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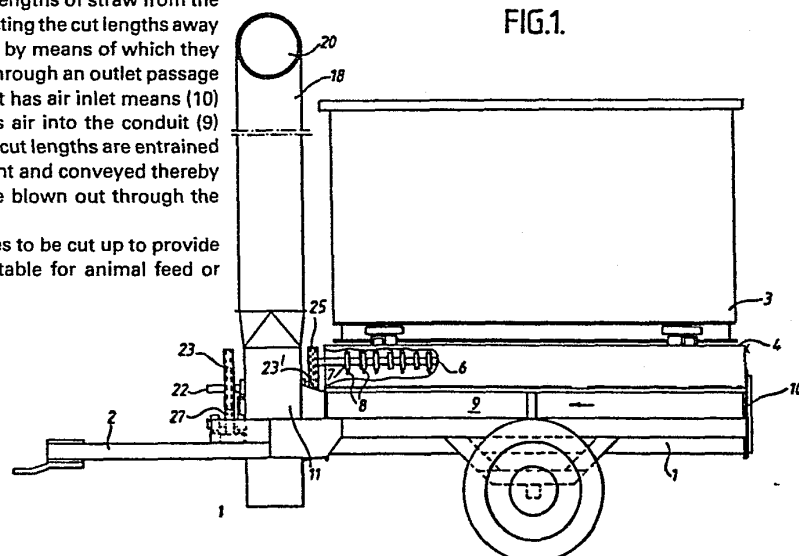
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54 Bale chopping and distributing apparatus.

57 Cutting and distributing apparatus for bales of straw, hay, silage or the like, comprising a container(3) for one or more bales, cutting means (6) for cutting lengths of straw from the bale or bales, a conduit (9) for conducting the cut lengths away from the cutting means to a fan (11) by means of which they are discharged from the apparatus through an outlet passage (20) characterised in that the conduit has air inlet means (10) so arranged that the fan (11) draws air into the conduit (9) through the inlet means (10) and the cut lengths are entrained by the resulting air current and conveyed thereby to the fan (11), whereupon they are blown out through the outlet passage(20).

This apparatus enabled the bales to be cut up to provide lengths of straw, hay or silage suitable for animal feed or bedding.



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Bale Chopping and Distributing Apparatus

This invention relates to chopping and distributing apparatus for straw or hay or silage bales. Straw and hay is normally stored in bales which are either of the older small rectangular type, or more commonly
5 nowadays of the larger round or rectangular type. However, the bales are preferably chopped into individual pieces of hay, straw or silage of a particular length, to enable the straw to be used as feed or bedding for farm animals.

10 The conventional type of chopping and distributing apparatus for straw or hay comprises a towable wheeled chassis carrying a tub to receive one or more bales rotatable about a vertical axis, a rotatable cutting means beneath the tub for gradually cutting up the
15 rotating bale into short lengths of straw or hay, a blower for discharging the cut straw or hay from the machine, and a rotatable auger for conveying the cut straw or hay from the cutting means to the blower.

20 Unfortunately, straw, hay and silage are not uniform materials. For example, straw varies depending on the type of grain (e.g. wheat, barley) from which it has been derived, and hay varies depending on the variety of grass used. Also, straw, hay and silage are sometimes wet and sometimes dry, depending on the
25 weather and storage conditions. These variations

cause a great deal of difficulty with auger conveyors, because these will not satisfactorily handle cut lengths of straw, hay or silage with widely differing properties. Straw, hay or silage which is unsuitable for a particular
5 auger conveyor can cause jamming of the auger.

We have now discovered that if the auger conveyor is replaced by an air conveyor in which a current of air conveys the cut lengths away from the cutting means to enable them to be blown out of the apparatus, these
10 problems are overcome. The air conveyor can handle a wide variety of different types of straw, hay, or silage in different states of dryness without becoming clogged.

According to this invention we therefore provide
15 cutting and distributing apparatus for bales of straw, hay, silage or the like, comprising a container for one or more bales, cutting means for cutting lengths of straw, hay, silage or the like from the bale or bales, a conduit for conducting the cut lengths away
20 from the cutting means to a fan by means of which they are discharged from the apparatus through an outlet passage, characterised in that the conduit has air inlet means so arranged that the fan draws air into the conduit through the inlet means and the cut lengths
25 are entrained by the resulting air current which conveys them to the fan, whereupon they are blown out through the outlet passage.

Preferably, the container comprises a tub (which

may be cylindrical or any other convenient shape)
mounted to be rotatably driven about a vertical axis,
and provided with means for gripping a bale or bales
contained within it to ensure that it or they rotate
5 with the tub. The cutting means preferably comprises
at least one horizontal rotatably-driven shaft provided
with cutter blades and mounted beneath the tub so that
as the tub turns its contents are carried over the
rotating cutter blades and the bales are therefore
10 gradually cut up.

The fan is preferably arranged so that the air
carrying the cut lengths of straw, hay or silage is
drawn into the fan parallel to or along the axis, and
is discharged tangentially to the fan into the outlet
15 passage. In this case the fan is preferably mounted
in a generally cylindrical housing in such a way that
the gap between the fan and the housing wall increases
progressively towards an outlet through which the air
and cut material are discharged into the outlet passage.

20 The fan blades are preferably flat and extend
almost parallel to the fan axis, but with a slight
offset to provide the necessary suction. Each blade
preferably comprises a wider portion which is joined
to a narrower axial boss by a tapered portion. The
25 blades which may for example be six in number, are
preferably each strengthened by a web extending
perpendicular to the fan axis. The webs preferably

taper towards their outer ends.

As an alternative to the above-described centrifugal fan, an axial fan may be used.

The tub is preferably rotatably driven by a hydraulic
5 motor (although any other type of motor could also
be used) which is in turn driven from the hydraulic
system of a tractor e.g. a tractor used to tow the
apparatus. The fan and the or each cutter shaft are
preferably both driven from the tractor power take-
10 off, and their rotational speeds (and also that of
the tub) are carefully chosen. More specifically,
it has been found that the optimum length for cut straw
and hay is about $2\frac{1}{2}$ to 3 inches (6.35 to 7.62 cm) for
animal feed or bedding, although lengths down to one
15 inch or even less may be preferred in some applications.
The speed of rotation of the cutter shaft is chosen
bearing the desired length in mind. The speed of
rotation of the tub is so selected that the bales are
carried over the cutting shaft at such a speed that
20 the material is cut at a rate which is fast enough
for practical purposes, whilst not being so rapid as
to cause cut material to jam around the cutter shaft
or to accumulate in the conduit. The slower the rate
of rotation of the tub for a given rotational speed
25 of the cutter shaft, the faster is the rate of cut.
The speed of rotation of the fan is chosen so that
it provides a current of air which is sufficient to

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