

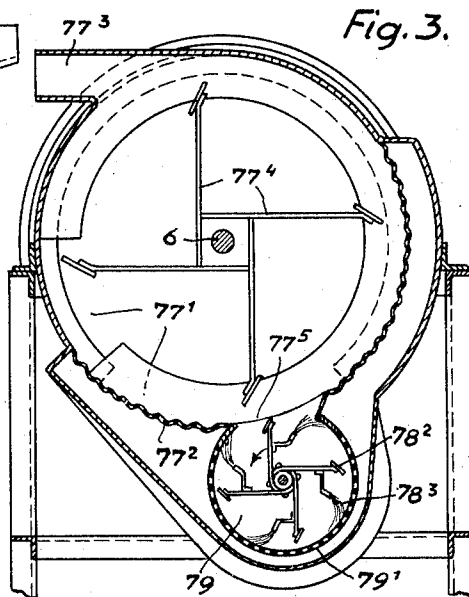
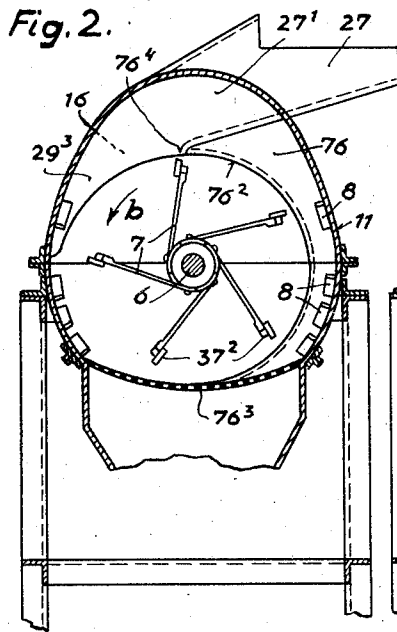
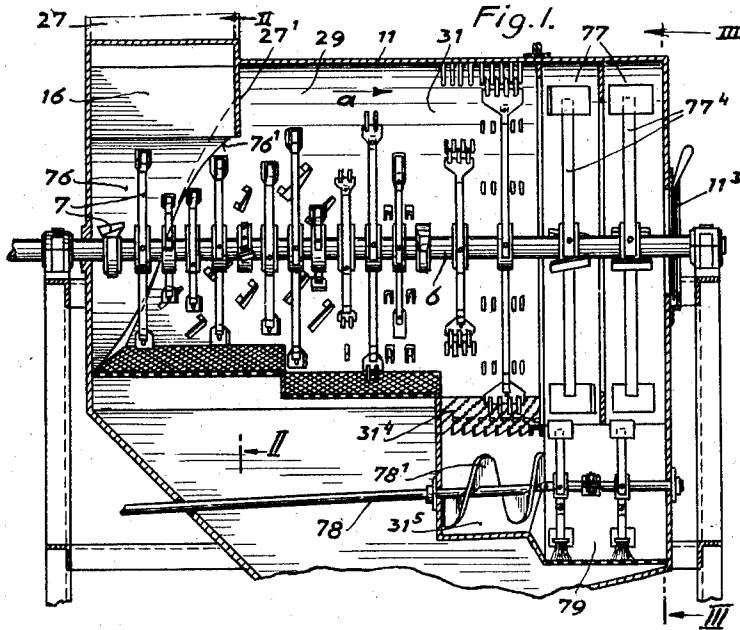
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F. SCHLAYER

1,744,336

AXIAL THRASHING OR STRAW REDUCING MACHINE

Original Filed March 26, 1925 2 Sheets-Sheet 1



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Fig. 4.

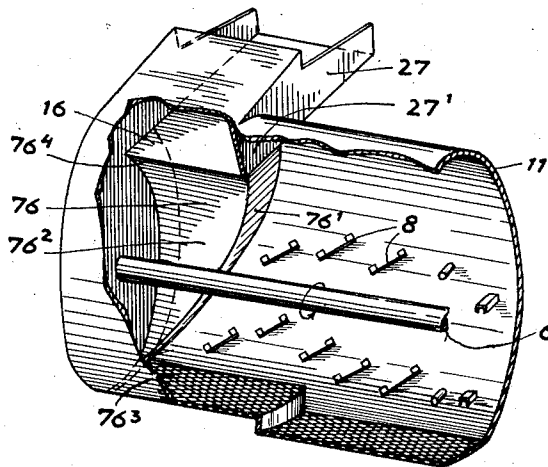


Fig. 5.

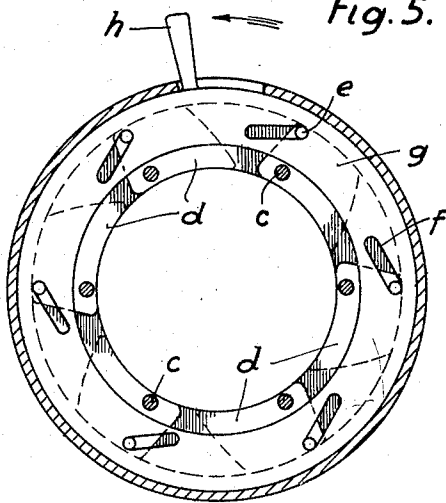
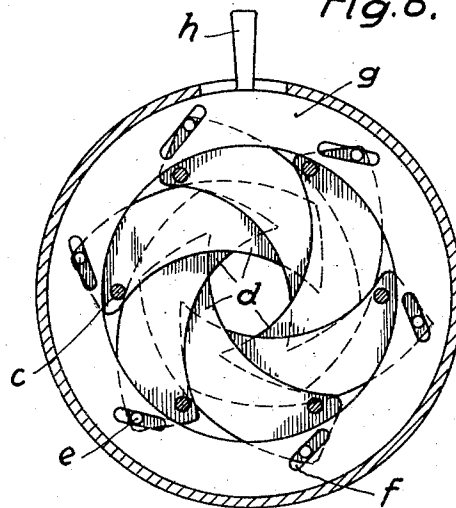


Fig. 6.



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UNITED STATES PATENT OFFICE

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AXIAL THRASHING OR STRAW-REDUCING MACHINE

Original application filed March 26, 1925, Serial No. 18,587, and in Germany April 8, 1924. Divided and this application filed October 23, 1928. Serial No. 314,411.

My invention relates to axial thrashing and/or straw-reducing machine, as for example machines of the class described and claimed in my earlier applications Serial No. 662,577, filed September 13, 1923 and Serial No. 18,587, filed March 26, 1925. This application is a division of the latter application Serial No. 18,587.

The aim and object of the present invention is so to perfect the effective operation of the draft created by the working members of this axial machine that the thrashing materials will be forcibly drawn in at the intake end, rapidly driven through the machine during the treatment proper, incidentally well stripped of the grains, and finally blown away a certain distance. In contradistinction to well known axial machines of the kind, in which special fans or blowers are provided for creating the draft necessary to feed on the thrashing materials, the present invention contemplates the methodical production and regulation of the auto-draft, which is created incidentally as a result of the rotation of the working members.

An important feature of the invention of application Serial No. 18,587 resides in forming the intake end of the machine into a special combined material feeding and draft producing part as for example by providing in advance of the intake, speaking in the sense of rotation of the machine shaft, a projection restricting the annular space between the revolving beaters and the drum wall, and propelling the air drawn in by suction from the feeding chute by the revolution of the working members, towards the discharge end of the machine.

The present invention relates to a machine of the general character indicated above provided with means for the regulation of the auto draft and thereby the duration of treatment of the materials and in the particular embodiment herein exhibited this means comprises the introduction of regulatable quantities of air at the rear end and axially of the machine independently of the outlet for the thrashed materials and draft. The auto draft may be produced in any suitable manner, as for example by the working members

of the rotor or by these working members assisted by the guiding and blower construction at the intake end of the machine.

It is immaterial for the true nature of the invention what kind of stationary and revolving working members are employed in the machine; whether their activity be principally a thrashing one or a thrashing and straw-reducing one, or merely a straw-reducing one. The subject matter of the patent is, therefore, an axial machine for the treatment of corn-blades, the treatment consisting either in thrashing and straw-reducing, or in either one of these two activities.

With these and other objects in view which will more clearly appear as the specification proceeds, the invention resides, generally stated, in the novel features and devices and combination of features and devices hereinafter described and defined in the claims, the descriptive matter being supplemented by the accompanying drawings in which—

Fig. 1 represents a longitudinal section of a thrashing and straw-reducing machine according to the invention.

Fig. 2 is a cross-section on the line II—II,

Fig. 3 a cross-section on the line III—III of Fig. 1,

Fig. 4 is a diagrammatic and perspective view of an interior part of the housing, and

Figs. 5 and 6 are detail views on an enlarged scale of the regulating device at the discharge end of the machine, showing two different regulating positions.

At the intake end of the machine, between the rotary working members or beaters 7 and the drum well 11, a projection or guide element 76 is arranged so as to restrict the space between the beaters and the drum. The guide element, which adjoins the end wall of the drum, is in the particular embodiment herein exhibited wedge-shaped and widens out circumferentially in the rotating direction of the beater shaft 6 marked by the arrow *b* as well as axially towards the discharge end of the drum, the pointed end 76³ of the guide element being preferably situated diametrically opposite the drum inlet 16. The spirally arranged guide surface 76¹ which faces the discharge end of the machine,

is held at right angles to the drum wall 11, and the inner surface 76² which faces the beater shaft 6, approaches the latter spirally in the rotating direction. The abutments or stationary working members 8 which co-

operate with the beaters for thrashing the materials are absent from the guide element. The far end 76⁴ of the guide element 76, considered in relation to the rotating direction of the beater shaft, is bounded by the bottom of the feeding chute 27 which opens into the machine tangentially to the beater path. The chute 27 is to a great extent entirely enclosed within the side walls and a top and bottom wall so that an air throat is formed which conducts the air tangentially into the drum. The radially extending side wall 27¹ of the chute which faces the discharge end of the drum, has a prolongation 29³ which separates the intake zone of the drum from the working zone. This prolongation of the chute wall is particularly adaptable for use in machines in which the drum 11 is enlarged at the top to form an accumulating pocket 29, as more particularly described in my above named application Serial No. 662,577.

The beaters 7 are arranged helically about the shaft 6 and fitted at their ends with dished shoes 37² which are either rigidly connected to the beaters or adapted for adjustment, the shoes being arranged at a suitable angle relative to the plane of rotation. The beater arms may either be rigid or resilient.

Behind the straw-reducing zone 31 of the machine a grain-separating zone 77 is provided for the utilization of the draught created by the rotation of the beaters. This zone is divided into two compartments, and the radially extending annular plates which divide the compartments from one another and from the straw-reducing zone are interrupted to form gateways 77¹ through which the material to be treated can proceed in its course through the machine. The lower portion of the wall which surrounds the separating zone is composed of corrugated sieve material as at 77². The end compartment communicates with a tangentially arranged conduit 77³ which forms an outlet for the air and for the reduced straw. Beaters 77⁴, connected to the shaft 6 and fitted at their free ends with operating shoes, work in the compartments 77.

Under the compartments 77 a cylindrical sieve drum 79¹ is arranged which is in communication with said compartments by an opening 77⁵ so as to receive the materials from the same. Within this sieve revolving beaters 78² are arranged, and brushes 78³ are connected to the beater arms so as to work behind the beaters against the sieve surface.

Under the straw-reducing zone there is a trough or drum 31⁵ which receives the straw particles and those grains which fall through

the bottom grate 31⁴ of said zone. A conveying screw 78¹, working in the trough 31⁵, feeds the materials from the latter into the working space 79 of the sieve drum 79¹. A shaft 78 drives the screw 78¹ as well as the beaters 78² and the brushes 78³. The drive of this shaft is derived from the beater or main shaft in a convenient manner.

An aperture is made in the end wall of the machine drum concentrically with the shaft 6. Into said aperture is fitted an iris diaphragm 11³ which can be adjusted for admitting more or less air into the drum through the aperture. This diaphragm consists of a plurality of lamellæ *d* having the shape of annular discs which overlap each other and are rotatable transversely of the shape about the stationary bolts or pins *c*. These lamellæ carry pins *e* which slide inside oblong or elongated slots *f* on the circular disc *g* and this disc can be turned by a hand lever *h*. The slots *f* are inclined, as indicated, so that when the lever *h* is moved in the direction of the arrow indicated in Fig. 5 the lamellæ *d* are radially displaced outwardly, while with the opposite movement of the lever *h* they are caused to move inwardly. In this manner it is possible to insure an increase or a decrease in size of the slits enclosed between the lamellæ.

When the machine is in operation, the air will be circulated in the drum by the beaters 7 which, owing to their inclination relative to the plane of rotation, also propel the air towards the discharge end of the machine. Air will thus be drawn in through the chute 27, and this tangentially entering air will be deflected by the helical surface 76¹ of the guide element 76 so as to enhance the propulsion. This effected is augmented by the spiral arrangement of the surface 76² which gradually narrows the space around the beaters in the rotating direction. The wider the surface area of the dished shoes 37², which act like the vanes of a fan, the larger will be the volume of air sucked in through the chute 27, and the materials also will be virtually sucked into the machine. The wall 29³ aids in guiding the air current and induces it to pursue a helical course. The materials are carried along by the air current and pass in the direction of the arrow *a* quickly through the thrashing zone into the straw-reducing zone 31 where the straw is effectively cut up. As the air passes from the zone 31 into the compartments 77, it is caught by the beaters 77⁴ and discharged through the conduit 77³. The reduced straw passes from the straw-reducing zone 31 through the gateways 77¹ into the compartments 77 where it is circulated until it reaches the conduit 77³ and is blown out through the latter. While the straw circulates in the compartments 77, the grains mixed with the same will be hurled against the corrugated sieve 77² and either

passed through the latter or delivered into the drum 79¹. The brushes 78³ in the latter keep the sieve clean so that the grains received from the compartments 77 as well as from the hopper 31⁵ can pass through. The straw particles which enter the drum 79¹ are thrown back by the beaters 78² into the compartments 77.

If the iris diaphragm 11³ is opened so as to admit air along the shaft, the suction effect in the chute 27 will be reduced, and the propulsion of the materials through the machine will be retarded. In this manner the operation of the machine can be regulated.

The guide element 76 as well as the feeding chute may be arranged in a different position on the drum, and the length of the guide elements may be varied according to requirements. It is understood that the casing including the projection or guide element 76 may assume other specific forms than that illustrated without departing from the principle of the invention and that the gap between the rotary leaders and the surface 76 and the inclination of the edge 76¹ and the axial extent thereof and other dimensions of the radially inwardly projecting part 76 may be varied to suit the particular requirements. The regulation of the auto draft may be effected in various and sundry ways and it is understood that the embodiment herein exhibited is merely for illustrative purposes and that the claims hereto annexed are not to be limited to the specific means shown except as may be necessary in view of the prior art and the terms of the claims themselves.

Claims:

1. A machine of the class described having a drum, a rotary shaft axially extending within said drum, rotary working members on said shaft adapted to create an air current through said drum, said drum having a discharge conduit and an end wall at the discharging end, an aperture in this end wall connecting the interior of said drum with the outside air and means to adjust the area of said aperture for regulating said air current and varying the speed with which the materials are driven through the machine.

2. A machine of the class described having a drum, a rotary shaft axially extending within said drum, rotary working members on said shaft adapted to create an air current through said drum, said drum having a tangential discharge conduit and an end wall at the discharging end, an aperture in this end wall connecting the interior of said drum with the atmosphere and an iris diaphragm adapted to adjust the area of said aperture for regulating said air current and varying the speed with which the materials are driven through the machine.

3. An axial thrashing or straw reducing

machine including a drum surrounding a shaft and rotating working members carried thereby, said rotating members being arranged to induce a draft axially of the machine and said drum having an interior contour at the inlet end restricting the space about the rotary working members at points circumferentially in advance of the inlet so as to cooperate and function with the rotating working members at the intake end to set up a strong draft in the axial direction, a discharge outlet at the discharge end for the air current and the material worked upon and means for regulating the draft.

4. In an axial thrashing or straw reducing machine, a rotary shaft, a housing of elongated form surrounding said shaft and having at one end an inlet opening and at the opposite end a discharge opening, a plurality of rotary beaters carried by said shaft and a plurality of stationary members carried by the housing and cooperatively functioning with said rotary beaters to work upon and feed the material axially toward the discharge end the intake end of said machine being formed into a combined material feeding and draft producing or blower element part including rotary beaters and casing part which function as a blower and a regulatable air intake opening in the discharge end wall for controlling the speed with which the materials are driven through the machine.

5. A machine of the class described having a drum, a rotary shaft axially extending within said drum, rotary working members on said shaft adapted to create an air current through said drum, and means at the discharging end for regulating said air current.

6. In a thrashing and straw reducing machine of the class described having a drum, a rotary shaft axially extending within said drum, rotary working members on said shaft adapted to create an air current through said drum, said drum having an end wall at the discharging end, an aperture in this end wall and means to adjust the area of said aperture for regulating said air current.

7. In a thrashing and straw reducing machine of the class described having a drum, a rotary shaft axially extending within said drum, rotary working members on said shaft adapted to create an air current through said drum, said drum having an end wall at the discharging end, an aperture in this end wall and an iris diaphragm adapted to adjust the area of said aperture.

8. In a thrashing and straw-reducing machine of the class described having a drum, a rotary shaft axially extending within said drum, rotary working members on said shaft adapted to create an air current through said drum, additional compartments at the discharge end of the drum, adapted to receive said air current together with the thrashed

and reduced material for further treatment, and a corrugated sieve partly surrounding said additional compartments.

9. A thrashing or straw reducing machine of the axial type including a drum a shaft a plurality of rotary beating members carried by the shaft, said drum at the intake end of the machine being arranged to closely surround the rotary beating members and forming therewith a blower to set up an axial draft and a portion of the drum adjacent the intake end being enlarged at its upper part to form an accumulating chamber.

10. In a thrashing and straw reducing machine comprising a drum having an intake and a discharge end, a rotary shaft axially extending within said drum, rotary working members mounted on said shaft, stationary working members, and a projection adjoining the intake end wall of said drum and widening out uniformly towards the discharge end of the machine as well as in the rotating direction of the shaft, a portion of the drum axially behind the intake end being enlarged at its upper part to form an accumulating chamber for the material to be thrashed.

In testimony whereof, I have signed my name to this specification.

FELIX SCHLAYER.