In a loading machine, an elevating conveyer, an inclined apron extending along each side of and forwardly of said conveyer and having a forward end inclined at a greater angle with respect

to the ground than the rearward portion thereof, a pair of spaced endless chains disposed above said apron and extending along opposite sides of said conveyer, said chains having gathering arms pivotally mounted thereon for vertical movement relative to their normal plane of travel and extending beyond the forward end of said apron at the lower turning points of said chains, means for positively raising said arms as they approach their upward turning points away from said conveyer, and means for pivoting said gathering arms downwardly about their axes of pivotal connection to said chains, for positively depressing said arms during their lower turning movement towards said conveyer, to cause said arms to conform to the inclination of the forward end of said apron and positively position the forward ends of said arms adjacent the ground forwardly of said apron.

5. In a loading machine, a gathering and loading element comprising an inclined endless conveyer, gathering means extending forwardly of said inclined conveyer and along opposite sides thereof including endless chains having gathering arms mounted thereon and extending laterally therefrom, an apron extending along each side of said conveyer and forwardly therefrom, the forward end of said apron being adapted to engage the ground, and the sides and forward end of said apron being inclined at a greater angle with respect to the ground than said inclined conveyer and the rearward portion of said apron, and means for pivoting said gathering arms in a downward direction for depressing said gathering arms with respect to said chain during their lower turning movement to cause them to move in paths conforming substantially to the shape of the forward end of said apron.

6. In a loading machine, a gathering and loading element comprising an elevating conveyer, gathering means extending forwardly of said conveyer and along opposite sides thereof including chains having gathering arms pivotally mounted thereon and extending laterally therefrom, an apron extending along each side of said conveyer and forwardly therefrom, the forward end of said apron being adapted to engage the ground and the sides and the portion of said apron ahead of the conveyer being inclined at a greater angle with respect to the ground than said inclined conveyer and the portion of said apron extending along said conveyer, and means engaging each of said arms above and below the pivotal axis thereof for pivoting said gathering arms in a downward direction for positively depressing said arms relative to their respective chains during their lower turning movement and holding them from pivotal movement with respect to said apron at the forward end thereof to cause said arms to conform to the inclination of the forward end of said apron and positively position the forward ends of said arms adjacent the ground forwardly of said apron.

7. In a loading machine, a gathering and loading element comprising an elevating conveyer, gathering means extending forwardly of said conveyer and along opposite sides thereof including chains having gathering arms pivotally mounted thereon and extending laterally therefrom, an apron extending along each side of said conveyer and forwardly therefrom, the forward end of said apron being adapted to engage the ground and the sides and forward end of said apron being inclined at a greater angle with respect to the ground than said inclined conveyer,

and rotatable guide means for positively pivoting said gathering arms in a downward direction and depressing said arms relative to their respective chains during their lower turning movement.

5 8. In a loading machine, a gathering and loading element comprising an elevating conveyer, gathering means extending forwardly of said conveyer and along opposite sides thereof and including endless chains having laterally extending gathering arms pivotally mounted thereon for vertical movement relative to their plane of travel, and a pair of aprons along which said gathering means move, each of said aprons extending along one side of said conveyer and beyond the forward end thereof, the outer sides and forward ends of said aprons being inclined downwardly towards the ground and forming a pair of spaced-apart semi-frusto-conical sections, means for positively raising said arms as they approach their upward turning point, and rotatable guide means for positively depressing said arms to conform to the contour of said aprons during their lower turning movement.

10 9. In a loading machine, a gathering and loading element comprising an elevating conveyer, gathering means extending forwardly of said conveyer and along opposite sides thereof and including endless chains having laterally extending gathering arms pivotally mounted thereon for vertical movement relative to their plane of travel, and a pair of aprons along which said gathering means move, each of said aprons extending along one side of said conveyer and beyond the forward end thereof, the outer sides

and forward ends of said aprons being inclined downwardly towards the ground and forming a pair of spaced-apart semi-frusto-conical sections, and said sections being joined by an inclined plate so as to form an open channel along which said gathering arms may move material onto said conveyer, means for positively raising said arms as they approach their upward turning point, and other means for positively depressing said arms to conform to the contours of said aprons during their lower turning movement.

15 10. In a loading machine, a gathering and loading element comprising an elevating conveyer, gathering means extending forwardly of said conveyer and along opposite sides thereof including chains having gathering arms pivotally mounted thereon and extending laterally therefrom, an apron extending along each side of said conveyer and forwardly therefrom, the forward end of said apron being adapted to engage the ground and the sides and forward end of said apron being inclined at a greater angle with respect to the ground than the rearward portion thereof, and rotatable means engaging each of said arms above and below the pivotal axis thereof for positively moving said gathering arms in a downward direction with respect to said chain and positively depressing said arms relative to their respective chains during their lower turning movement to cause said arms to conform to the contour of the forward end of said apron.

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