Dec. 19, 1944. L. E. EGEDAL 2,365,179

GRAIN PROCESSING APPARATUS

Filed Oct. 16, 1941 4 Sheets-Sheet 1

FIG. 1

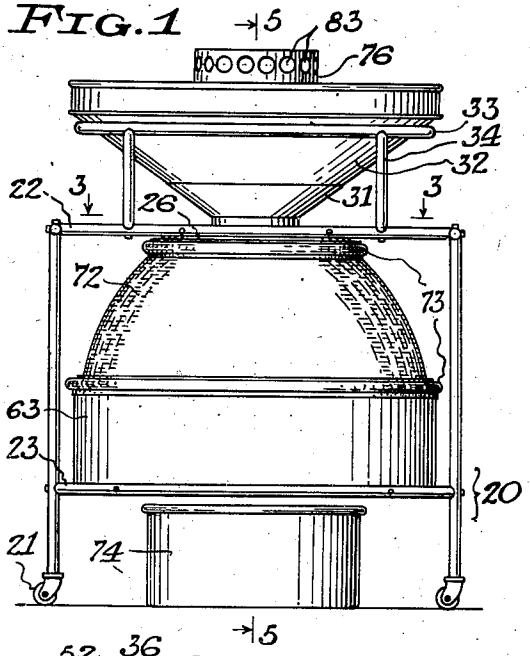



FIG. 2

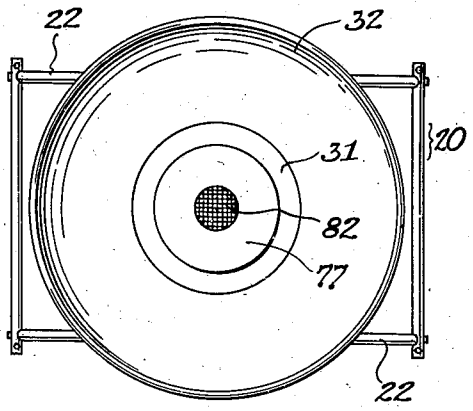



FIG. 3

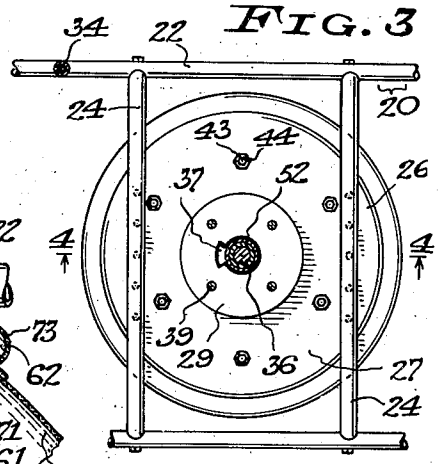



FIG. 4

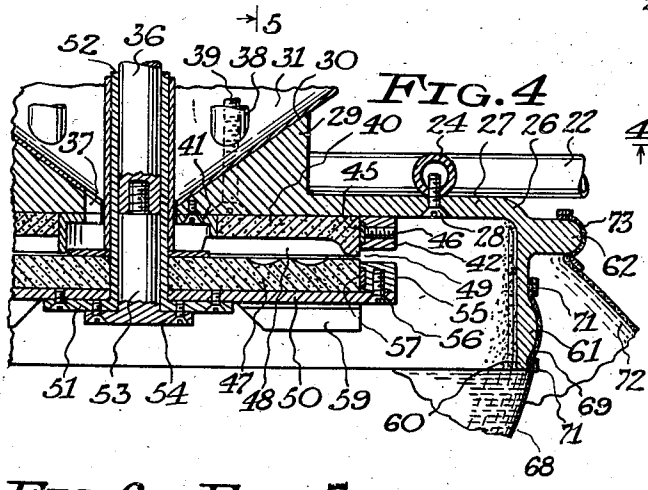



FIG. 6

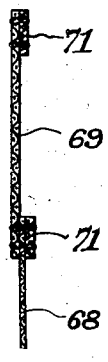



FIG. 7

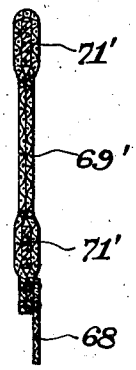
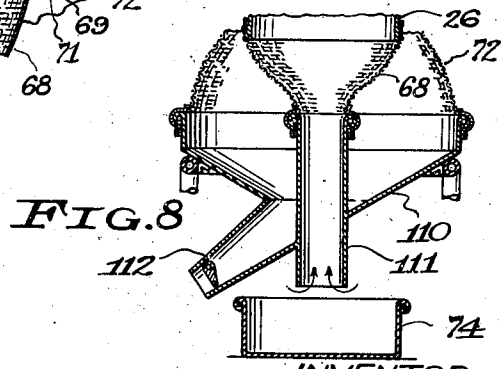



FIG. 8




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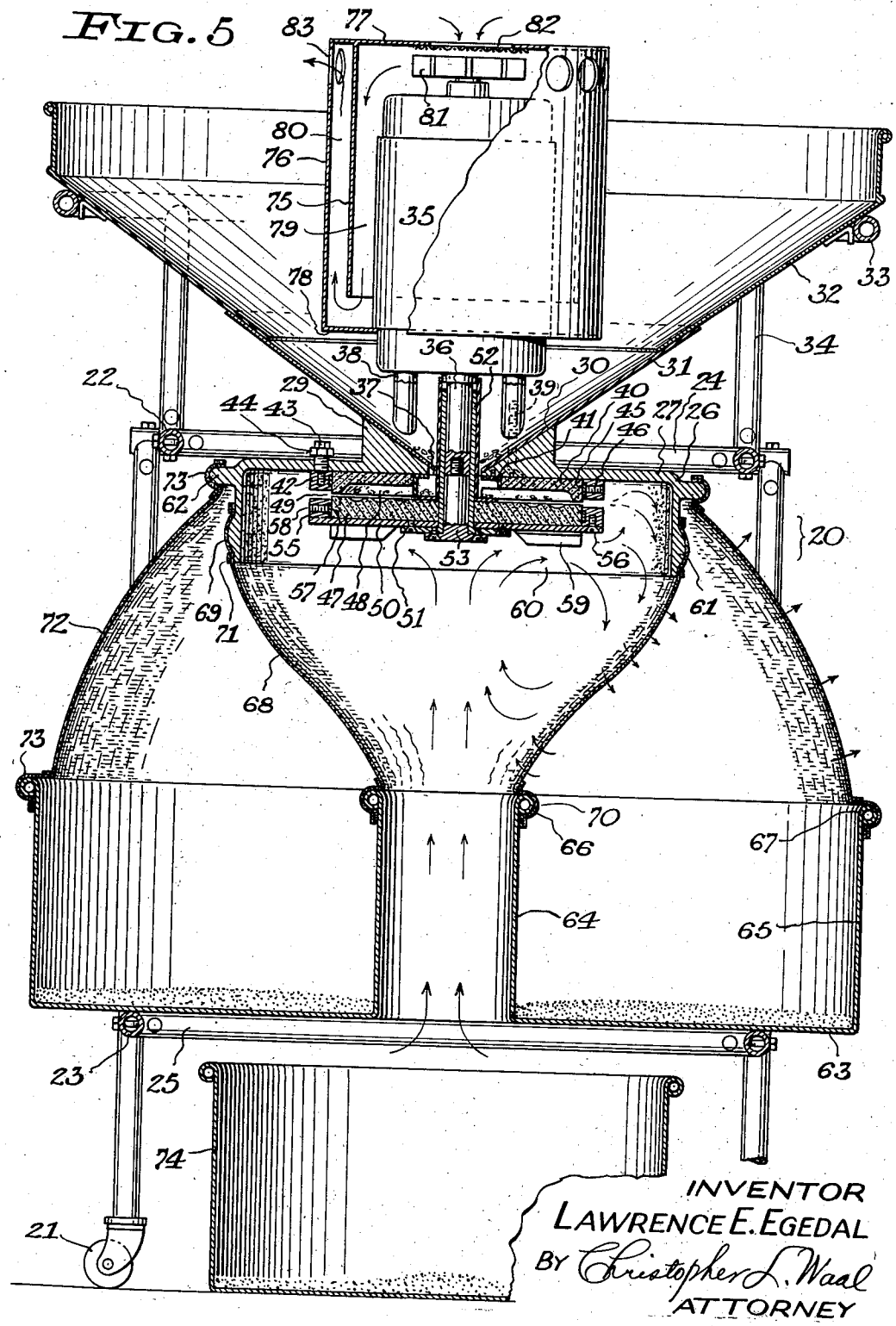
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GRAIN PROCESSING APPARATUS

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FIG. 5




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GRAIN PROCESSING APPARATUS

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FIG. 9

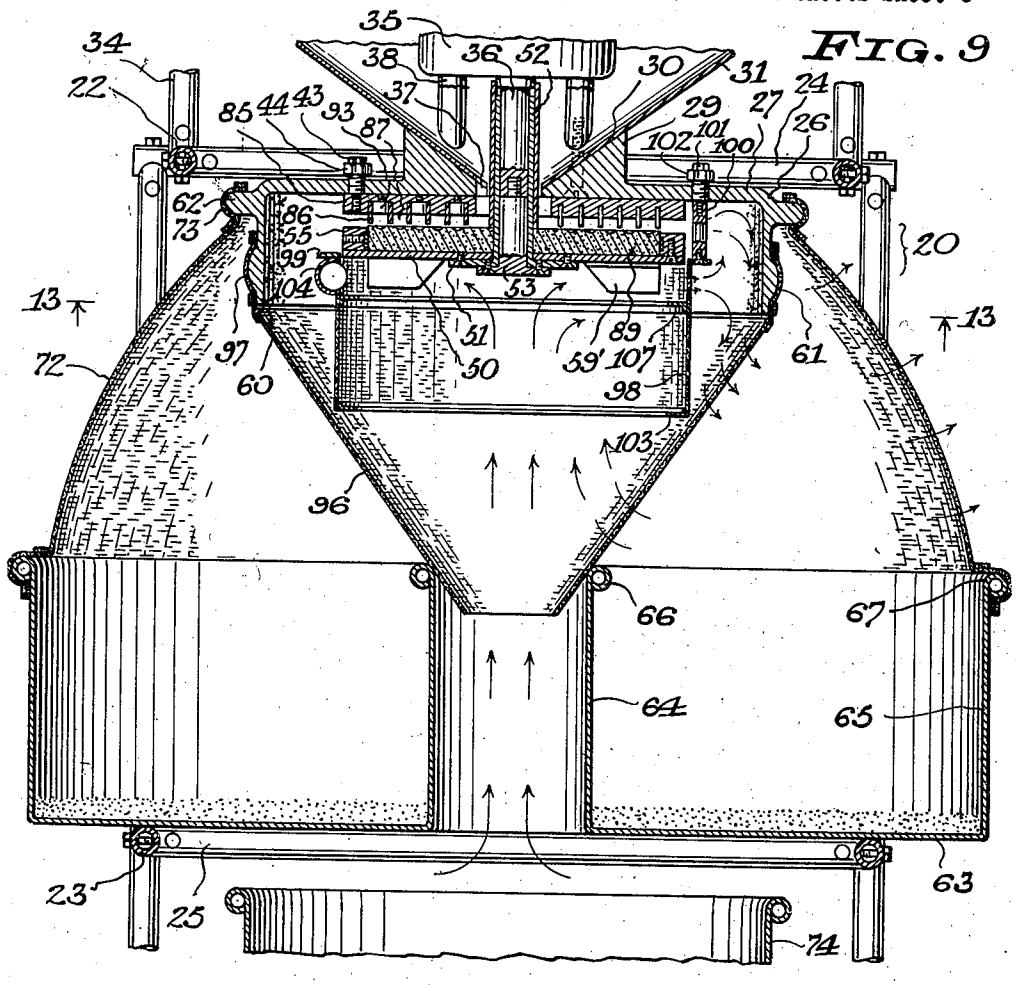



FIG. 10

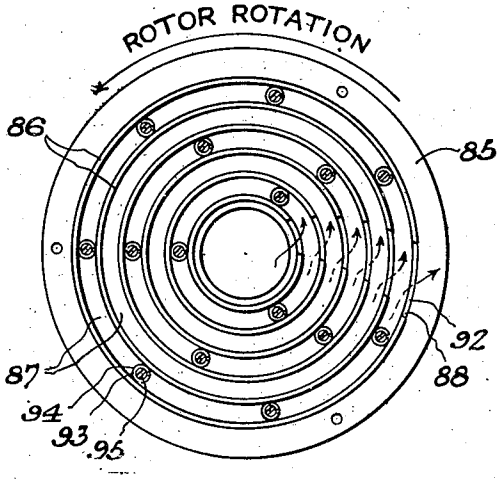



FIG. 11

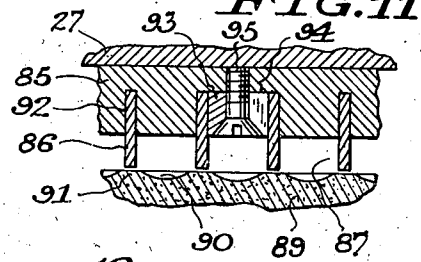



FIG. 12




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FIG. 13

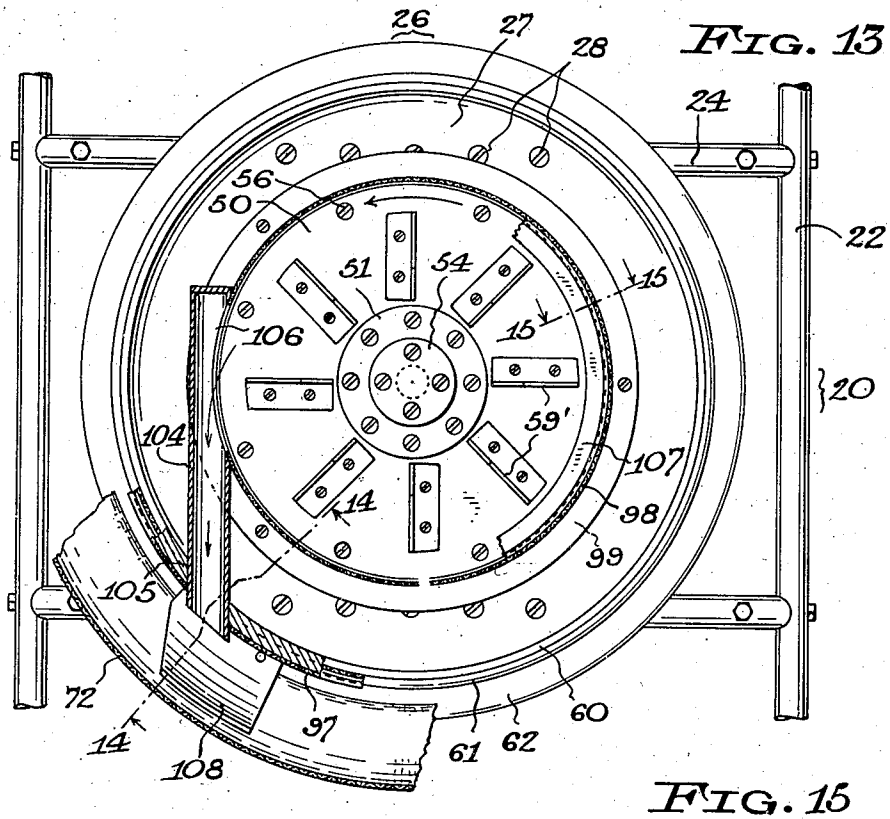



FIG. 16

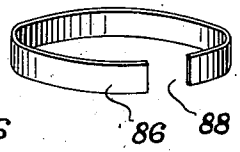



FIG. 15

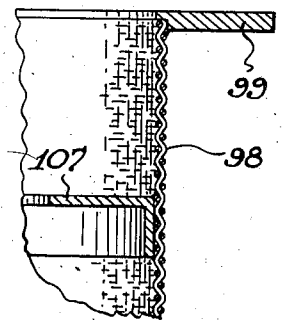
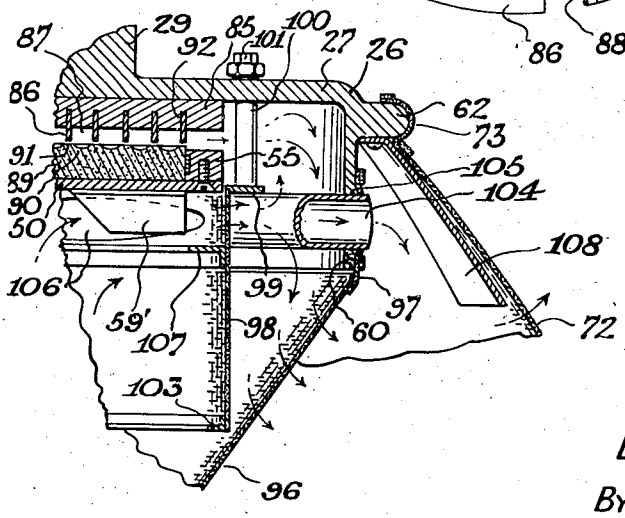



FIG. 14




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# UNITED STATES PATENT OFFICE

2,365,179

## GRAIN PROCESSING APPARATUS

Lawrence E. Egedal, Milwaukee, Wis.

Application October 16, 1941, Serial No. 415,192

8 Claims. (Cl. 209—21)

The present invention relates to apparatus for processing grain and other materials, as by abrading, reducing and separating.

An object of the invention is to provide an improved apparatus adapted for use in the manufacture of flour and including simple but effective means for drying and sifting freshly ground flour and for avoiding heating of the flour during grinding.

Another object of the invention is to provide improved means for mounting and agitating sieve members of the apparatus.

A further object is to provide an apparatus which by relatively simple changes can readily be used for either grinding or scouring of grain.

Still another object is to provide a grain processing apparatus which is of self-contained character and which will avoid introduction of dust into the room in which it is operated.

A still further object is to provide a grain processing apparatus which will effectively separate sticks, joints, chaff and other debris from the grain.

Other objects are to perfect details of construction generally and to provide a structure which is capable of inexpensive manufacture.

The invention further consists in the several features hereinafter described and claimed.

In the accompanying drawings, illustrating certain embodiments of the invention,

Fig. 1 is a side elevation of a grain processing machine constructed in accordance with the invention;

Fig. 2 is a top view of the machine;

Fig. 3 is a detail sectional view taken generally on the line 3—3 of Fig. 1;

Fig. 4 is a detail sectional elevation taken generally on the line 4—4 of Fig. 3;

Fig. 5 is a sectional elevation taken generally on the line 5—5 of Fig. 1;

Fig. 6 is a detail sectional elevation of a sieve member, showing an edge portion thereof;

Fig. 7 is a view similar to Fig. 6, but showing a modified form of sieve member;

Fig. 8 is a sectional elevation of a modified form of machine including a hopper for sifted material;

Fig. 9 is a sectional elevation similar to Fig. 5, but showing the machine modified to form a grain scourer;

Fig. 10 is a detail bottom view of a stationary grain scouring member;

Fig. 11 is a detail sectional elevation taken radially through the grain scouring member of Fig. 10 and a cooperating rotary scouring member;

Fig. 12 is a perspective view of a rib-clamping plug for the grain scouring member;

Fig. 13 is a sectional view taken generally along the line 13—13 of Fig. 9;

Fig. 14 is a detail sectional elevation taken generally along the line 14—14 of Fig. 13;

Fig. 15 is a detail sectional elevation of a screen member taken generally along the line 15—15 of Fig. 13, and

Fig. 16 is a perspective view of one of the ribs of the stationary scouring member of Fig. 10.

In these drawings, 20 designates a legged rectangular frame here shown to be formed of metal tubing and mounted on casters 21. The frame includes upper and lower pairs of parallel horizontal bars 22 and 23, the upper bars 22 being connected by a pair of parallel cross bars 24, and the lower bars 23 being connected by a pair of parallel cross bars 25.

A housing 26, preferably in the form of an inverted cup, includes a horizontal top wall 27 which extends below the cross bars 24 and is rigidly secured thereto by bolts 28. The housing is provided at its upper side with a central embossment 29 extending upwardly between the cross bars 24 and having a downwardly converging conical seat 30 on which is rigidly mounted a conically formed hopper member 31 to hold grain or other granular material. The hopper member 31 detachably supports thereon a considerably larger upper hopper member 32 which is further supported in centered position by a ring bar 33 having legs 34 detachably secured to the frame bars 22.

An electric motor 35 extends centrally within the hopper and has a vertical shaft 36, the projecting lower end of which extends downwardly through a central aperture 37 in the housing embossment 29. The motor casing has downwardly projecting legs 38 which are rigidly secured to the housing by bolts 39, the lower hopper member 31 being clamped between the housing and the motor-supporting legs 38.

In the embodiment of the invention shown in Figs. 1 to 6, constituting a flour mill, a stationary grinding member 40, preferably in the form of a shallow centrally apertured inverted cup, is detachably and adjustably secured to the under side of the housing wall 27, the grinding member fitting over a laterally notched annular grain feeder 41 which is detachably secured to the housing. The securing means for the grinding member 40 comprises a surrounding centering and retaining ring 42 which is adjustably secured to the housing by screws 43 passing through bushings 44 screwed into the housing, the ring 42 carrying an inset clamping ring 45 urged inwardly against the periphery of the grinding member by screws 46. A rotatable centrally apertured grinding member 47, preferably in the form of a grooved abrasive disk, lies below the stationary grinding member 40 and forms therewith a grinding chamber 48, the peripheral portions of the two grinding members being slightly spaced to form an annular abrasive outlet 49 for the ground

material. The grinding member 47 is carried on a metal disk 50 secured to the flanged lower end 51 of a tubular hub member 52 which fits on the motor shaft. The hubbed disk 50 is detachably secured to the motor shaft as by a coupling member 53 fitting in the lower end of the hub member 52 and having a reduced upper end screw-threaded into the lower end of the motor shaft, the lower end of the coupling member having a flange 54 which is secured, as by screws, to the flanged lower end 51 of the hub member. The direction of rotation of the motor shaft is such as to tighten the screwed connection between the shaft and the coupling member. The rotary grinding member 47 is detachably secured to the supporting disk 50, as by a surrounding retaining ring 55 adjustably fastened to the disk by screws 56, and by a clamping ring 57 set into the retaining ring 55 and urged inwardly against the periphery of the grinding member by screws 58. The disk 50 is provided with radial vanes 59 on its lower face to produce a fanning action as hereinafter more fully described. The housing 26 includes a downwardly projecting marginal skirt 60 which preferably extends lower than the fan vanes on the rotary disk, the skirt having a wide bead or bulge 61 around its lower edge portion. The housing also has a peripheral bead or flange 62 near its upper portion. If desired, the skirt may have an abrasive inner surface so as to have an attritional action on the material thrown outwardly from the rotary grinding member and from the fan.

Removably resting on the lower bars 23 and 25 of the frame is an annular receptacle 63 of cylindrical shape having inner and outer walls 64 and 65, respectively, the inner wall forming a central vertical tube open at both ends. The upper edges of the tube-forming wall and outer wall are at approximately the same level, and these edges are provided with respective outturned beads 66 and 67.

A funnel-shaped conduit-forming sieve or screen 68 of pliable or flexible material, such as silk bolting cloth, extends loosely between the housing 26 and the receptacle 63, the walls of the sieve being of conoidal shape and converging downwardly, and the axis of the hollow sieve extending in a generally vertical direction. The upper edge portion of the sieve has a band 69 which embraces the bead 61 at the lower edge of the housing skirt, and the lower edge portion of the sieve has a similar band 70 embracing the bead 66 at the upper end of the receptacle tube 46. The sieve is thus detachably supported at its upper and lower ends. Each of the sieve edge bands is made elastic, as by means of a pair of laterally spaced elastic ribbons 71 sewn thereon, so as to fit snugly over the supporting beads and to prevent leakage and lodging of flour.

A modified edge band construction for the sieve is shown in Fig. 7 and comprises a doubled or folded cloth strip 69' forming tunnels loosely enclosing therein a pair of laterally spaced elastic ribbons 71', the elastic ribbons being held in spaced relation by stitching, and the selvages of the folded strip being sewn to the edge of the bolting cloth.

An annular filter-forming cover or casing 72 of porous cloth, such as flannel, and preferably of downwardly converging conical or conoidal shape, extends loosely between the housing 26 and the outer wall of the receptacle and has elastic edge bands 73 detachably secured to the peripheral bead 62 of the housing and the bead 67 of the receptacle, the edge bands being similar to those of the sieve 68. The cover is thus supported at its upper and lower edges. The porous cloth cover permits the passage of air therethrough, but prevents escape of flour.

The vertical tube 64 of the receptacle forms a passage for an upward current of air, as indicated by arrows in Fig. 5 of the drawings, and also provides a conduit for the descent therethrough of bran and coarse particles which are too large to pass through the meshes of the sieve 68. These coarse particles are caught in a container 74 set on the floor below the tube. The container 74 may be of any convenient size and in some instances may be as large as the receptacle 63.

The placement of the motor 35 within the grain hopper not only lowers the center of gravity of the machine, but also avoids the use of an excessively long driving shaft for the abrading rotor. Since the driving motor extends well into the grain hopper and is surrounded by grain during a large part of a milling run, it is desirable to provide means for adequately cooling the motor. For this purpose the motor casing carries an enclosure comprising spaced concentric cylindrical inner and outer shells 75 and 76, respectively, the outer shell extending above the motor casing and being closed by a top wall 77 and a bottom wall 78, and the inner shell extending to the top wall but being spaced from the bottom wall. The annular space 79 between the inner shell and the motor forms an air passage which communicates at its lower end with an annular passage-forming space 80 between the inner and outer shells. The upper end of the motor shaft carries a fan 81 which draws cooling air downwardly through a central screen 82 in the top wall 77 and forces the air outwardly and downwardly through the annular space 79 between the inner shell and the motor to cool the motor, and then upwardly through the passage 80 between the inner and other shells, the air leaving through openings 83 formed in the upper portion of the outer shell above the level of the top of the upper hopper member 32.

It is usually desirable to make the frame of the machine of such width that it will pass through an ordinary doorway. The upper hopper member 32, the supporting ring bar 33 therefor, and the receptacle 63 are here shown to have diameters which are greater than the width of the frame, but these members can readily be removed from the frame when it is necessary to move the machine through doorways or narrow passages.

In setting up the machine for use, the receptacle 63 is placed on the frame bars 23 and 24, as by sliding it along these bars, and the container 74 is set centrally below the receptacle. The funnel-shaped sieve 68 is then engaged at its upper and lower elastic edges over the beads 61 and 66, respectively, and the cloth filter cover 72 is similarly secured over the beads 62 and 67.

In the operation of the machine, a quantity of wheat or other granular material to be ground is placed in the hopper 31, 32, and the motor is set in rotation, driving the grinding member 47 at a high speed, for example a peripheral speed of 10,000 feet per minute. The grain descends from the hopper through the aperture 37 and passes from the notched feeder 41 into the grinding chamber 48 between the abrasive members, the rate of feed being suitably regulated as by providing a restricted passage for the grain. The grinding members, by their relative rotation,

abrade and comminute the grain, the ground meal or flour, including coarse branny particles, being discharged through the annular outlet 49 between the grinding members. The rotation of the grinding member 47 draws air down through the mass of grain in the hopper and discharges it through the outlet with the ground meal. The fanning action of the vanes at the bottom of the rotor draws air upwardly through the tube 64 and causes its movement in the direction indicated by arrows in addition to a swirling or rotary motion about the vertical axis of the sieve 68. Some of this air eddies up into the annular space between the grinding members and the housing skirt 60, mingling with the air and meal discharged from the grinding outlet. The meal-laden air passes downwardly in a spiral or swirling motion along the inner walls of the conical sieve 68 and some of the air passes outwardly through the sieve together with some of the fines of the ground meal. In some instances, there may be an inward and upward passage of air through the lower portion of the sieve, as indicated by arrows in Fig. 5. The inward current of air through the lower portion of the sieve will dislodge ground meal from the inner walls thereof and permit the dislodged meal to be swept upwardly to the fan. The lower portion of the limp or pliable funnel-shaped sieve is urged inwardly by differences of air pressure, thus introducing considerable slack therein and causing a longitudinal wrinkling or corrugating of the sieve. In some instances, the lower portion of the sieve may be contracted by the differential air pressure to such an extent that it will form a throat smaller than the tube 64. The fines which do not pass through the sieve during their first contact therewith circulate with the air and eventually find their way through the sieve. The sifted flour passing outwardly through the sieve falls into the receptacle 63, and the excess air passes outwardly through the porous cloth filter cover 72 which is bulged or bellied out by the internal air pressure. The grinding of the grain liberates heat and moisture, but the flour is kept cool and rapidly dried by the circulating air, so as to avoid damage to the flour and clogging of the sieve meshes, as well as enhancing the keeping qualities of the flour. The grinding members are kept cool by the air currents, so as to prevent heating of the flour during grinding. The updraft of air through the tube 64 prevents loss of flour through the tube while permitting the dropping of the coarse particles of the meal into the container 74. The air currents in the sieve chamber cause a fluttering, rippling or whipping action of the limp or pliable sieve cloth, thus preventing packing of the flour on the inner walls of the sieve and keeping the meshes open. This agitating action usually proceeds in a wave-like manner around the sieve. The air currents also cause a fluttering movement of the cloth cover 72, so as to prevent accumulation of flour thereon. The downwardly converging walls of the sieve 68 favor the deposit of flour thereon at their inner sides, so as to improve the sifting action, and the downwardly diverging walls of the cloth filter cover discourage the lodging of flour thereon, so as to avoid clogging of the meshes. The upper edge of the sieve 68 meets the lower edge of the housing skirt 60 below the level of the rotor so that the flour and coarse particles thrown from the rotor will not directly impinge on and damage the sieve. The loose pliable sieve cloth is capable of yielding under the impact of flying particles, thus absorbing the shock and reducing wear on the cloth. The coarse particles which are not too heavy will circulate with the fines and will aid in keeping the sieve meshes open. The sieve and filter cover are readily removed from the receptacle 63 to permit unloading of the receptacle, and are also readily removed from the housing 26 to permit inspection or adjustment of the parts. It will be obvious that the apparatus may be used to abrade material that is already of a floury nature, and make it finer, and to separate coarser flours from finer flours.

The machine of the invention, by suitable changes hereinafter described, can readily be used as a grain scourer and fanning mill, this form of the invention being shown in Figs. 9 to 16. For this purpose the stationary grinding member 40 and its retaining ring 42 are removed and are replaced by a centrally apertured disk or plate 85, Figs. 9 to 11 and 14, secured by the screws 43 and having at its under side a series of concentrically arranged ribs 86 forming grain channels 87 between them. Each rib has a gap 88 to permit the outward passage of grain. Preferably, the several gaps are arranged approximately in line at one side of the disk 85, as shown in Fig. 10. The grooved rotary grinding disk 47 of Fig. 5 is removed from the motor shaft and is replaced by an abrasive disk 89, Figs. 9 and 14, which is sufficiently close to the ribbed stationary disk to prevent the passage of grain under the ribs. The abrasive disk 89 is mounted on the hubbed supporting member 50 hereinbefore described, the latter being provided at its under side with a series of radial fan blades 59′ which are preferably wider and larger in number than the flour mill fan blades 59. The disk 85 is preferably provided at its upper surface with a series of concentric grooves 90 to increase the abrasive area, the lower edges of the ribs 86 being centered over lands 91 formed between these grooves. The ribs 86 are here shown in the form of strips, Figs. 11 and 16, such as of resilient metal, let into respective narrow annular grooves 92 formed in the disk 85. The ribs are suitably anchored in place as by a series of longitudinally split expansion plugs 93 set into vertical bores 94 formed in the disk 85 between the grooves 92, each bore laterally communicating with adjacent grooves and having a diameter substantially equal to the distance between the adjacent grooves, so that the opposite sides of each plug will laterally engage the adjacent ribs and firmly hold them in adjusted position. Each plug is secured to the disk 85 by a screw 95 which also serves to expand the plug. Any desired distribution of the grain within the channels 87 can be obtained by varying the width of the channels and the width and location of the rib gaps 88.

The bolting cloth sieve 68 of Fig. 5 is replaced by a conical metal sieve 96 of wire cloth or perforated sheet metal, Figs. 9 and 14. The upper edge portion of the metal sieve has an elastic band 97 which detachably embraces the bead 61 on the housing skirt 60. The open lower end of the metal sieve extends into the upper end of the central tube 64 of the receptacle 63. In some instances, it is possible to use a cloth sieve similar to the sieve 68 of Fig. 5, but having a somewhat coarser mesh. The cloth filter cover 72 is used without change.

The construction above described will serve

to scour the grain kernels and to remove the fuzz and dust. However, grain may contain extraneous matter such as sticks, straws, joints and other light bulky objects which will not pass through the meshes of the conical sieve 96. In order to remove such foreign matter, the machine further includes separating means which will conduct such matter to the receptacle 63, whereas the cleaned and scoured grain will be deposited in the container 74. A cylindrical metal screen 98 is arranged concentrically of the scouring rotor and has a diameter slightly larger than the rotor plate 50. The upper end of the cylindrical screen is soldered or otherwise secured to the rabbeted inner edge of a flat stationary supporting ring 99 which surrounds the rotor plate 50. The ring 99 is carried by spaced hanger rods 100 which are adjustably fastened to the top wall 27 of the housing 26 by a screw 101 passing through bushings 102 screw threaded into this top wall. The lower edge of the cylindrical screen is spaced a short distance from the sloping walls of the sieve 96 and is suitably reinforced as by a flanged internal ring 103. At its upper portion the cylindrical screen carries a horizontal tangential delivery tube 104, the discharge end of which passes through an opening 105 in the housing skirt 60. (When the machine is used as a flour mill the opening 105 is closed by the upper sieve band 69.) The delivery tube has an elongated inlet opening 106 which is in the line of blast produced by the fan blades 59'. The cylindrical screen carries an inner annular baffle flange 107 immediately below the level of the delivery tube 104, so that foreign objects impelled by the fan will be forced into the delivery tube and will not escape downwardly along the inner walls of the screen. The blast from the fan passes through the meshes of the cylindrical screen, and the air circulation is generally similar to that occurring when the machine is used as a flour mill. A guard plate 108, Figs. 13 and 14, is carried by the housing near the upper end of the cloth filter cover 72, so as to protect the cover from damage which might otherwise be caused by the objects ejected at high speed from the delivery tube 104.

In the operation of the machine as a scourer, the grain is placed in the hopper 31, 32, and descends through the open center of the ribbed disk 85 onto the rotary abrasive disk 89 which runs at a high speed. The grain kernels are abraded by the grooved rotary disk, removing fuzz and dirt from the kernels and also removing the woody outer portions of the kernels. The high speed rotary disk has a light contact with the kernels, and removes the dirt-laden outer coating of the kernels without danger of cracking them. The ribs 86 of the stationary disk retard the outward passage of the kernels and also have some abrading action. The grain kernels travel around the channels 87 of the stationary disk under urge of the rotating disk and pass from each channel to the next outer channel through the gap 88 in the rib between the channels, as indicated by arrows in Fig. 10. Some of the grain may make more than one circuit in each channel before passing to the next channel. The grain kernels are finally discharged from the rotor through the gap in the outermost rib, and drop onto the conical metal sieve 96, being swept around the sieve by air currents to cause a further abrading action. The fuzz, dirt, dust and other fine removed material discharged from the rotor pass outwardly through the sieve meshes and fall into the receptacle 63, while the cleaned grain kernels fall through the tube 64 and into the container 74. Any sticks, straws, joints or other light foreign objects in the grain which do not or cannot pass through the sieve meshes will descend along the conical walls of the sieve, and after passing the lower edge of the cylindrical screen 98 will be swept upwardly within the screen by the rising air currents and will be blown outwardly by the fan blades through the delivery tube 104, so that they will be deposited in the receptacle 63. By changing the size and number of the fan blades, any desired degree of buoyant separation can be obtained.

In some instances, the scouring members 85 and 89 can be used as grinding elements in the grinding mill of Fig. 5.

In the modified construction shown in Fig. 8, the receptacle for the flour or sifted material is in the form of a suitably supported hopper 110 having a central tube 111 corresponding to the tube 64 of Fig. 5. The lower end of the sieve 68 is detachably secured to the upper end of the tube, and the lower end of the filter cover 72 is detachably secured to the upper edge of the hopper. The hopper is provided with a valved spout 112 for the discharge of sifted material. With this construction it is not necessary to detach the sieve and cover in order to unload the receptacle. The construction of Fig. 8 may also be used when the machine forms a scourer.

While the machine of the invention is more particularly intended for use in the processing of grain, it is also capable of use in the treatment of other materials.

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

1. A device of the character described, comprising a sieve forming a chamber with loose limp side walls and having an updraft bottom opening, means for introducing comminuted material into the upper portion of said chamber, said side walls permitting the outward passage of fines therethrough and said bottom opening permitting the gravity discharge therethrough of coarse parts of the material, and rotary fan means in said chamber for causing a current of air to flow upwardly through said bottom opening into said chamber and thence outwardly and rotatively against said sieve walls and to wrinkle and agitate the loose limp side walls of the sieve and to urge the air and fines outwardly through said sieve walls.

2. A device of the character described, comprising a sieve forming a chamber with side walls converging downwardly to an updraft bottom opening, said chamber being adapted to receive therein material to be sifted, and said side walls permitting the outward passage of air and fines therethrough, and rotary fan means at the upper portion of said chamber rotatable on a substantially vertical axis and having a bottom intake and a peripheral discharge for causing a current of air to flow upwardly through said bottom opening and downwardly in a spiral path along the inner sides of said chamber, said chamber having an updraft portion extending between said bottom opening and said fan intake.

3. A device of the character described, comprising upper and lower supports, a hollow sieve forming a chamber with side walls and having upper and lower ends secured to said respective supports, said chamber being adapted to receive therein material to be sifted, and said side walls permitting the outward passage of fines there-

through, the lower end of the sieve being open to permit the discharge therethrough of coarse parts of the material, said lower support being a receptacle for the fines, fan means within said sieve chamber for urging air and fines outwardly through said sieve walls, and a filter cover surrounding said sieve and connected to said upper and lower supports, said filter cover permitting the outward escape of air therethrough but preventing the passage of fines.

4. A device of the character described, comprising a support, a receptacle below said support and having an outer wall portion and a conduit-forming inner wall portion, a hollow sieve extending between said support and receptacle and secured at its upper end to said support and at its lower end to said inner wall portion of the receptacle, said sieve forming a chamber with downwardly converging side walls and adapted to receive therein material to be sifted, said side walls permitting the outward passage of fines therethrough for deposit in said receptacle, a filter cover surrounding said sieve and secured at its upper end to said support and at its lower end to the outer wall portion of said receptacle, and fan means in said sieve chamber for producing therein an upflow of air from the inner wall portion of the receptacle and for urging air and fines through said sieve side walls.

5. A device of the character described, comprising a sieve forming a chamber with side walls and having an updraft bottom opening, said chamber being adapted to receive therein material to be sifted, and rotary fan means at the upper portion of said chamber having a bottom intake and a peripheral discharge for causing a current of air to flow upwardly through said bottom opening and downwardly along the inner side of said sieve, said chamber having an updraft portion extending between said bottom opening and said fan intake.

6. A device of the character described, comprising a housing having a downwardly projecting skirt, a sieve secured at its upper end to said housing and forming a chamber with side walls, rotary abrading means within said skirt rotatable on a substantially vertical axis and having a peripheral discharge for introducing comminuted material into said chamber, said sieve having an updraft bottom opening for the discharge of coarse parts of the material, and fan means within said skirt rotatable with said abrading means and having a bottom intake and peripheral discharge for causing a current of air to flow upwardly through said bottom opening and downwardly along the inner side of said sieve.

7. A device of the character described, comprising a sieve having a generally vertical axis and having side walls for the outward passage of fines therethrough, an annular screen within said sieve and having a generally vertical axis and a bottom opening, fan means for causing a current of air to flow upwardly within said screen and outwardly through the screen walls, and a delivery conduit communicating with said screen and having a discharge exterior to said sieve, said conduit having an entrance portion at approximately the same level as said fan means, the air currents produced by said fan means serving to elevate light objects from within said sieve and into said screen and to discharge the same through said delivery conduit.

8. A device of the character described, comprising a sieve having a generally vertical axis and having side walls for the outward passage of fines therethrough, an annular screen within said sieve and having a generally vertical axis and a bottom opening, rotary fan means at the upper portion of said screen for causing a current of air to flow upwardly within said screen and outwardly through the screen walls, a delivery conduit communicating with said screen and having a discharge exterior to said sieve, said conduit having an entrance portion at approximately the same level as said fan means, and a baffle member extending around the interior of said screen adjacent to the lower portion of said delivery conduit, the air currents produced by said fan means serving to elevate light objects from within said sieve and into said screen and to discharge the same through said delivery conduit.

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