March 3, 1942. H. H. COLLIER 2,274,887

APPARATUS FOR SEPARATING COMMINGLED STOCK

Filed March 2, 1940

Fig. 1

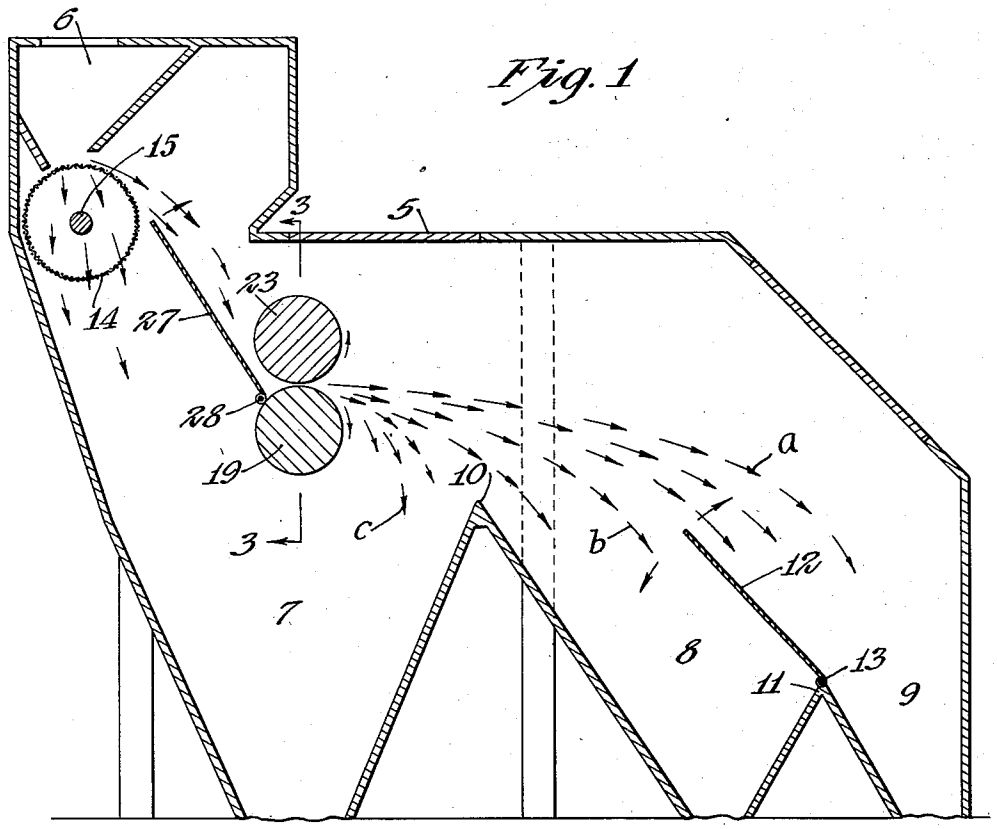



Fig. 2

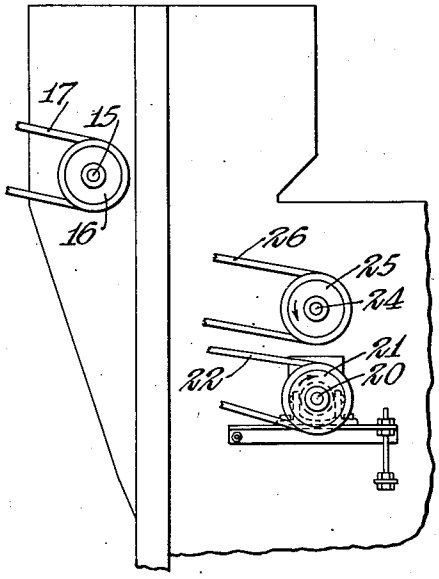
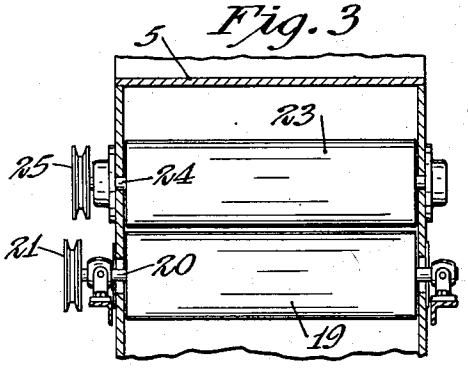



Fig. 3




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## APPARATUS FOR SEPARATING COMMINGLED STOCK

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Application March 2, 1940, Serial No. 321,935

1 Claim. (Cl. 209—12)

My invention provides an improved apparatus for separating commingled materials of varying size and specific gravity.

Broadly stated, the invention consists of the novel devices, combinations of devices and arrangement of parts involved in an improved machine or apparatus, for separating wheat germ from other materials that are commingled in the process of making wheat flour.

In the process of milling wheat flour there is produced a commingled stock quite generally designated as "germ stock" or "sizing stock." This commingled stock contains (*a*) wheat germ; (*b*) certain materials not wheat germ but of approximately the same size but of different specific gravity such as middlings; and (*c*) finer materials such as bran and flour.

With my improved apparatus I first separate materials of substantially the same size but of different specific gravity, such as those above designated under sub-headings *a* and *b*, from the majority of finer and lighter materials, designated as *c*, and, thereafter, or as the second step, projecting the materials *a* and *b* of substantially the same size, on lines of varying trajectory and collecting the various materials according to their specific gravity.

In the accompanying drawing I have illustrated a novel apparatus or machine for carrying out the process above described.

For performing the first step of the process above outlined, I employ a rotary cylindrical screen, of such mesh that will pass therethrough the finer materials, such as flour, but will tail-over the wheat germ *a* and materials of substantially the same size as wheat germ but of less specific gravity; and the second step is carried out by feed rollers running at such velocity that the heavier materials, such as wheat germ, will be projected on longer trajectories than will the material of like size but of less specific gravity. The rollers or rotating devices for thus projecting the stock on different trajectories, act as a catapulting device, and hence, will be frequently so designated in this specification and in the claim.

Referring to the drawing wherein like characters indicate like parts throughout the several views:

Fig. 1 is a vertical section taken through the complete apparatus or machine;

Fig. 2 is a side elevation of the machine or apparatus, some parts being broken away; and

Fig. 3 is a section taken on the line 3—3 of Fig. 1.

The apparatus illustrated includes an enclosing casing 5 provided at its top with a supply hopper 6 and at its bottom with hopper-like receiving troughs or chambers 7, 8 and 9, all of which are opened at their bottoms. The walls of the hoppers 7 and 8 are united at 10, and the walls of the hoppers 8 and 9 are united at 11, and at the point 11 an adjustable trough extension blade or deflector 12 is pivoted at 13.

Immediately under the open bottom of the supply hopper 6 is a cylindrical or drum-like screen 14, the shaft 15 of which is extended through and journaled in the sides of the casing; and, in the structure illustrated, is provided with a pulley 16 over which runs a power-driven belt 17.

At a point considerably below and offset from the feed screen 14 is a catapulting drum or roller 19, the shaft 20 of which is extended through and journaled in the sides of the casing and, as shown, is provided with a pulley 21 over which runs a power-driven belt 22. Mounted immediately above but slightly spaced from the roller or drum 19 is a similar roller or drum 23, the shaft 24 of which is extended through and journaled in bearings on the sides of the casing and, as shown, is provided with a pulley 25 over which runs a power-driven belt 26. Located on the receiving sides of the rollers 19 and 23 is an inclined feed board or blade 27 that is pivoted to the sides of the casing by a transverse shaft or rod 28. The faces of the rollers 19 and 23 are preferably smooth and, in practice, if they become rough, should be occasionally turned down or smoothed up.

The blades or boards 12 and 27 are made adjustable and, in practice, will be frictionally or otherwise held in the required adjustments by means not illustrated but capable of being applied by any mechanic of ordinary skill.

The catapulting rollers 19 and 23 will be driven at very high speed in respect to the screen 14. For example, if the screen 14 be driven at the rate of 250 R. P. M., then rollers 19 and 23 should be driven at approximately 800 R. P. M.

It is, of course, obvious that the catapulting means discharges or projects the various materials on lines of different trajectory transversely of or through the lines of forced specific gravity.

### *Operation*

The operation of the apparatus is substantially as follows.

The commingled materials assumed to contain (*a*) wheat germ, (*b*) certain materials not wheat germ but approximately of the same size but of

different specific gravity, such as middlings, and, (c) the finer materials, such as flour, will be fed or delivered into the supply hopper 6 and gravity fed onto the rotary cylindrical screen 14. The finer materials, such as flour, will pass completely through the screen 14 and drop into the hopper 7 while materials *a* and *b*, to wit: the wheat germ and materials of substantially the same size but of less specific gravity will, by said screen, be tailed-over onto the feed board 27 and by the latter delivered onto the roller 19 and under the roller 23. Usually the initial stock will be divided about fifty per cent (50%) of the flour or fine materials *c* and fifty per cent (50%) of the said materials *a* and *b* but, in practice, there will usually be some of the flour carried with the materials *a* and *b* to the catapulting rollers. By the catapulting rollers the relatively heavy wheat germ *a* and particles *b*, with a small percent of the flour *c*, will be projected by these catapulting rollers substantially as indicated by the arrows marked on Fig. 1, wherein the arrows *a* indicate the trajectories of the wheat germ, the arrows *b* indicate the trajectories of the lighter materials of substantially the size of wheat germ, and the arrows *c* indicate the trajectories of the relatively small part of the finer materials, such as flour. From this it will be noted that the flour or very fine materials passed through the hopper 7 where it is commingled with the main body of the flour, while the wheat germ will be projected into hopper 9 and the lighter particles of substantially the size of wheat germ, will be caught in the hopper 8. By adjustments of the blade or leaf 12 the desired division between the above particles *a* and *b* may be varied.

The feed board 27 may be angularly adjusted so that the desired proportion of the material will be delivered to the catapulting rollers; and the blade or trough extension 12 may be adjusted so as to make the desired division between wheat germ and materials of like size but of different specific gravity. At this point it may be stated that very frequently a one hundred percent separation between the wheat germ and the other materials is not desired and that the degree of separation may be varied by the adjustments of the said blade 12 and feed board 27.

An important function of the upper roller 23 is to keep the commingled stock pressed in a frictional contact with the lower drum or roller 19 so that the particles will be given the required velocity to project them into the compartments or troughs intended to receive them. However, both of the rollers have a co-operating catapulting or stock-projecting action.

A preferred form of the apparatus has been illustrated and described, but it will, of course, be understood that the invention is capable of various modifications as to details of construction and relative arrangement of parts all within the scope of the invention herein disclosed and claimed.

What I claim is:

In a machine of the kind described, a casing having catch receptacles in its lower portion, a rotary cylindrical screen in the upper portion of said casing, means for delivering onto the exterior of said screen material to be separated, a pair of cooperating catapulting rollers in said casing arranged to receive the coarser materials from said screen and to project the same over the underlying catch receptacles, one of said catch receptacles being located immediately below said rollers and receiving the finer particles passing thru said screen.

HARWOOD H. COLLIER.