June 28, 1927. 1,634,219

O. P. SMITH

GRAIN REDUCING MACHINE

Filed Nov. 4, 1925 2 Sheets-Sheet 1

Fig. 1.

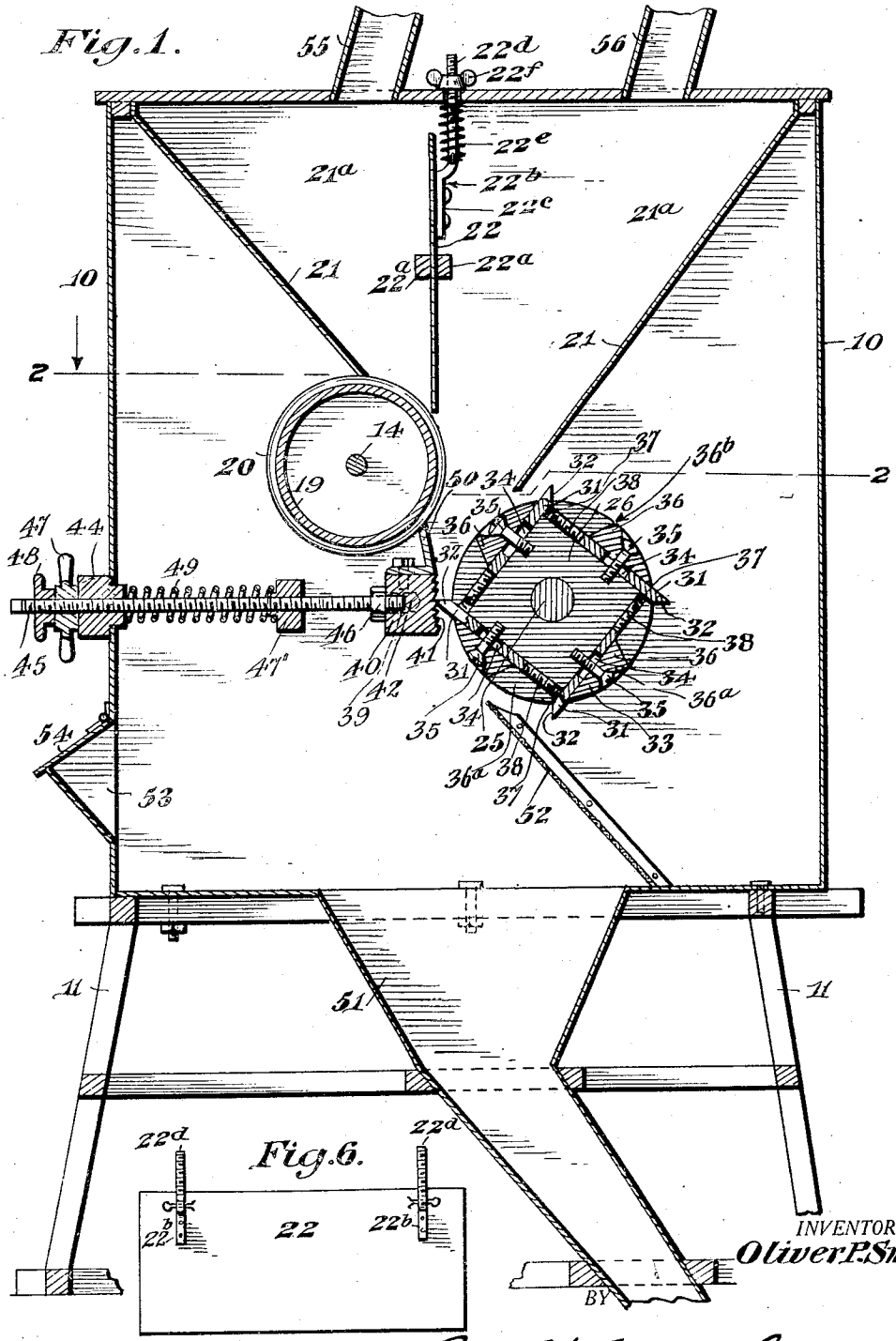


Fig. 6.

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Fig. 2.

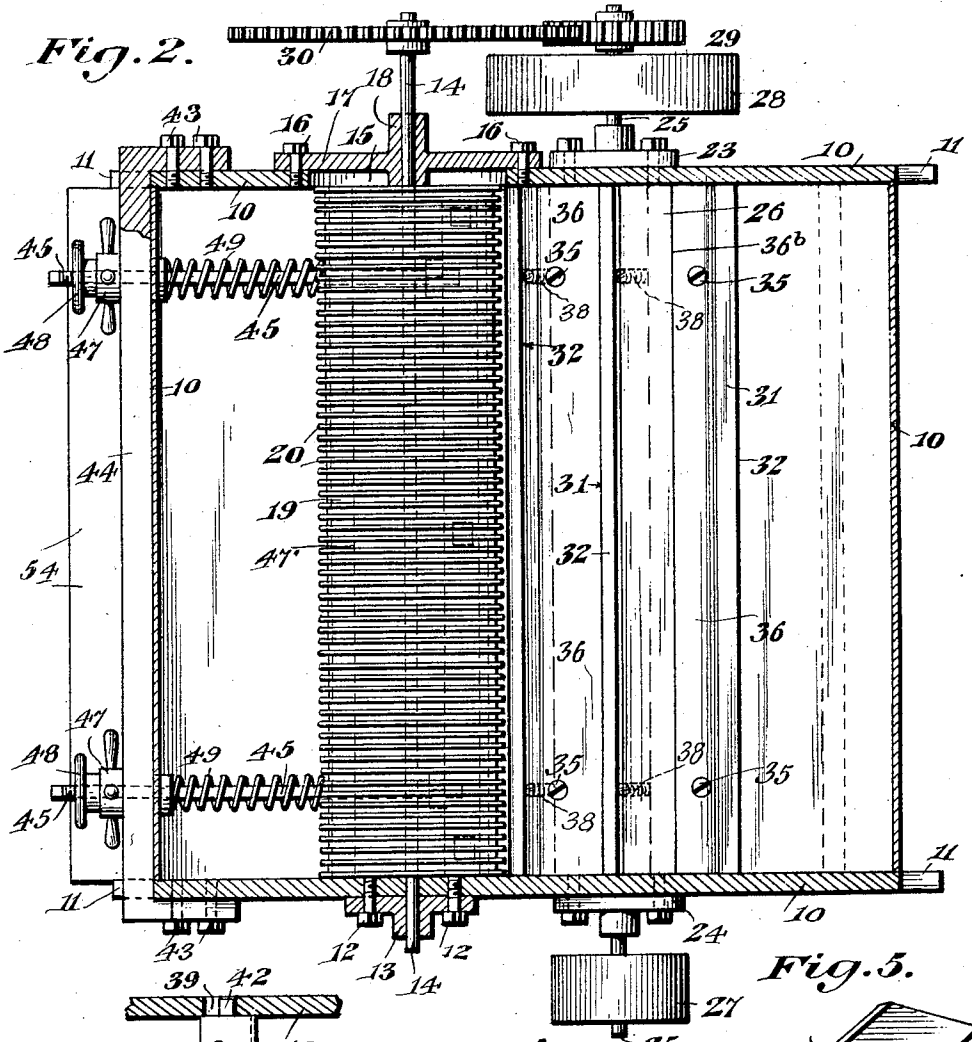


Fig. 3.

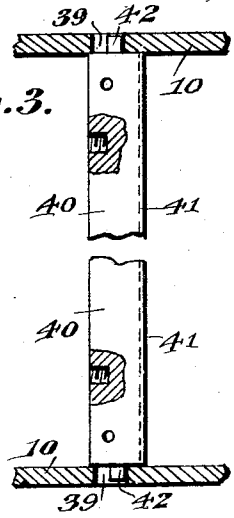


Fig. 4.

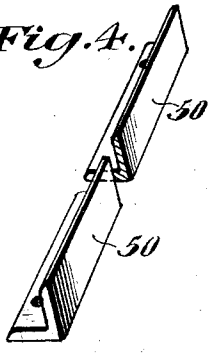
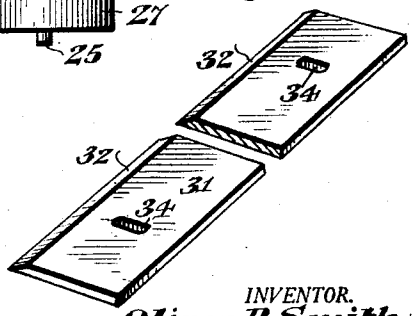


Fig. 5.



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UNITED STATES PATENT OFFICE.

OLIVER P. SMITH, OF PORTLAND, OREGON.

GRAIN-REDUCING MACHINE.

Application filed November 4, 1925. Serial No. 66,782.

This invention relates to grain reducing apparatus, and has for one of its objects to provide an apparatus of this character adapted to quickly reduce grain of various kinds, and with means for adjusting the parts to control the sizes of the reductions, and likewise with means for readily changing the cutting elements to adapt the device to various sizes of the reductions.

With these and other objects in view, the invention consists in certain novel features of construction as hereinafter shown and described and then specifically pointed out in the claims, and in the drawings illustrative of the preferred embodiment of the invention—

Figure 1 is a vertical section of the improved apparatus.

Figure 2 is a horizontal section on the line 2—2 of Figure 1.

Figure 3 is a plan view, partly in section and foreshortened, of the adjustable cutter bar.

Figure 4 is a perspective view of the guide member.

Figure 5 is a detached perspective view of one of the rotating cutting blades.

Figure 6 is a detail view of the sliding partition.

The improved apparatus includes an enclosing casing or housing represented conventionally at 10 and supported upon a suitable frame indicated conventionally at 11.

Attached at 12 to one of the side walls of the casing is a bearing 13 for one end of a shaft 14, and formed in the opposite side wall of the casing is a relatively large opening 15, and attached at 16 to the wall adjacent to the opening and extending over the same is a plate 17 carrying a bearing 18 in alinement with the bearing 13 and supporting the opposite portion of the shaft 14.

Mounted on the shaft 14 within the casing is a drum 19 formed with spaced encompassing grooves or channels 20, the drum being of less diameter than the opening 15, so that the drum can be inserted and removed through the opening.

A pair of inclined partitions 21 are arranged within the casing as shown. Extending transversely of the casing between the two inclined partitions is a vertical partition 22 held in position against side movement between the spaced guide bars 22^a. Secured to the vertical partition is a pair of upright members 22^b which comprise a lower portion 22^c and an offset upper threaded portion 22^d which projects through the top of the casing. As shown the portion 22^d is set away from the partition 22 and about this portion a spring 22^e is placed, which bears against the underside of the casing top. Upon the upper end of the portion 22^d a thumb nut 22^f is threaded, which nut bears upon the top of the casing and regulates the raising and lowering of the partition between the guide slats 22^a and against the tension of the spring 22^e. The vertical partition 22 thus divides the space between the partitions 21 into two hopper compartments 21^a, which receive grains of various degrees of fineness or coarseness and the rate of flow is regulated by the partition 22 as they pass through the open converging lower ends of the hoppers.

Mounted for rotation in bearings 23 and 24 on the side walls of the casing is another shaft 25 carrying a cutter head member 26 of other form than round, for instance square, as shown in Figure 1.

Mounted on the shaft 25 near one end is a drive pulley 27, and a fly wheel 28 is mounted on the same shaft. A gear wheel 29 is also mounted on the shaft 25 and engages with a larger gear 30 on the shaft 14, to transmit the motion of the shaft 25 to the shaft 14 and the drum 19 carried thereby but at a reduced speed.

Bearing upon each of the faces of the head member 26 is a cutter blade 31, each having a chisel shaped cutting edge 32.

Each of the baldes is provided with transversely directed slots 34 to adjustably receive a clamp screw 35 tapped at the inner end into the body of the head 26.

Bearing upon the outer face of each of the blades 31 is a clamp block 36 in which the heads of the clamp bolts are embedded as shown in Figure 1.

Each of the clamp blocks 36 has its outer side curved to form the front edge relatively thin or sharp as shown, while the rear edge thereof is inclined and engages beneath the undercut forward edge of the fixed body 36^a as indicated at 36^b. The outer surface of the fixed bodies 36^a are curved to conform to the curvature of the blocks 36 thus forming the head, when the cutters are in position, circular in cross section, as shown. Threaded passages 37 are formed between the fixed bodies 36^a and the head proper to receive the screws 38 which, when threaded in force the blades forwardly. The slots 34 in the blades permit this adjustment while the clamp screws secure the blocks against the blades to hold the same in adjusted position.

Formed in each of the side walls of the casing 10 are horizontal guide slots 39, as shown in Figure 3, and extending between the side walls of the casing is a cutter bar 40 having a plurality of longitudinally directed knife edged ridges 41, the face containing the ridges being convexed in outline to conform to the paths of the cutting edges 32 of the blades 31, as represented in Figure 1, as the cutter head is rotated. Extending from the ends of the bar 40 are studs 42 which engage in the slots 39, and thus hold the bar in horizontal position while leaving it free to be adjusted toward and away from the cutter head.

Attached at 43 to the side walls of the casing is a holding bar 44, and slidable through the latter at two points are adjusting rods 45, each attached at the inner end in the cutter bar 40, preferably by threading, and held by a clamp nut 46, as shown. The rods 45 are each threaded to receive an adjusting nut 47 and a jamb nut 48.

Disposed on each of the rods 45 between the bar 44 and the adjusting nut 47′ is a spring 49, operative to hold the cutter bar 41 yieldable in position, and adjustable to control the position of the teeth 41 relative to the cutting edges 32 of the blades 31.

A guide member 50 is attached to the cutter bar 40 to conduct the grain to the reducing elements.

A discharge spout 51 leads from the bottom of the casing 10, and an inclined safety screen 52 is supported within the casing below the line of the cutter head.

An opening 53 is formed in the casing below the bar 44 and provided with a hinged closure 54, to provide access to the interior of the casing if required.

An inlet spout 55 provides means for the introduction of wheat, oats, rye, and like sized grains into the hopper at one side of the partition 22, while a like spout 56 provides means for the insertion of coarser grain such as corn into the hopper like receptacle at the other side of the partition. The flow of the finer or smaller sized grain is controlled by the grooved drum 19 between whose ribs the kernels of grain are received and caused thereby to flow in a uniform stream lengthways or at right angles to the cutting elements.

The coarser grain such as corn and the like, needs no such flow controlling devices and passes directly to the cutting elements.

By this arrangement, when wheat and like grains are to be reduced, they are disposed in the left hand hopper, and the right hand hopper left vacant, and as the cutter head is rapidly revolved, and the drum 19 more slowly revolved, the kernels of grain are fed to the cutting elements in a relatively thin uniform stream by the action of the channelled drum, and effectually reduced by the coaction of the blades 31—32 and the cutter bar 40—41, and fall into the discharge chute 51 and are conveyed away in any suitable manner.

The springs 49 are strong enough to hold the bar 40 in coactive relation to the cutting blades under normal condition of the grain, but if any hard foreign matter should be commingled with the grain, the cutter bar would yield and permit such substances to pass, and thus prevent breakage of the parts.

If coarser grain such as corn and the like is to be reduced, it is fed to the right hand hopper and the left hand hopper left vacant, and as the cutter head is rapidly rotated, the grain is reduced as before by the coaction of the cutter bar 40—41, and the blades 31—32.

The improved device is simple in construction, can be made of any required capacity, and of any suitable material, and in which the reducing elements can be adjusted to adapt them to operate on various sizes of grain, and reduce the same to any required size.

Having thus described my invention what I claim is:

1. In a grain reducing machine of the character described, comprising a casing, a roller journalled transversely in the casing, adjustable cutter blades in parallelogram relation upon the roller, and having their knife edges projecting from the surface thereof, a cutter bar arranged at one side of the roller and having plural knife edge ribs longitudinally thereof coacting with the knife edges of the blades, a guide rail carried upon the top of said bar, tensioned adjustable means supporting the bar in working relation to the roller, and a feeding roll above and coacting with the guide rail.

2. In a grain reducing machine of the character described, comprising a casing, a roller journalled transversely in the casing, adjustable cutter blades in parallelogram relation upon the roller, and having their knife edges projecting from the surface thereof, a cutter bar arranged at one side of

the roller and having plural knife edge ribs longitudinally thereof coacting with the knife edges of the blades, a guide rail carried upon the top of said bar, tensioned adjustable means supporting the bar in working relation to the roller, a feeding roll above and coacting with the guide rail, and a hopper within the upper portion of the casing and provided with an outlet at its lower end confronting the space between the feeding roll and cutting roller.

In testimony whereof, I affix my signature hereto.

OLIVER P. SMITH.