J. C. KELLER.

TWIN MILL.

APPLICATION FILED FEB. 20, 1915.

1,189,122.

Patented June 27, 1916.

2 SHEETS—SHEET 1.

Fig. 1.

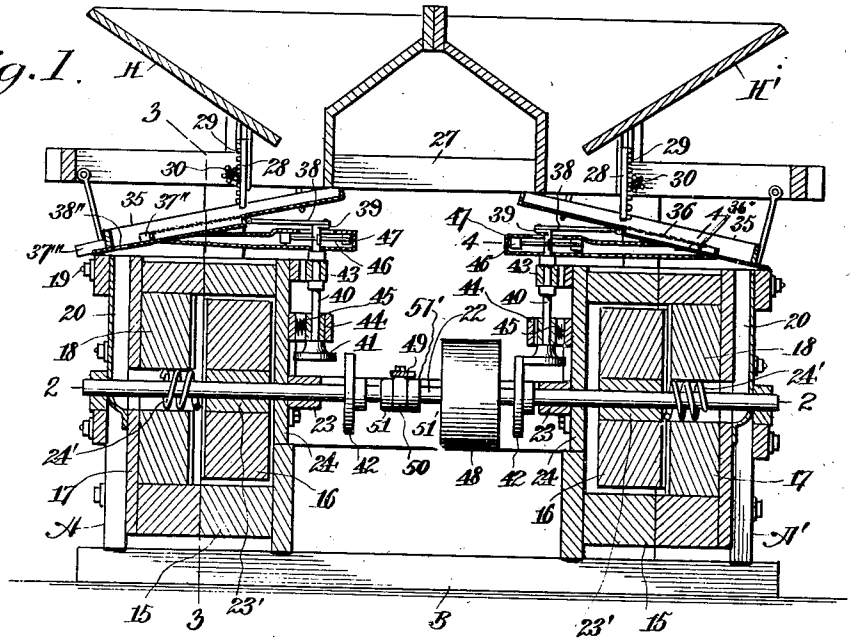


Fig. 2.

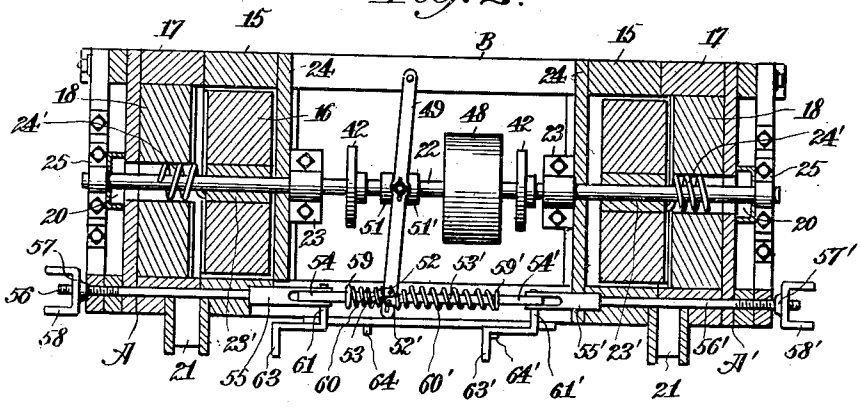


Fig. 7.

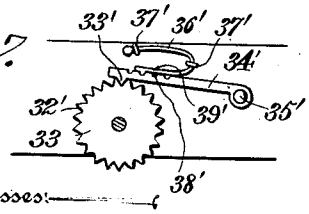
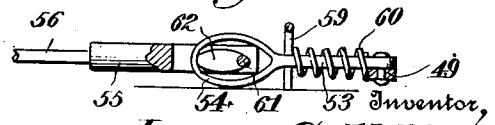


Fig. 8.



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2 SHEETS—SHEET 2.

Fig. 5.

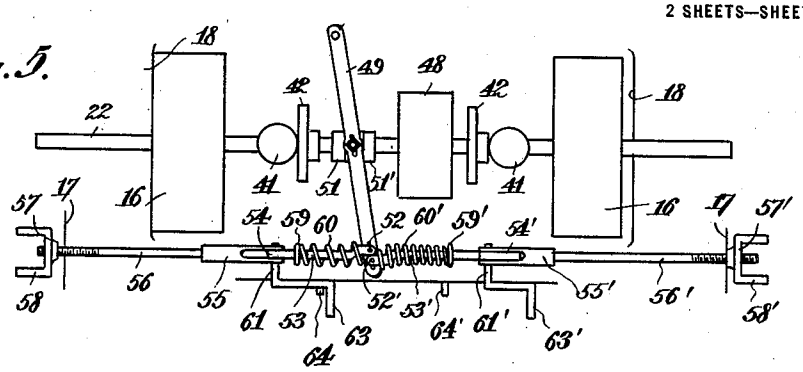


Fig. 3.

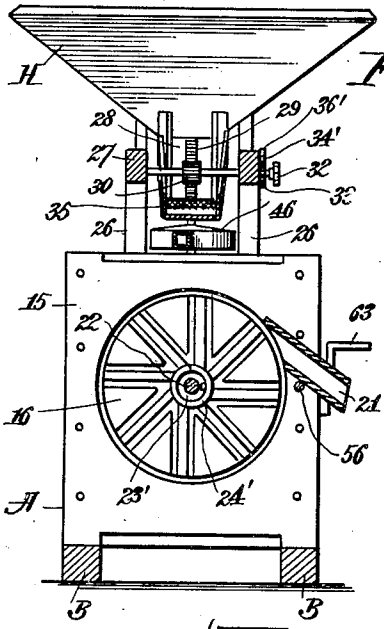


Fig. 4.

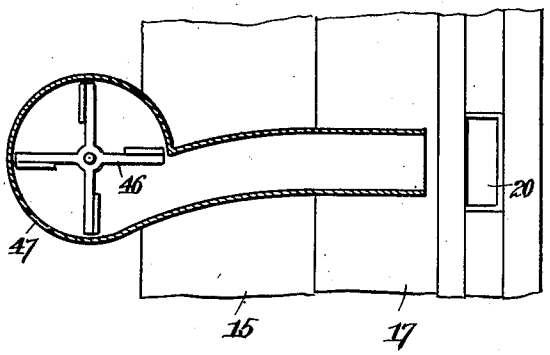
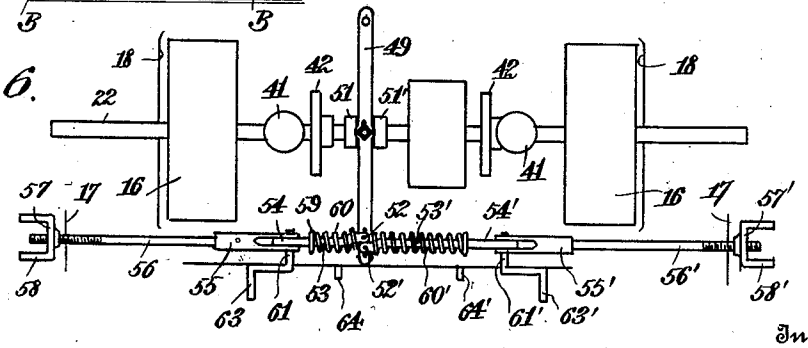


Fig. 6.



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UNITED STATES PATENT OFFICE.

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TWIN MILL.

1,189,122. Specification of Letters Patent. Patented June 27, 1916.

Application filed February 20, 1915. Serial No. 9,663.

To all whom it may concern:

Be it known that I, JAMES C. KELLER, a citizen of the United States, residing at Sugar Grove, in the county of Watauga and State of North Carolina, have invented new and useful Improvements in Twin Mills, of which the following is a specification.

This invention relates to mills for grinding corn, grain and the like, and it has particular reference to a twin mill comprising two casings each containing a bed stone and a runner stone, the runners being mounted upon and driven by a single shaft, and the latter supported for rotation in a horizontal plane.

One object of the invention is to produce a mill of the class described of simple and improved construction wherein the shaft carrying the runners may be moved lengthwise to place one runner in grinding engagement with its bed, while the other runner is moved to a non-engaging position, the last mentioned runner being utilized as a fly wheel while the mill is in operation.

A further object of the invention is to produce a mill of the character described wherein the runner stone which is temporarily in use will be held in engagement with its bed by the action of a spring.

A further object of the invention is to produce a mill of the character described, wherein both runner stones may be temporarily moved to an intermediate and inactive position.

A further object of the invention is to produce a mill of the character described having two feed devices, one associated with each casing, and means for transmitting motion from the main shaft to said feeding devices, the arrangement being such that only the feeding device associated with the mill casing in which the stones are temporarily active will be operated, the other feed device being temporarily at rest.

A further object of the invention is to simplify and improve the construction and operation of the feed mechanism.

With these and other ends in view which will readily appear as the nature of the invention is better understood, the same consists in the improved construction and novel arrangement and combination of parts which will be hereinafter fully described and particularly pointed out in the claims.

In the accompanying drawings has been illustrated a simple and preferred form of the invention, it being, however, understood that no limitation is necessarily made to the precise structural details therein exhibited, but that changes, alterations and modifications within the scope of the claims may be resorted to when desired.

In the drawings, Figure 1 is a vertical longitudinal sectional view of the mill. Fig. 2 is a horizontal sectional view of the same taken on line 2—2 of Fig. 1. Fig. 3 is a transverse sectional view of the same taken on the line 3—3 of Fig. 1. Fig. 4 is a detail sectional view taken on the line 4—4 of Fig. 1. Fig. 5 is a diagram illustrating various adjustments of the mill. Fig. 6 is a similar view showing the parts in a different position. Fig. 7 is a detail view of a valve adjusting means used upon the mill. Fig. 8 is a detail view of a shifting device used upon the mill.

Corresponding parts in the several figures are denoted by like characters of reference.

The twin casings A and A′ of the improved mill are mounted and supported on sills B, each of said casings comprising a frame 15 surrounding the runner stone 16 and a movable housing 17 in which the bed stone 18 is securely mounted, said movable housing being adapted to be connected with the frame 15 by means of bolts 19. Each housing 17 is provided with an intake 20 communicating with the eye of the bed stone, and each of said casings is equipped with a discharge spout 21 arranged intermediate the frame 15 and the housing 17.

The runner stones are mounted on a shaft 22 which is supported for rotation in bearings 23 carried by a frame 24 intermediate the casings A and A′ which are connected together and reinforced by said frame. The ends of the shaft 22 project through the eyes of the bed stones and are supported in auxiliary bearings 25 mounted on the housings 17.

The runner stones 16 are each provided with a hub 23′ secured firmly in the eye of the stone and also keyed upon or otherwise firmly connected with the shaft 22 for rotation. Connected firmly with each hub 23′ is the inner end of a feed coil 24′ which extends within the eye of the bed stone, said coil being of a diameter equal to the diameter of the eye within which in practice it

rotates for the purpose of feeding the grain between the faces of the stones. By thus connecting the feed coil with the runner stone and incidentally with the shaft, it is made possible to remove the runner stone from the shaft and to effect adjustment of said runner stone lengthwise on the shaft to compensate for wear without previously detaching the feed coil, as has been necessary when the feed coil has been secured directly upon the shaft, as has heretofore been customary.

The casings A and A′ are provided with uprights 26 supporting a frame 27 on which feed hoppers H, H′ are mounted. Each hopper, for the purpose of regulating and obstructing the flow therefrom, is provided with a valve or gate 28 having a rack 29 meshing with a pinion 30 carried by a shaft 31. The latter is provided with a hand wheel 32 whereby it may be conveniently rotated, and it also carries adjacent to the face of the frame 27 a toothed wheel 33 having a large number of circumferentially disposed substantially triangular or oppositely beveled teeth 32′. These teeth are engaged by a substantially V-shaped stop member 33′ formed on a lever or arm 34′ which is pivoted on the frame 27 at 35′. The arm 34′ with its stop or detent 33′ constitutes a dog which is actuated in the direction of the toothed wheel 32′ by means of a flat spring 36′ which is bent to substantial U-shape, as shown, a portion of said spring being confined in keepers or staples 37′ in which the spring is capable of being slid or moved so as to vary the length of the effective portion thereof, thereby varying the tension exerted against the arm 34′. The latter is provided on its upper face with a series of notches 38′, any one of which may be engaged by a tongue 39′ formed by bending the terminal of the effective portion of the spring. The spring will thus be retained in any position to which it may be adjusted, and its tension against the arm or lever 34′ may be varied. This is important, because it is considered extremely desirable to be able to gage the feed with the utmost accuracy which may be done owing to the presence of the toothed wheel having a large number of teeth, the operator being enabled to move the said wheel the distance of a single tooth, if required, thereby making an infinitesimal adjustment of the feed. This adjustment may be effected without disengaging the toothed dog 34′ from the toothed wheel, the teeth of which, as well as the tooth of the dog being beveled in opposite directions to permit the wheel to be turned in either direction.

Supported by the frame 27 below each of the hoppers is a shaking shoe 35, said shoes being mainly for the purpose of conducting the material discharged from the respective hoppers to the respective casings A and A′, the material passing over the hoppers being discharged into the intakes 20. These hoppers, it will be observed, also coöperate with the valves or gates 28 to regulate and obstruct the feed from the hoppers, said gates being adapted to abut upon or to be variously spaced from the bottom portions of the shoes, as may be required.

Each shoe is provided with a sieve-bottom 36 through which the siftings will pass to the solid bottom of the shoe, where said siftings are intercepted by an obliquely disposed cross piece 37″, the siftings being discharged through a side opening 36″ to a duct 37‴ over which said siftings may be discharged into a receptacle provided for the purpose or on the floor of the room where the mill is located. The grain is discharged over the cross piece 37″ with which the lower end of the sieve 36 is connected upon the floor or bottom portion of the shoe which has an opening 38″ through which the grain passes to the intake of the mill, the end of the shoe being obstructed by a cross piece 39″ to prevent the grain from jumping clear of the intake. The shaking shoes are actuated each by a pitman 38 connecting said shoe with a crank 39 at the upper end of a vertical shaft 40, the lower end of which carries a friction disk 41 adapted to be engaged by a friction wheel 42 on the main shaft 22. Each shaft 40 is preferably supported near its upper end in a rocking bearing 43 and near its lower end in a slidable bearing 44 which is actuated by means of a coiled spring 45 in the direction of the friction wheel 42 so that when engagement between the latter and the friction disk 41 takes place, the said friction disk will be capable of yielding resiliently to the pressure, and thus obviating strain and breaking of parts when adjustments to be hereinafter described are made. It will be understood that the rocking movement of the shaft 40 is slight and not sufficient to interfere with the proper working of the parts.

Each of the shafts 40 carries at its upper end a fan 46 which in practice is surrounded by a casing or housing 47, the outlet of which is directed toward the stream of material passing over the shaking shoe 35 to the intake 20, thus causing the dust, chaff and the like to be blown away, only the clean grain being permitted to enter the mill.

The main shaft 22 carries a band wheel or pulley 48 adapted to receive motion from a convenient source of power. The shaft 22 is slidable longitudinally in its respective bearings to a sufficient extent to enable one runner stone to be placed in grinding engagement with the mating bed stone, while the other runner stone will be retracted with respect to its mating bed stone. The movement of the shaft, while not of great extent, should be sufficient to permit the runner

stones in both casings to be placed in an intermediate position, non-engaging with respect to the bed stones in the two casings.

The longitudinal movement of the shaft 22 is effected by means of a lever 49 which is arranged to actuate an antifriction thrust collar 50 mounted on the shaft intermediate stationary collars 51, 51′ so that rocking movement of the lever will result in sliding the shaft in one direction or the other, thereby placing one of the friction wheels 42 in engagement with the friction disk 41 adjacent thereto, while the other friction wheel is retracted with respect to the friction disk adjacent thereto. The lever 49 is connected by pivot pins 52, 52′ with the inner ends of rods 53, 53′, the outer ends of which are provided with eccentric straps or bands 54, 54′. The said eccentric straps are positioned within housings 55, 55′ formed upon or associated with the inner ends of rods 56, 56′, which latter are slidably supported with respect to the casings A and A′, said casings being provided with apertures extending through the frames 15 and the housings 17 for the passage of the ends of the rods, said ends being threaded for the reception of nuts 57, 57′ having handles 58, 58′, whereby they may be turned and properly adjusted. The frame of the machine is provided with keepers or staples 59, 59′ through which the rods 53, 53′ are guided and between which and the lever 49 coiled springs 60, 60′ are mounted on said rods.

The housings 55, 55′ afford bearings for rock shafts 61, 61′ carrying eccentric disks 62, 62′ which are positioned within the straps 54, 54′, said rock shafts being provided with cranks or handles 63, 63′, whereby they may be conveniently rocked. Stops 64, 64′ are positioned in the path of the cranks 63, 63′ to limit the movement of the latter.

In one position of the respective rock shafts 61, 61′ the lever 49 and the shaft 22 will occupy an intermediate position. In this position, diagrammatically illustrated in Fig. 8, both runner stones will be spaced from the respective bed stones, and the friction wheels 42 will be spaced from the respective disks 41. The mill will consequently be inoperative. By turning the cranks of the two rock shafts in one direction until one crank encounters the stop member 64 or 64′, the shaft 22 will be moved in a corresponding direction, thus moving one of the runner stones into engagement with the mating bed stone and also placing one of the friction wheels 42 in engagement with a friction disk 41, thereby placing one of the mills in position for grinding. By turning and adjusting the nut 57, 57′ with respect to the casing of said mill, the spring 60 or 60′ will be tensioned, thereby causing the runner stone to be pressed toward the face of the mating bed stone with the requisite degree of pressure to obtain the best results. This tensioning, however, should not be effected until the grinding of the grist has commenced in order that the grist may have sufficient time to enter between the opposed faces of the stones. It is obvious that by turning the cranks of the rock shafts 61, 61′ in the opposite direction, the other mill will be placed in operation, but before this can be done it is obviously necessary to loosen the nut 57 or 57′ bearing against the casing of the mill which is to be thrown out of commission.

It will be seen that by actuating the two rock shafts 61, 61′ one or the other of the mills will be placed in commission, while the other mill is placed temporarily out of commission. The gate or feed valve of the hopper associated with the mill that is placed out of commission is obviously to be moved to an obstructing position, while the feed valve of the other hopper is opened to the desired extent, it being secured in adjusted position after the proper regulation has been obtained.

It will be seen from the foregoing description, taken in connection with the drawings hereto annexed, that I have produced a mill of simple and inexpensive construction comprising two separate casings containing each a bed stone and a runner, either set being capable of being placed in operation while the other is out of commission. The change may be effected at any time, thus enabling the grinding of one batch to be interrupted while the other batch is being ground. At all times when one of the mill units is in operation, the runner stone of the other unit will serve the purpose of a fly wheel whereby the operation of the mill is rendered smooth and steady.

Having thus described the invention, what is claimed as new is:—

1. In a twin mill for casings containing stationary bed stones, a slidably supported driven shaft carrying runner stones which may be alternately placed in engagement with the respective bed stones, said shaft having fixed collars and an intermediate thrust collar, a shipping lever connected with said thrust collar, rods pivotally connected with the shipping lever, said rods having eccentric straps, keepers through which the rods are guided, rods having housings for the eccentric straps, said last mentioned rods having threaded ends extending through the respective casings and provided with adjusting nuts, rock shafts supported in the housings and having eccentrics engaging the eccentric straps, and springs coiled about the first mentioned rods between the keepers and the shipping lever.

2. In a mill of the class described, a pair of spaced casings, comprising a stationary frame and a detachable housing, the latter containing a bed stone, a continuously ro-

tating shaft supported for longitudinal sliding movement with its opposite ends extending through the eyes of the bed stones, runner stones carried by the shaft, means including a shipping lever for effecting longitudinal movement of the shaft, and means for actuating the shipping lever including rods connected with said lever, springs pressing against opposite sides of the lever, and means for independently tensioning said springs.

3. In a mill of the class described, the combination of a bed stone, a shaft extending axially through the eye of the bed stone, a runner stone carried by the shaft, and a feed coil carried by the runner stone and loosely surrounding the shaft and extending within the eye of the bed stone.

In testimony whereof I affix my signature in presence of two witnesses.

JAMES his × mark C. KELLER.

Witnesses:
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J. L. REECE.