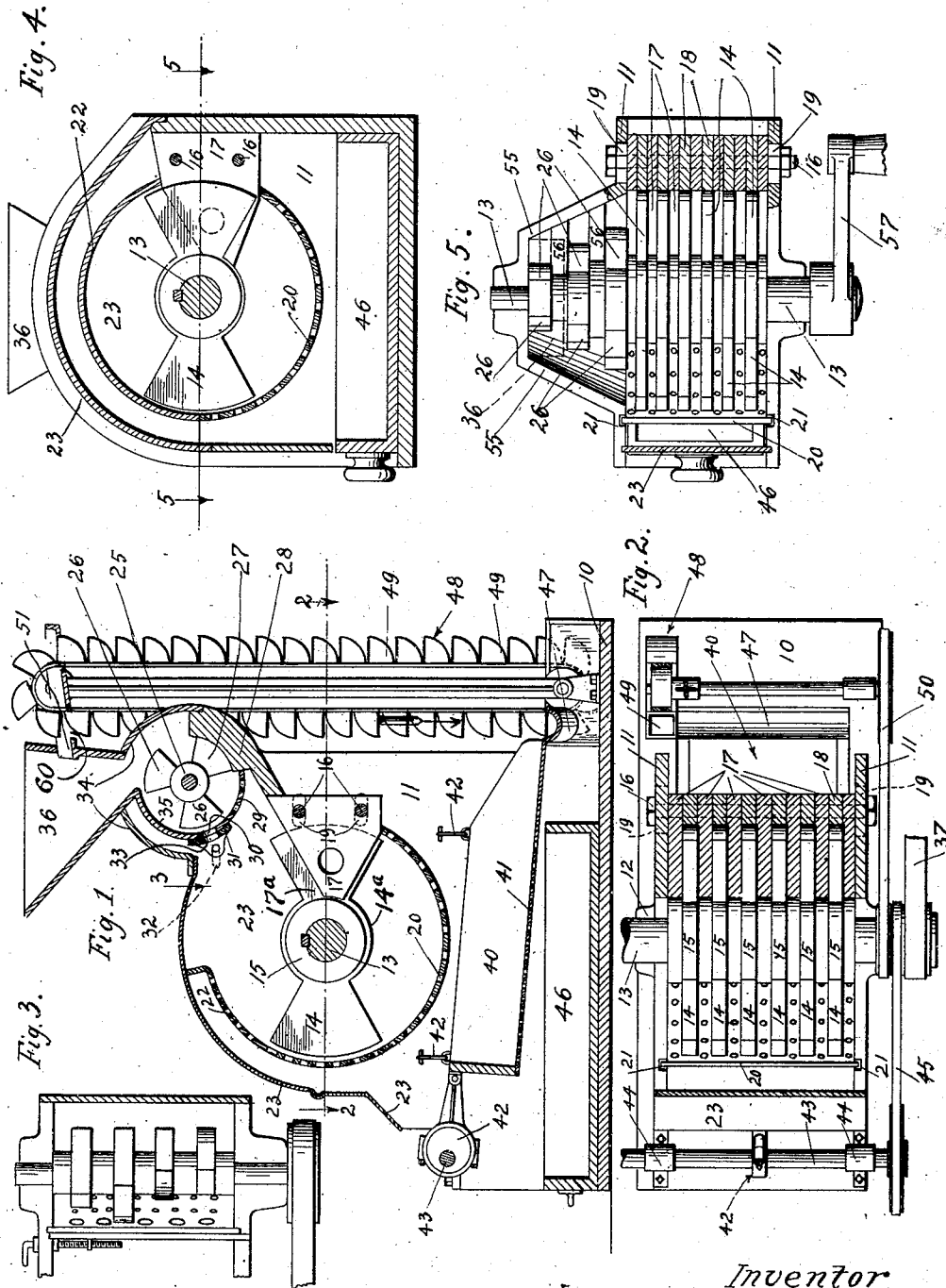


R. F. CLINE.
 SPICE MILL.
 APPLICATION FILED JUNE 1, 1908.

973,761.

Patented Oct. 25, 1910.



Witnesses
Rudolf Weldenhausen
James T. Burkett

Inventor
 Robert F. Cline
Harold Strauss
 Attorneys.

UNITED STATES PATENT OFFICE.

ROBERT F. CLINE, OF LOS ANGELES, CALIFORNIA.

SPICE-MILL.

973,761.

Specification of Letters Patent.

Patented Oct. 25, 1910.

Application filed June 1, 1908. Serial No. 436,072.

To all whom it may concern:

Be it known that I, ROBERT F. CLINE, a citizen of the United States, residing at Los Angeles, in the county of Los Angeles and State of California, have invented new and useful Improvements in Spice-Mills, of which the following is a specification.

The chief object of this invention is to provide a mill in which spices may be finely divided to any desired extent without mutilating them or detracting from their peculiar properties by crushing or abrading. In the accomplishment of this object I have produced a machine in which the spices may be cut instead of being ground, crushed or broken so that the severed surfaces may be cleanly cut with the minimum of mutilation of the spices.

The construction embodies a plurality of devices for shearing the spices into parts and means are provided to carry the shearing operation on until the parts are reduced to the desired size when they are passed into the receptacle from which they may be withdrawn.

In the accompanying drawings, forming a part of this specification:—Figure 1,— is a vertical sectional view of the improved mill. Fig. 2,— is a sectional plan view of the same taken on line 2—2 of Fig. 1. Fig. 3,— is a sectional plan view of a portion of the same taken on line 3—3 of Fig. 1. Fig. 4,— is a vertical sectional view of a modified form of mill. Fig. 5,— is a sectional plan of the same taken on line 5—5 of Fig. 4.

In the drawings 10 designates a base upon which the mill is mounted, side standards 11 providing supporting means for the mechanism and also forming the sides of the casing therefor. Mounted in bearings 12 is a transverse shaft 13 which may be rotated through any power connecting medium (not shown), such as a belt or gears. Removably keyed to shaft 13 are a plurality of cutter plates 14 being formed with radially projecting lugs or blades as shown in Fig. 1. Mounted by means of bolts 16 on side standards 11 is a series of cutter dies 17 which project into the space between the cutter plates 14, as shown in Fig. 2. A number of spacing plates 18 serve to accurately space dies 17 apart so that cutter plates 14 will enter accurately into the spaces between the dies and the edges of the plates forming the shearing contact with the edges of the dies as the plates revolve. The dies are adjustably

mounted by the provision of slots 19 in side standards 11 for bolts so that any wear upon their inner ends which come into close contact with spacing rings 15 may be taken up by the movement of the dies toward shaft 13. Spacing plates 18 fit snugly against the outer circular edge of cutter plates 14 so as to prevent the passage of any particles of spice beyond the edges of the plates. The upper face of dies 17 on which the shearing takes place are inclined as shown in Fig. 1 so that the spices are readily passed down into a position where they will be engaged with and cut by plates 14.

Inclosing the lower part of the space in which plates 14 rotate is a cylindrical sheet of perforated metal 20 removably mounted in grooves 21 so that sheets with different sized perforations may be substituted for each other. The upper part of this space is inclosed by a perforated casing 22 which is secured to side walls 23 of the upper part of the casing, these side walls forming a continuation of side standards or walls 11. Over the top of the whole of this part of the machine a casing 23 is provided.

Journalled above and to one side of shaft 13 and more directly over the outer ends of dies 17 is a shaft 25 which carries a plurality of blades 26 thereon preferably in staggered relation to each other. Dies 27 for these blades are formed on lower part 28 of the casing which surround shaft 25, this part 28 being secured to side pieces 23 on which shaft 25 is journalled. A perforated cylindrical casing 29 is provided below shaft 25, one side of perforations 30 being of larger diameter than the remainder. A slide 31 operated by means of a handle 32 on the outside of the mill is provided with perforations 33 which may be registered with perforations 30 to allow the passage there-through of cut pieces of spice of a maximum diameter. By moving perforations 33 more or less out of register with perforations 30 the size of the spice allowed to pass is thereby reduced, the size of the small perforations in casing 29 being the minimum to which this reduction may be effectively carried. Mounted over shaft 25 is a casing 34 and an inner shield 35 which prevents the spice from passing over the edge of casing 29 and thus dropping into the lower cutting mechanism before being cut to the desired size. A hopper 36 is mounted on the upper part of casing 34 and discharges into the

casing toward dies 27. Shaft 25 may be rotated by means of the belt 37 from shaft 13 or by any other convenient and efficient means which may be adaptable to any peculiar conditions.

The spice to be cut is placed in hopper 36 and passes down upon dies 27 where it is coarsely cut by cutting lugs 26. The particles which are cut small enough pass through the perforations in casing 29 into the lower cutting mechanism. The particles which are too large to pass through these perforations are carried around by lugs 26 into the dies again and are cut in this way until the particles are small enough to pass through the perforations. Upon emerging from these perforations the coarsely cut spice falls upon the upper inclined face of dies 17 and falls into the path of cutter plates 14 in their revolution. The spice is thereby cut between the plates and the dies by the shearing action being constantly agitated by the rotation of plates 14. The particles which are not fine enough to pass through these perforations are carried by cutter plates 14 and are again cut upon dies 17 until they are reduced in size sufficiently to pass through the perforations. Upon emerging from the perforations the spice falls into a shaker 40 having a screen or perforated bottom 41. This shaker is conveniently supported by means of links 42 and is constantly shaken by the operation of an eccentric 42 mounted upon shaft 43 journaled in bearings 44 upon side standards 11. This shaft may be conveniently operated by a belt connection 45 from shaft 13 and the spice falling into the shaker is thereby constantly agitated so that the finer portions pass through the meshes of the screen 41 into a receptacle 46 below whence they may be withdrawn. The coarser portions roll down the screen which is placed upon an incline as shown in Fig. 1, and pass into trough 47 at its lower end. At one end of this trough an elevator 48 is arranged to pass so that its buckets 49 or other elevating means will pass adjacent to the end of trough 47. This elevator may be of any convenient form and may be operated by a belt connection 50 from shaft 13. At the upper end of the elevator where buckets 49 discharge, a sprout or trough 51 leads to hopper 36 so that the coarser particles are replaced in the hopper and re-passed through the mill to be cut until they are fine enough to pass through the meshes of screen 41. This operation is continued until all the spice is reduced to sufficiently fine particles to pass through screen 41 and it is then removed from receptacle 46.

In Figs. 4 and 5 I have illustrated a modified form of mill on which cutting lugs 26 are directly mounted on shaft 13, reducing in size as shown in Fig. 5 as they proceed

away from the main cutter plates 14. The extension casing 55 incloses these cutters and supports dies 56 which take the place of cutter dies 27. Lugs 26 in the modified form are not shown as being staggered as the lugs may be either placed in staggered relation or not so as may be desired. As the spice is coarsely divided by lugs 26 it is gradually passed laterally into the casing surrounding cutter plates 14 and is then carried up by these plates onto cutter dies 17 as in the form before explained. A receptacle 46 is placed below casing 20 into which the spice falls after it is cut sufficiently to pass through the apertures in the casing. A crank 57 is preferably provided on this form of mill so that the mill may be evenly operated by hand, this form being especially designed for small machines. Hopper 36 is placed over the outer end of casing 55 as indicated in dotted lines in Fig. 5.

From the foregoing description it will be seen that this machine does not crush or abrade the spices but shears them into small particles with clean cut faces. This mode of division of the spices into small particles obviates all the loss of the characteristic properties attendant upon the usual method of crushing or grinding of spices. When the spice is crushed or ground the small particles into which it is divided are broken and split so that they are exposed to the air in many places, besides their outer surface proper. With my method of division the spices are cut cleanly so that the only surfaces exposed to the deteriorating effect of the air are those of its outer surface, there being no breaks or cracks. Thus spice cut by this mill retains its characteristic qualities in a much more marked degree than spices ground or crushed and also these properties for a much longer period of time.

Special attention is called to the form of the cutter plates or blades 14. These plates are formed with center hubs or disks 14^a; the outer portions of the blades are fan shaped, that is, their edges are substantially radial so that they diverge outwardly, the outer edges of the blades being arcs having their center on the axis of the shaft 13. The extremities of the dies 17 lie substantially against the faces of the rings 15 and the disks 14^a of the plates 14 are of sufficiently large diameter to insure that they will maintain their side faces in contact with the side faces of the blades when the fan shaped portions of the blades are not in contact with the dies 17. This arrangement is important for it prevents any lateral displacement of the die 17 which might cause a faulty alinement of the cutting edges and perhaps stop the rotation of the cutter plates and cause breakage. As the inner ends of the dies 17 wear away they are, of course,

adjusted toward the rings by reason of the slots 19. Attention is also called to the fact that the upper edges of the die plates 17 incline downwardly toward the shaft 13 and these edges are disposed at their inner ends at about the level of the axis of the shaft 13 so that the rings 15 coöperate with the upper faces of the die plates to form pockets 17^a in which the spices may collect. In this connection attention is called to the fact that, on account of the radial position of the cutting edges of the cutters 14 contact between the cutter plates 14 and the dies 17 begins at the outer ends of the cutter plates so that a scissor like action or result is brought about between the cutting edges as the plates rotate.

Having described my invention what I claim as new and desire to secure by Letters Patent is:—

1. In a machine of the class described, in combination, a case, a plurality of die plates projecting into the interior of said case and disposed apart to form spaces therebetween a shaft extending from said case, a plurality of blades fixed on said shaft and adapted to pass through the spaces between said die plates, said blades having outer portions coöperating with said die plates, and having hubs constantly engaging the inner ends of said die plates and maintaining the same in alinement.

2. In a machine of the class described, in combination, a case, a transverse shaft passing therethrough, a plurality of blades rigidly mounted on said shaft, a plurality of rings disposed between said blades, a plurality of die plates projecting into the spaces between said blades and coöperating with the outer portions of said blades, the inner ends of said die plates lying adjacent to the faces of said rings, said plates having hubs engaging the inner faces of said die plates when the cutting portions of said blades are out of contact with said die plates, said hubs affording means for maintaining the alinement of said die plates.

3. In a machine of the class described, in combination, a case, a shaft passing transversely through said case, a plurality of blades rigidly secured on said shaft, having disk shaped center portions and having sub-

stantially radial cutting edges on their outer portions, a plurality of die plates mounted on said case projecting into the spaces between the cutting portions of said blades and having their inner ends projecting beyond the edges of said hubs and maintained in alinement by said hubs when the cutting portions of said blades are out of contact therewith, and means for adjusting said die plates toward said shaft, the upper edges of said die plates being inclined downwardly toward said shaft.

4. In a machine of the class described, in combination, a case, a shaft passing transversely therethrough, a plurality of die plates mounted on said case and projecting into the interior thereof, said die plates having upwardly disposed cutting edges inclined downwardly toward said shaft, a plurality of blades rigidly attached on said shaft and adapted to pass through the spaces between said die plates, a plurality of rings disposed between said blades and having their faces adjacent to the inner ends of said die plates, the inner ends of said cutting edges being depressed to substantially the level of the axis of said shaft whereby pockets are formed adjacent to the side faces of said rings in which the spices may collect.

5. In a machine of the class described, in combination, a case, a shaft rotatably mounted on said case, rings mounted on said shaft, said plates holding the same apart, a plurality of die plates projecting into the space between said plates, means for adjusting said die plates toward said shaft, said blades having cutting edges on the outer portions thereof coöperating with the upper edges of said die plates and having hubs adapted to engage the side faces of said die plates to maintain the alinement thereof, the upper edges of the die plates inclined downwardly toward said shaft and coöperating with said rings to form pockets to retain the spices.

In witness that I claim the foregoing I have hereunto subscribed my name this 23rd day of May, 1908.

ROBERT F. CLINE.

Witnesses:

EDMUND A. STRAUSE,
OLLIE PALMER.