

[54] MACHINE FOR FEEDING MATERIALS FROM A STACK

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[58] Field of Search 214/10, 44 A; 198/36, 7;
37/190, 192; 83/356.2, 155, 37, 200.1, 23,
112; 241/265, 101 A, 283

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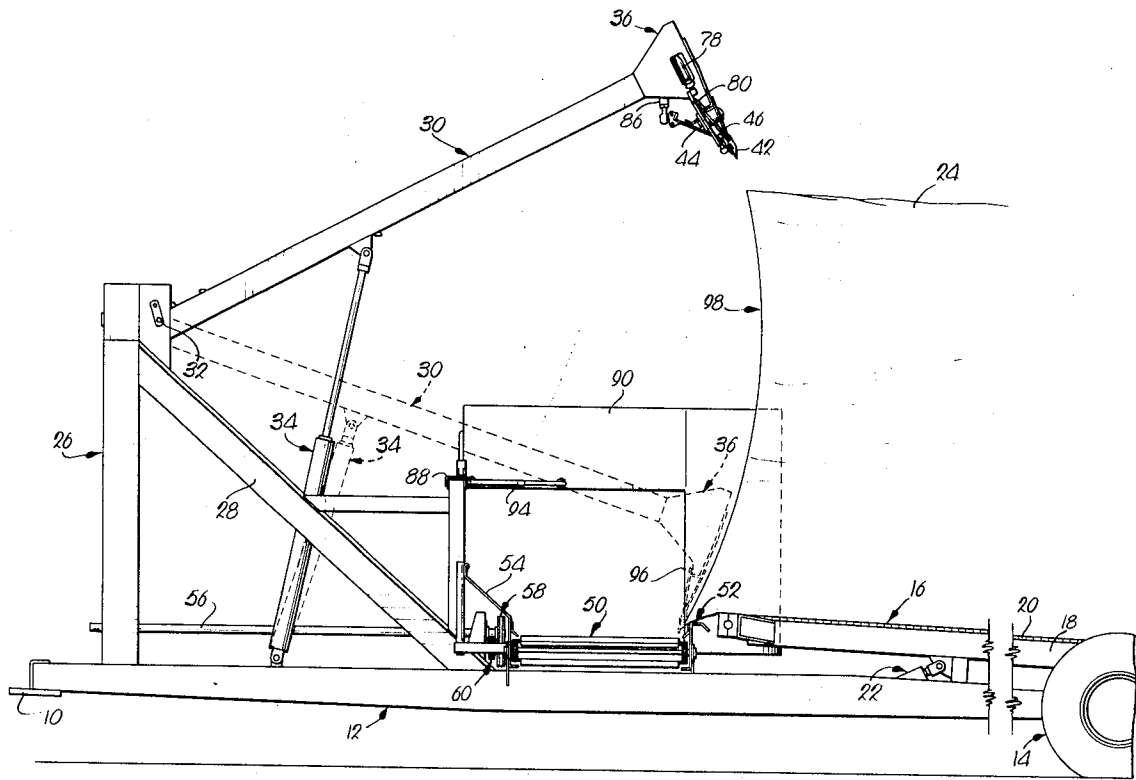
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Attorney, Agent, or Firm—Schmidt, Johnson, Hovey &
Williams

[57] ABSTRACT

Hay is fed from a stack to a point of further processing or livestock consumption by intermittent advancement of the stack to positions beneath a cutting mechanism that is carried by a vertically swingable boom. The boom is carried at one end thereof opposite to the cutting mechanism by a mast and is actuated by a fluid pressure piston and cylinder assembly. A lateral conveyor beneath the boom and adjacent the leading end of the stack receives the hay that is cutaway, and a flipper on the cutting mechanism deflects the cutaway hay toward the conveyor.

12 Claims, 5 Drawing Figures



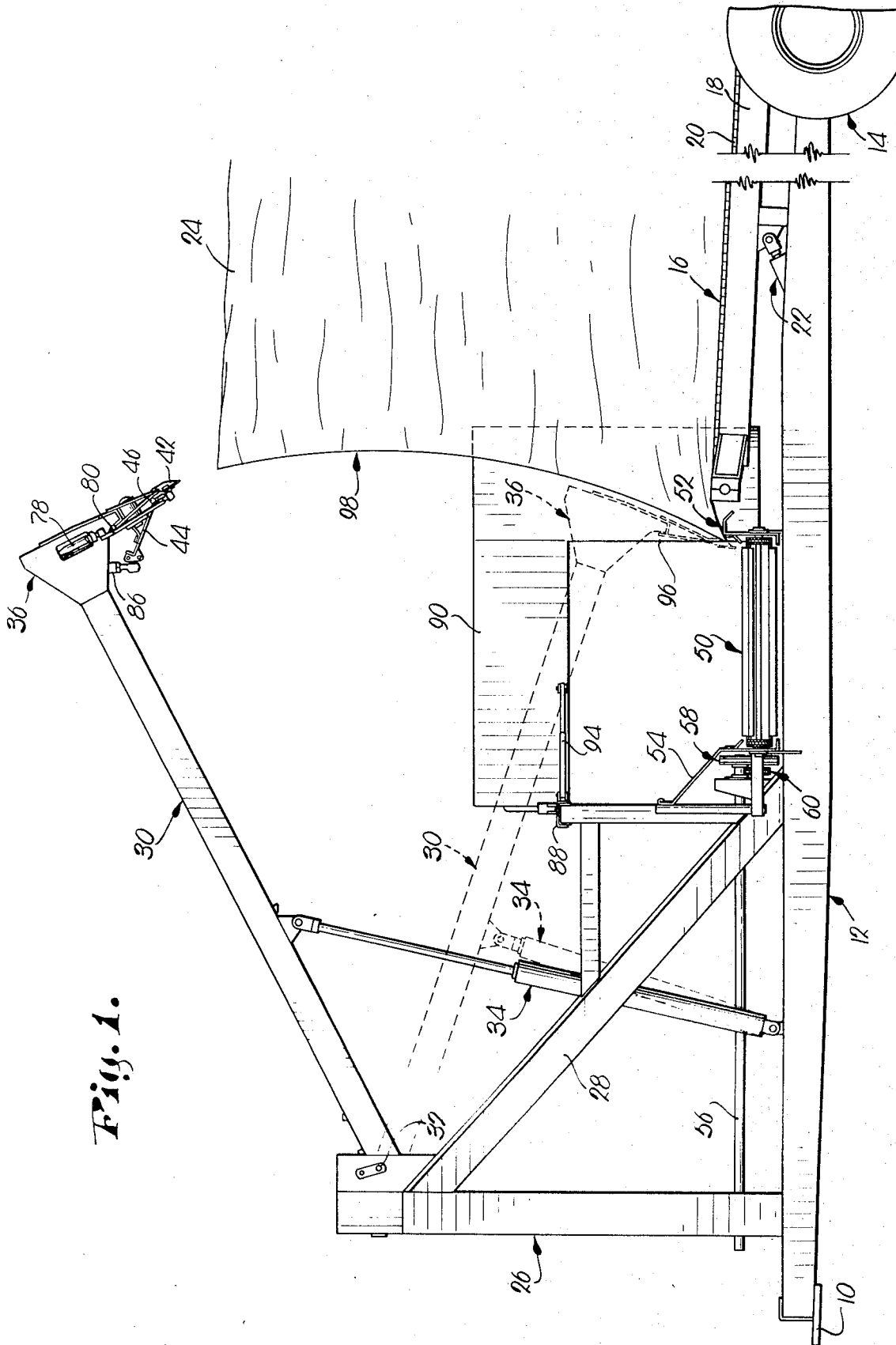


Fig. 1.

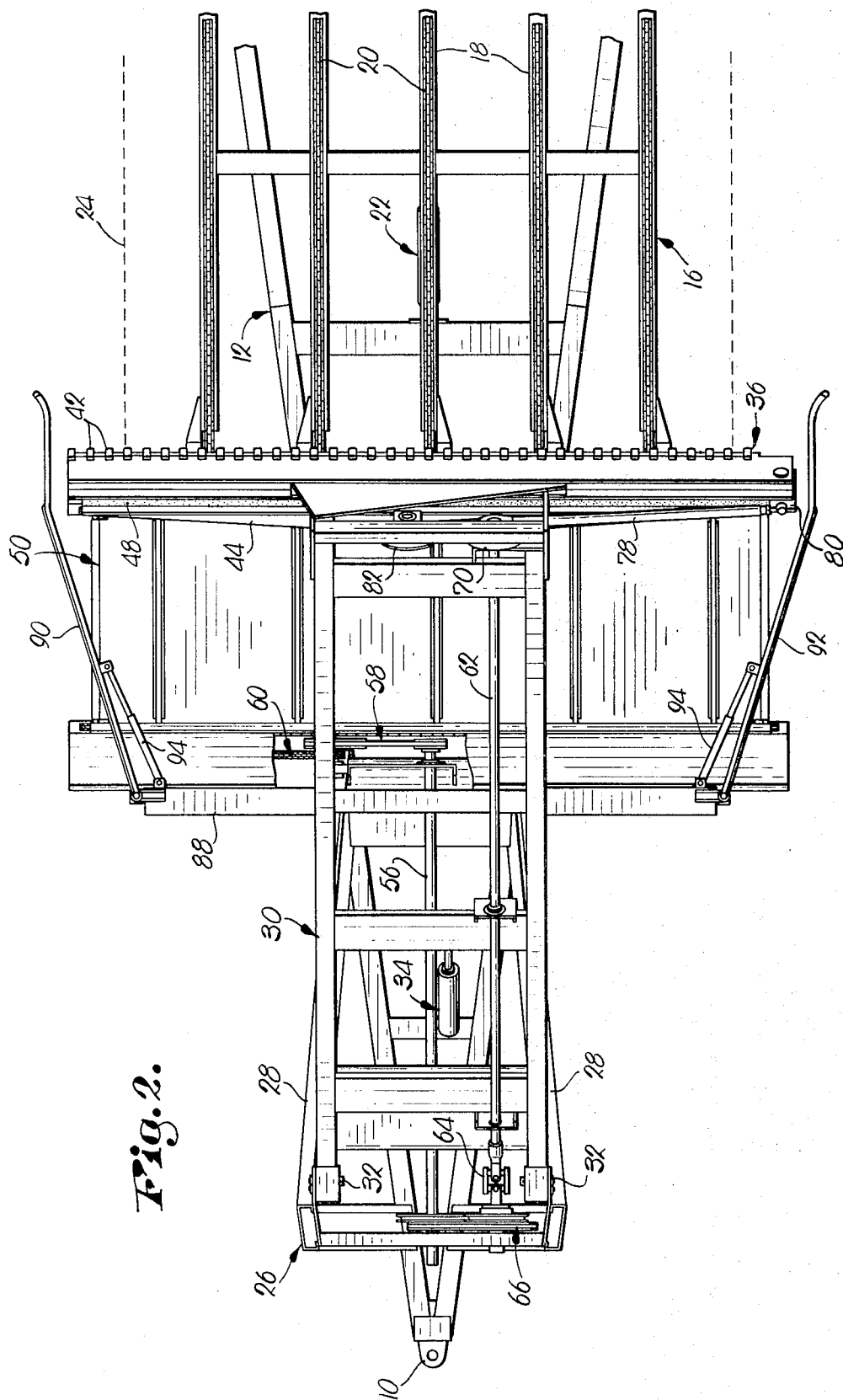
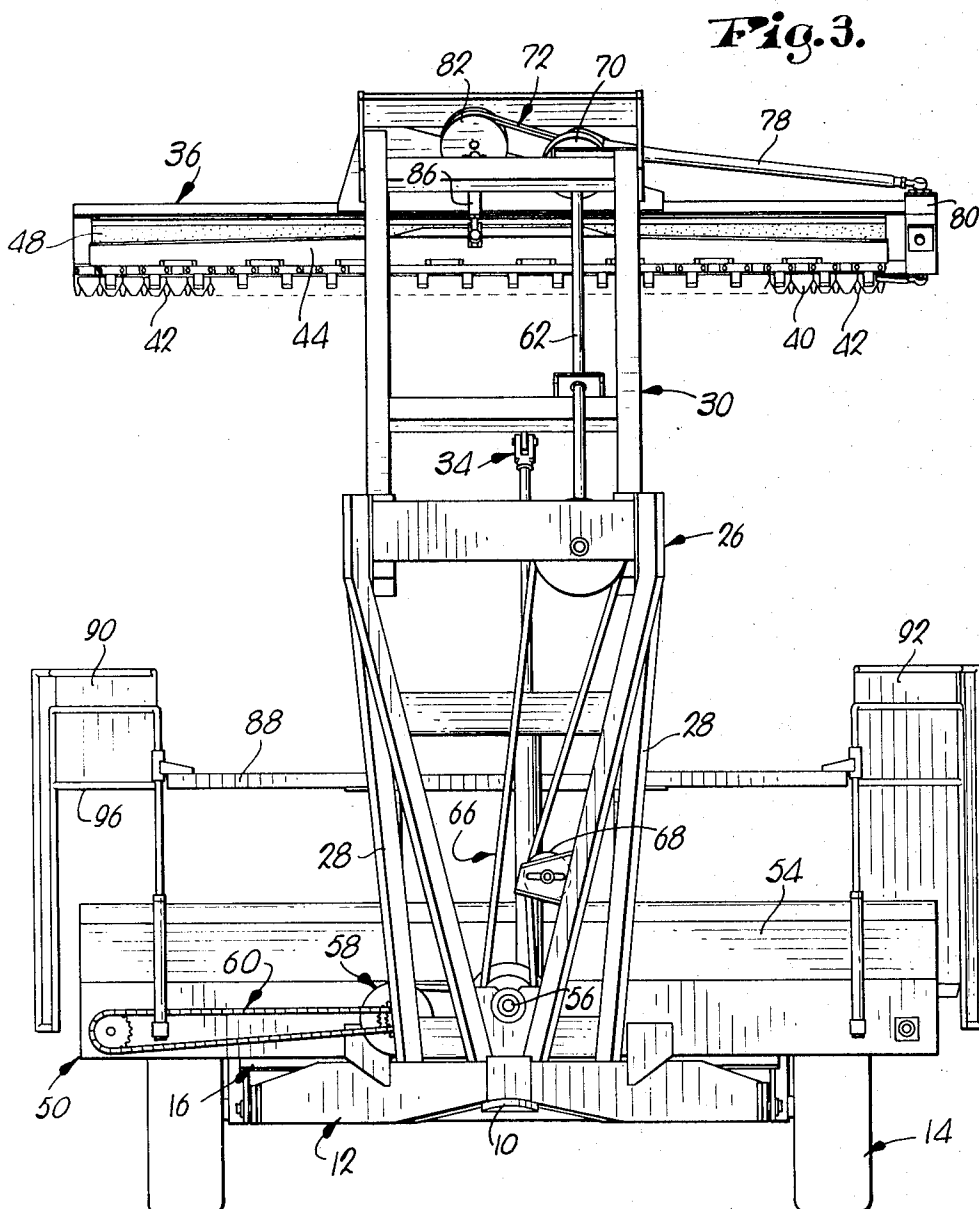
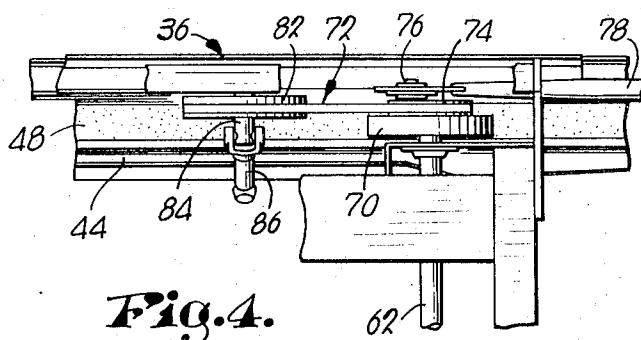
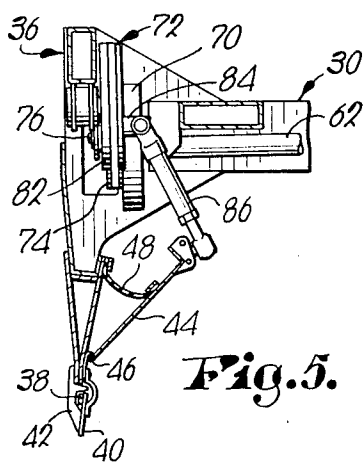


Fig. 2.



MACHINE FOR FEEDING MATERIALS FROM A STACK

This invention relates to a stack feeder in the nature of that disclosed by co-pending application Ser. No. 146,882, filed May 26, 1971, in the names of Brooks, et al. It is an object of the instant invention to provide a stack feeder operable equally as efficiently as that of the aforementioned application but on the principle of a swinging, rather than a rectilinear, reciprocation of the elongated cutting mechanism.

An important object of our instant invention is the provision of a machine for feeding materials from a stack which will permit the cutting mechanism to be reciprocated along a curve without difficulties of clogging, improper discharge of the cutaway materials to the lateral conveyor, or undue stresses upon any of the component parts of the machine.

In the drawings:

FIG. 1 is a fragmentary, side elevational view of a machine for feeding materials from a stack made in accordance with our present invention;

FIG. 2 is a fragmentary, top plan view thereof;

FIG. 3 is a front elevational view thereof;

FIG. 4 is an enlarged, fragmentary, detailed plan view of a portion of the cutting mechanism and proximal parts; and

FIG. 5 is an enlarged, fragmentary, transverse cross-sectional view through the cutting mechanism and proximal parts looking oppositely to FIG. 1.

The machine as chosen for illustration is adapted to be towed behind a tractor through use of a hitch 10 at one end of a tongue 12 operably coupled with a wheel and axle assembly 14. The machine is also provided with a tiltable stack mover 16 such as is disclosed, for example, in U.S. Pat. No. 3,209,932, issued to Bruce A. Schiltz, on Oct. 5, 1965, suffice in that connection to merely point out that the mover 16 is provided with a series of spaced, longitudinally extending beams 18, each of which, in turn, is provided with an endless chain 20. When the mover 16 is tilted upwardly and rearwardly through use of a fluid pressure piston and cylinder assembly 22, the rearmost end (not shown) of the mover 16 is disposed adjacent the ground at one end of the stack. Thereupon, as the machine is moved toward the stack by the tractor, and as the chains 20 are actuated by a suitable drive (not shown), the upper stretches of the chains 20 are moved from right to left viewing FIGS. 1 and 2 to load a stack 24 onto the mover 16 which is then returned to the slightly inclined position shown in FIG. 1 with the stack 24 thereon.

The machine for feeding materials from the stack 24 used in association with the mover 16 and forming the subject matter of our present invention includes a mast 26 rigid to and extending upwardly from tongue 12 adjacent the hitch 10. Suitable inclined bracing 28 for the mast 26 extends from the tongue 12 upwardly and forwardly to the upper end of the mast 26.

The mast 26 supports an elongated boom 30 which extends rearwardly from the mast 26 toward the stack 24 and is mounted on the mast 26 for vertical swinging movement toward and away from the tongue 12 by horizontal trunnions 32 at the forwardmost end of the boom 30 and uppermost end of the mast 26. Vertical swinging movement of the boom 30 about the axes of the trunnions 32 is effected by a double-acting fluid pressure piston and cylinder assembly 34 pivotally in-

terconnecting the tongue 12 and the boom 30 between the mast 26 and the stack 24.

An elongated cutting mechanism 36 mounted on the boom 30 transversely of the latter and at the free end of the boom 30 remote from the mast 26, includes an elongated reciprocable cutter bar 38 having a series of essentially triangular cutting elements 40 rigidly secured thereto and extending throughout the length of the bar 38. The elements 40 reciprocate with respect to a series of guards 42 in a manner not appreciably unlike comparable cutting mechanisms used with mowers, combines, and similar implements except only that the cutting elements 40 are downwardly oriented as best shown in FIGS. 1 and 5.

The cutting mechanism or head 36 is also provided with an elongated flipper 44 beneath the boom 30 and taking the form of a panel coextensive in length with the cutter bar 38. The flipper 44 and an essentially horizontal hinge 46 extending longitudinally thereof at its lowermost edge, adapting the flipper 44 for swinging movement toward and away from the tongue 12 at all times during reciprocation of the cutter bar 38 as will hereinafter become clear. A flexible member 48 between the head 36 and the flipper 44 above the hinge 46 prevents collection of hay material along the top surface of the flipper 44 at the hinge 46.

The tongue 12 supports an elongated, lateral conveyor 50 which extends transversely of the tongue 12 and is substantially coextensive in length with the head 36. Conveyor 50 is located between the assembly 34 and the proximal end of the mover 16 as is clear in FIGS. 1 and 2 with the top flight of the conveyor 50 slightly lower than the proximal end of the mover or stack advancing means 16. An upstanding sidewall coextensive in length with the conveyor 50 terminates in a narrow material-receiving platform 52 slightly below the proximal ends of the chains 20 and disposed to be cleared by the guards 42 and the cutting elements 40 when the boom 30 is at the lower end of its path of travel as depicted by dotted lines in FIG. 1. An inclined deflector 54 in opposed relationship to the platform 52 also operates to feed the cutaway material to the upper stretch of the conveyor 50, the deflector 54 also being essentially coextensive in length with the conveyor 50.

The cutter bar 38, the flipper 44 and the conveyor 50 may all be operated from the power takeoff of the tractor coupled with a jackshaft 56 extending rearwardly from the mast 26 above the tongue 12 and terminating adjacent the conveyor 50. A belt and pulley assembly 58 carried by the framework of the conveyor 50 is operably coupled with the jackshaft 56 and this assembly 58 is, in turn, operably coupled with the conveyor 50 by a chain and sprocket wheel assembly 60.

The boom 30 carries a shaft 62 longitudinally thereof between the mast 26 and the mechanism 36. A universal joint 64 on that end of the shaft 62 proximal to the mast 26 is operably coupled with the shaft 56 by a belt and pulley assembly 66, carried by the mast 26, and equipped with a belt tightening idler 68. The assembly 66 is equipped with a pair of pulleys on each of the shafts 56 and 62 respectively for alternate use as may be desired to control the speed of rotation of the shaft 62 in accordance with the speed of the power takeoff of the particular tractor that is used in connection with the machine illustrated.

That end of the shaft 62 adjacent the mechanism 36 is provided with a flywheel 70, together with a belt and pulley assembly 72. The pulley 74 of the assembly 72 which is rigid to the shaft 62 has an eccentric or crank-pin 76 that is operably coupled with a sickle bar 38 by a pitman 78 and a wobble plate 80.

The pulley 82 of the assembly 72 is also provided with an eccentric or crankpin 84 that is pivotally coupled with the flipper 44 by a link 86.

A frame piece 88 extending along the conveyor 50 above the deflector 54 carries a pair of horizontally swingable deflector panels 90 and 92, one at each end respectively of the conveyor 50. Panels 90, 92 may be swung away from and toward each other by adjustment of extensible devices 94 between the panels 90, 92 and the frame piece 88. the panel 90 has an outlet 96 for material emanating from the conveyor 50.

OPERATION

After the stack 24 has been loaded onto the mover 16 and positioned as illustrated in FIG. 1 by retraction of the assembly 22, the chains 20 are actuated to advance the stack 24 slightly to a position underlying the head 36 when the latter is raised to a position above the top of the stack 24 as shown in FIGS. 1-3 through extension of the assembly 34.

Thereupon, with the shaft 56 rotating continuously, the assembly 34 is retracted to exert a downward pull on the boom 30 swinging the head 36 about an arcuate path of travel concentric with the trunnions 32.

As the head 36 is thus moved through the stack 24 a concave cut 98 is formed in the stack 24 by the reciprocation of the cutting elements 40 and, at the same time, the constantly swinging flipper 44 deflects the slice or cutaway material away from the cut 98 toward the underlying conveyor 50. Manifestly, the material received by the upper flight of conveyor 50, deflected thereto by the panels 90 and 92 and by the inclined deflector 54, is carried away through the outlet 96 of the panel 90 to a point of discharge for further processing or livestock consumption. In this connection, the material may be discharged directly into feed bunks as the machine is advanced slowly by the tractor; may be discharged directly onto the ground in the case of range feeding; or may be fed into a grinder or other equipment for such additional processing as may be desired.

As the cutting elements 40 approach the platform 52 and come to a stop therebelow, but above the top flight of conveyor 50, the material will be sheared away from the stack 24 and deflected onto the conveyor 50 by the flipper 44 as aforesaid.

The boom 30 is then again raised and the stack 24 advanced for a new bite. If desired, prior to raising the head 36 from the dotted-line position shown in FIG. 1, the advancing chains 20 may be retracted slightly so that the head 36 does not tear into the proximal concave cut end 98 of the stack 24.

Having thus described the invention, what is claimed as new and desired to be secured by Letters Patent is:

1. A machine for unloading a stack of feed-stuff comprising:
 - a mast;
 - an elongated boom extending from said mast toward a stack to be unloaded;

means intermediate the top and bottom levels of the stack mounting the boom on said mast for swinging movement about a horizontal axis;

power means coupled with said boom for swinging the same;

a cutting mechanism carried by the boom remote from the mast for swinging movement with the boom through a path of travel concentric with said axis;

a support for said stack provided with means for advancing the stack toward the mast into said path of travel of said mechanism; and

an elongated, lateral conveyor between the mast and one end of said advancing means, and underlying said boom for receiving the feedstuff cut from the stack by the mechanism and carrying the same away to a point of further processing or livestock consumption,

said mechanism being provided with an elongated sickle bar having a series of cutting elements therealong and mounted for horizontal reciprocation traversing said path of travel,

said boom having a driven member extending therealong and swingable therewith for reciprocating said bar,

said mast having a drive extending upwardly therealong for actuating said member.

2. A machine as claimed in claim 1 wherein said power means is disposed between the mast and said conveyor.

3. A machine as claimed in claim 2 wherein said power means is adapted to pull the boom downwardly to move said mechanism through the stack and to push the boom upwardly to place said mechanism in position for receiving the stack beneath the mechanism as the stack is advanced by said advancing means.

4. A machine as claimed in claim 1 wherein said mechanism extends along one longitudinal edge of the conveyor above the latter and below the level of the proximal end of said advancing means when the mechanism is at the lowermost end of its path of travel.

5. A machine as claimed in claim 1 wherein is provided a jackshaft extending from the mast to the conveyor for actuating the latter, said shaft being operably connected with said drive.

6. A machine as claimed in claim 1 wherein is provided a flipper beneath the boom, extending along said bar, and mounted on said mechanism for swinging movement above a horizontal axis for deflecting the feedstuff toward the conveyor as the same is cut from the stack by said mechanism; and means operably coupling said member with said flipper.

7. A machine for unloading a stack of feedstuff comprising:

a stack support having a discharge end and provided with means for advancing a stack toward said end until a portion of the stack overhangs said end;

a lateral conveyor across said end of the support and lower than the latter in position to underlie the overhanging portion of the stack;

a mast spaced from said end of the support beyond said conveyor in the direction of stack advancement;

an elongated boom extending from said mast, toward the stack, and crossing above the conveyor;

means intermediate the top and bottom levels of the stack mounting the boom on the mast for swinging

movement about a horizontal axis disposed beyond said conveyor in the direction of stack advancement;

a cutting mechanism carried by the boom remote from the mast in disposition to overlie said overhanging stack portion; and

extensible power means located between said conveyor and the mast and coupled with said boom for swinging the boom toward and away from the conveyor to cut the overhanging portion from the stack and onto the conveyor for carrying the cut-away portion to a point of further processing on livestock consumption.

8. A machine as claimed in claim 7, wherein said power means is operable to cause the leading extremity of said mechanism to pass downwardly beyond said end of the support as the mechanism approaches its lower limit of travel to shear the overhanging portion from

the stack.

9. A machine as claimed in claim 8, wherein said conveyor is provided with a platform for the overhanging portion to facilitate said shearing action.

10. A machine as claimed in claim 8 wherein said mechanism is positioned to swing inwardly of said end of the support above the latter and then outwardly of said end at the level of the latter.

11. A machine as claimed in claim 7, wherein said mechanism is provided with means for deflecting the feedstuff toward the conveyor as the same is cut from the stack by said mechanism.

12. A machine as claimed in claim 11, wherein said conveyor is provided with second deflector means in opposition to said first-mentioned deflector means for augmenting the action of the latter.

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