J. MOORES.

MACHINE FOR MOLDING DOUGH.

APPLICATION FILED MAY 24, 1909.

1,044,803. Patented Nov. 19, 1912.

2 SHEETS—SHEET 1.

Fig. 1.

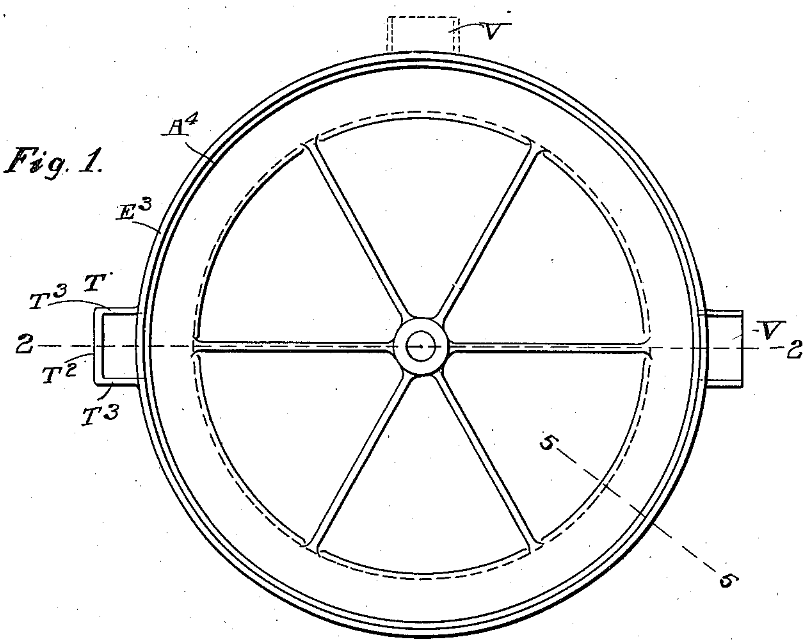


Fig. 2.

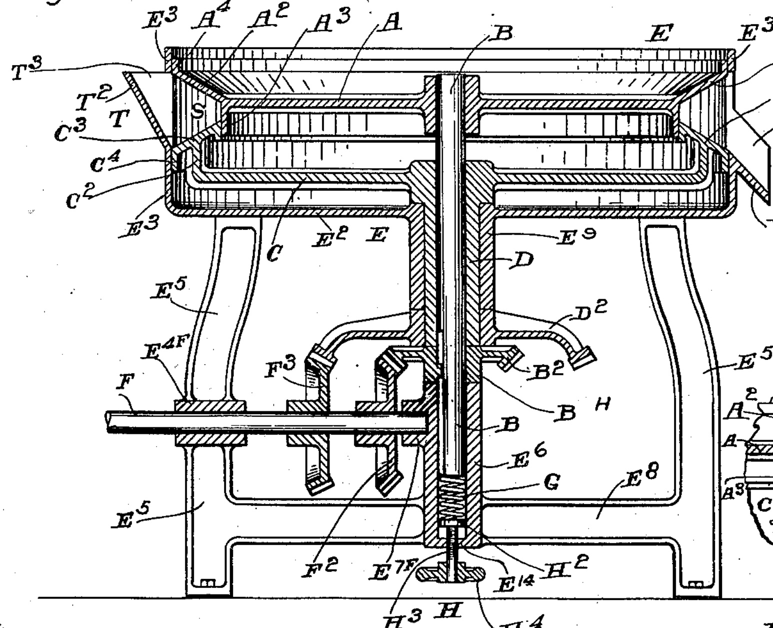
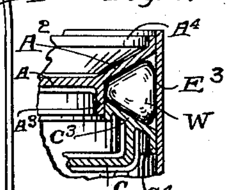


Fig. 5.



Witnesses.

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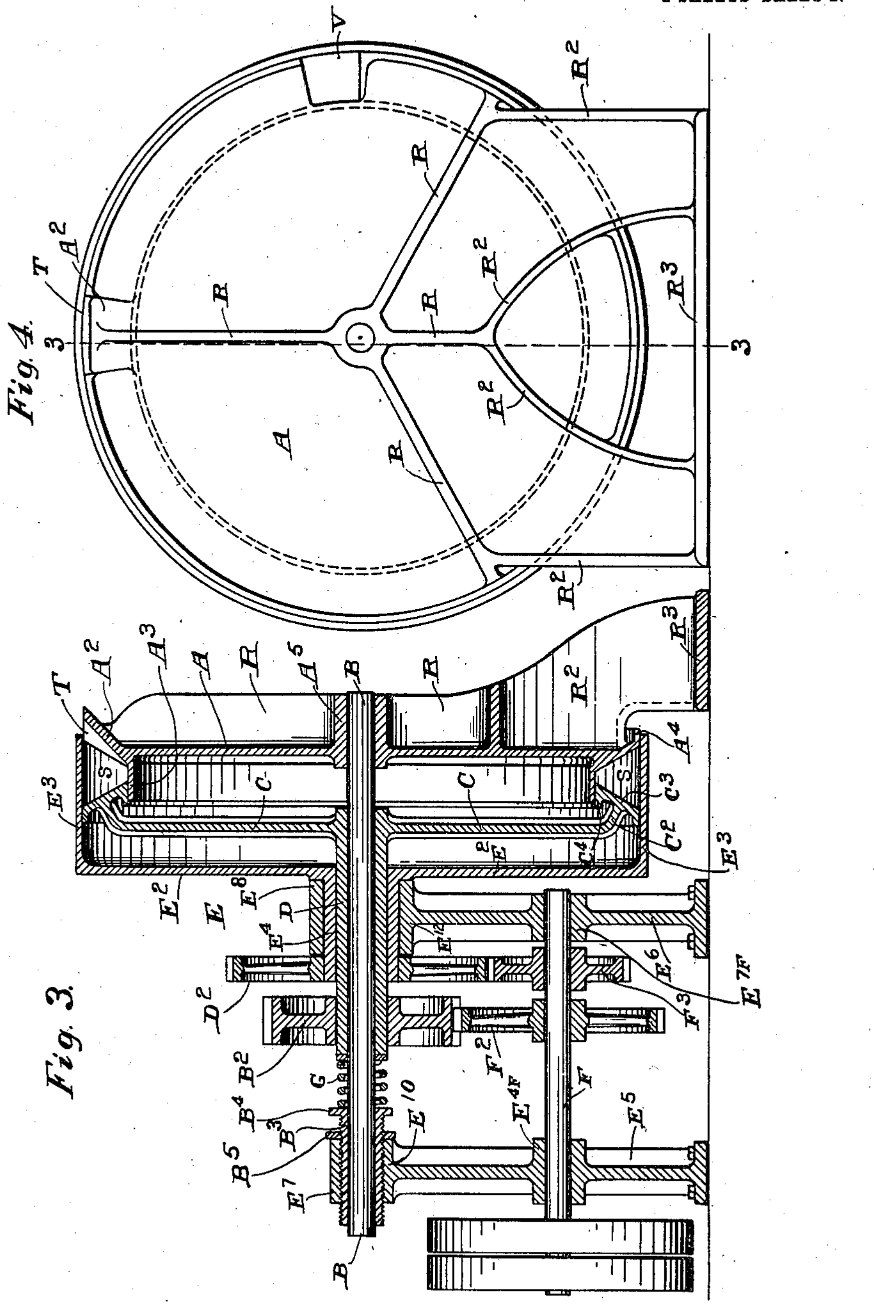
2 SHEETS—SHEET 2.



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UNITED STATES PATENT OFFICE.

JOEL MOORES, OF CINCINNATI, OHIO.

MACHINE FOR MOLDING DOUGH.

1,044,803. Specification of Letters Patent. Patented Nov. 19, 1912.

Application filed May 24, 1909. Serial No. 498,002.

To all whom it may concern:

Be it known that I, JOEL MOORES, a citizen of the United States, and a resident of the city of Cincinnati, in the county of Hamilton and State of Ohio, have invented a new and useful Machine for Molding Dough, of which the following is a specification.

The several features of my invention and the various advantages resulting from their use conjointly or otherwise, will be apparent from the following description and claims.

In the accompanying drawings making a part of this specification, and in which similar characters of reference indicate corresponding parts,—Figure 1 is a plan view of a machine embodying my invention. Fig. 2 is a vertical central section of the said machine, this section being taken in the plane of the dotted line 2, 2, of Fig. 1. Fig. 3 is a vertical central section of a machine like that illustrated in Figs. 1 and 2, but modified so as to enable the radii of the rotary devices for rolling and molding the dough to be in a vertical plane. Fig. 4 is a side elevation of that end of the mechanism shown in Fig. 3, which faces toward the right. In the plane of the dotted line 3, 3, of this figure, the section shown in Fig. 3 is taken. Fig. 5 is a vertical section taken through the walls of the chamber in the plane of the dotted line 5, 5, of Fig. 1.

I will now describe my invention in detail. A is a disk concentrically mounted on a shaft B, capable of imparting a rotatory motion to this disk. The peripheral edge of this disk carries a flange A^2 which latter extends at an angle from the plane of the disk. This angle is preferably about sixty degrees. This disk A also carries at its periphery a flange A^3, extending at right angles to the plane of the said disk A. C is another disk mounted concentrically on a sleeve shaft D, capable of imparting a rotatory movement to this disk C. This disk C carries at its peripheral edge the flange C^2, at right angles to the disk C. To that edge of the flange C^2, which is not connected to this disk C, is connected an inclined flange C^3. Outside of these flanges A^2 and C^3 is a stationary shell E. This shell has a bottom (disk) E^2. From the peripheral edge of this bottom E^2 a side E^3 extends upward, at right angles to said bottom E^2. This side E^3 forms an annular shell and wall. At the outer edge of the inclined flange C^3 is a flange C^4, preferably integral with flange C^3 and extended down vertically as shown. This flange C^4 bears against and is in close proximity to the wall E^3. The outer edge of the inclined flange A^2 is provided with a vertical flange A^4 which is close to the wall E^3. The part A^2, part A^3, part C^3 and wall E^3 constitute a chamber S, preferably of nearly triangular shape in cross section. At two places on the periphery of the wall E^3 openings are present. One of these openings T is the intake or hopper, and the other of these openings V is the exit opening or chute. In the drawing, Figs. 1 and 2, I have shown these openings as at opposite sides of the machine. In Figs. 3 and 4, I have shown these openings, one T at a given place on the edge of the chamber, see Figs. 3 and 4, and the other V at a quarter of a circle distant therefrom, see Fig. 4. For a hopper, the outer wall E^3 is preferably formed with the pocket T, having side walls T^3, T^3, and an inclined front or bottom T^2. For an exit chute, the outer wall E^3 is preferably formed with the inclined bottom piece V^2 extending out and down and with the side walls V^3, V^3.

Suitable means for imparting a rotatory motion to the disk A and its flange A^2, A^3, A^4, constituting an entirety are provided. The preferred means is as follows: A shaft B is concentrically fixed to the disk A. On the shaft B is a bevel gear wheel B^2, feathered to the said shaft and capable of sliding thereon. A power shaft F is present, and this shaft F carries a bevel gear wheel F^2 which latter engages with the gear wheel B^2, and rotates the said gear wheel B^2, and this in turn rotates the disk A and its parts A^2, A^3, A^4. I provide suitable means for the rotation of the disk C and its flanged parts C^2, C^3, C^4. The preferred means for carrying this object into effect is as follows: A sleeve D (through which extends said shaft B) carries a bevel gear wheel D^2. Fixed on the power shaft F is a bevel gear wheel F^3 that engages the gear wheel D^2 and imparts rotary motion to the gear wheel D^2. This latter wheel D^2 in turn rotates the said disk C and its parts C^2, C^3, C^4.

The power shaft F is supported by suitable bearings. One kind of such bearings is shown in Fig. 2 and consists in a bearing sleeve E^4F located on one of the legs E^5 which support the stationary frame E. The other end of the shaft F is journaled in a sleeve bearing E^7F and this is suitably supported, as for instance, as shown, by the sleeve E^6 carried by cross brace E^8 extending from a leg E^5 to another leg E^5 of the frame. This sleeve E^6 is utilized as a collar support for the hub BH of the wheel B^2, and this hub BH in turn furnishes a convenient support for the sleeve D aforementioned. A sleeve E^9 fixed to the bottom E^2 of the shell E extends down therefrom and outside of the rotatable sleeve D and comes into contact above with the hub of the bevel gear wheel D^2 and acts as a collar for the latter.

When the piece of dough is placed in the chamber of the machine, it is desirable that the flange A^2 of the disk A should not press upon the dough too heavily. If the said pieces of dough successively put into the chamber are not of exactly the same size and volume, the flange A^2, in connection with the disk A presses upon a large piece of dough more heavily than upon a smaller one. Where the machine is constructed as shown in Fig. 2, the weight of the disk A and its parts A^2, A^3, A^4 and of the shaft B will ordinarily be too much for the elasticity of the roll of dough to overcome. Therefore to enable the roll of dough to lift the flange A^2 and the disk A and overcome the weight of the said accompanying parts, I provide a spring G, and locate it directly beneath and against the lower end of the shaft B. I also provide a set screw H having a broad upper end H^2, the latter located beneath the spring G and bearing against the latter. The screw shank H^3 of this set screw engages a screw thread in the bottom E^{14} of the sleeve E^6. By rotating the handle H^4 of this set screw H, the latter can be elevated and thereby compress the spring G until the upward elastic pressure of the latter counterbalances the entire weight of the disk A and its flanged parts A^2, A^3, A^4 and the weight of the shaft B, or so nearly counterbalances these that the elasticity of the roll of dough can operate to raise the said disk A and its said parts and the said shaft, and receive the proper manipulation from the machine, irrespective of the size of the roll of dough.

In cases where the dough is always of a given size and of a uniform volume, the spring can be dispensed with, and the set screw H only be used to adjust relatively the walls of the chamber of a given size. This set screw H is also for changing the size of the chamber to accommodate the latter to a desired size of loaf, as, for example, a loaf weighing one pound, or a loaf weighing two pounds, etc., because I have provided that the wall of the shell E shall extend beyond the wall A^2, A^4, the chamber S is at all times a closed one, no matter what be the size of the loaf or roll, so long as the latter is within the limits of the machine.

The manner in which this mechanism operates is as follows: The dough properly prepared, is first cut or divided into portions of approximately the correct size for delivery to the machine. The machine being set in motion, the disk C and its parts C^2, C^3, C^4 will revolve at a given speed around the axial center B, and the disk A and its parts A^2, A^3, A^4 will revolve at a rate faster than that of the disk C and its said parts. The portions or lumps of dough are one after another dropped into the machine through the inlet T. Thus each lump, in succession, enters the chamber S. After entering this chamber S, each lump is carried along in said chamber. The lump immediately assumes the shape of the chamber in cross section, viz.: a pear shape W, substantially as shown in Fig. 5. The lump is rolled along between the inclined bottom C^3 of the chamber S and the inclined top A^2 of the chamber.

I have ascertained that in case all of the sides of the chamber, except the parts C^2, C^3 and C^4, were stationary, the roll will not be properly rolled or kneaded, whereas by causing two walls out of the three walls of the chamber to rotate, the dough is properly formed into the desired shape, and being duly worked and rolled is delivered from the chute V in proper condition to be baked. The skin formed upon the roll is not broken, and the doughy mass is caused to be more compact and rendered more dense by the operation of the machine.

When the roll is delivered from the machine at the chute V, it is compact, has a uniform and proper density, and has a proper and unbroken skin. Its shape is approximately that shown in Fig. 5. But this shape can be somewhat altered by pressing it, viz.: by pressing its small end toward the opposite one.

In practice, the delivery chute is three quarters of a circle from the hopper T. As a result, the dough lumps travel three quarters of a circle while being made into rolls of the kind aforesaid.

In Figs. 1 and 2, the delivery chute V is shown by solid lines at the opposite side of the circle from where the hopper T is. This is so shown to illustrate, in a single figure, viz.: Fig. 1, which is a section of Fig. 2, the construction and shape of the hopper end of the chute.

The preferred location of the hopper and the delivery chute relatively to one another is shown in Fig. 4, and by dotted lines at V, Fig. 1. The lump of dough travels around in the chamber S and along the wall E^3 for the distance of three quarters of a circle, namely: two hundred and seventy degrees, measured along the said annular wall.

When for any reason, it becomes desirable or necessary to have the disks A, C and

E vertical, the machine is then preferably constructed as shown in Figs. 3 and 4. In this case, the shaft B is horizontal. It is fixed, as hereinbefore mentioned, concentrically to the frame, at the part A^5 of the disk A provided as hereinbefore mentioned with the parts A^2, A^3 and A^4. In this modification, the disk A and its parts are stationary and are supported on a suitable frame-work, one form of which is shown and consists of the ribs R, R, R, connected to the disk A, and the legs R^2 extending therefrom to the base or foundation plate R^3. The disk C, with its parts C^2, C^3, C^4 is mounted on and fixed to a sleeve D embracing the shaft B and turning thereon. The disk E, with its parts E^2 and E^3, is fixed on a sleeve E^4, which embraces the sleeve D and rotates upon it. In this construction, the gear wheel B^2 is concentrically fixed on the sleeve D, and the gear wheel D^2 is concentrically fixed on the sleeve E^4.

The shaft F is present and carries gear wheel F^3 engaging the gear wheel D^2 for rotating the disk E with its parts E^2, E^3. This shaft F also carries the gear wheel F^2 which engages the gear wheel B^2, fixed on the sleeve D, which when rotated, rotates the disk C with its said parts. This shaft F is supported preferably by the support E^6, which is extended upward and serves as a bearing E^{12} for the sleeve E^4. The shaft is also supported by the support E^5, which is extended upward and provides a bearing E^{10} for the end of the shaft B.

It will be understood, as has already been intimated in the case of the description of the mechanism of Figs. 1 and 2, that instead of cog wheels, belt mechanism or the like may be used.

A convenient inter-bearing for the shaft B, in combination with the bearing E^7 is the bushing B^3, embracing this shaft B, and located within the bearing E^7. That end of this bushing B^3 which faces toward the chamber S is preferably provided with a flange B^4 which the better affords an abutment against which one end of the coiled spring G may press. The other end of this spring presses against the sleeve D. This spring G is coiled around the shaft B. The function of this spring G is much the same here as it is in the mechanism of Fig. 2. While the spring here is not called upon to sustain the weight of a disk with its parts as it is in the mechanism of Fig. 2, nevertheless it elastically yields to the pressure of the dough-lump as the latter is being formed into a roll, and yet causes enough pressure against the dough as the latter is rolled within the chamber, to cause it to be thoroughly compacted, and symmetrically formed and rolled, no matter what its varying size.

The bushing B^3 has an exterior screw thread, which engages a female thread on the inner surface of the cylindrical bearing E^7. By rotating this bushing B^3 and advancing it toward the disk C, the flange C^3 is advanced and the chamber S diminished in size. By rotating this bushing B^3 in an opposite direction, opportunity is given for the disk C and flange C^3 to recede, and thus to enlarge the chamber. Preferably a lock nut is present. This screw threaded bushing B^3 and the lock nut B^5 acts the same as the set screw H in Fig. 2. As in the case of the mechanism of Fig. 2, if the dough for the roll or loaf is of a uniform and unvarying size, the spring G in the mechanism of Fig. 3 may be dispensed with.

The operation of the mechanism of Fig. 3 does not differ in results from that of the mechanism shown in Fig. 2. As regards the movements of the parts of the chamber S, while in Fig. 2, the flange C^3 and the flanges A^2, A^3 rotate and the flange E^3 is stationary: on the other hand, in Fig. 3, the flange E^3 and the flange C^3 rotate and the flange A^2, A^3 is stationary. In both cases, the disk C, with its parts C^2 and C^3, is the rapid mover, and rotates more rapidly than the other rotating disk or part.

It will be noted that the function of the spring G is to advance a movable wall and to contract the chamber, when a piece of dough is too small for the chamber as it was. It is to be further noted that the feature of construction, in which one part of the chamber telescopes with another and can be set for variations of sizes of dough, can be employed, and the speed of rotation of the two rotatable portions of the chamber be varied, either by making one of said rotatable portions of the chamber rotate faster than the other in the same direction, or by making the said rotatable portions of the chamber rotate in opposite directions. Such opposite rotation can be readily accomplished by twisting a belt where belt mechanism is employed, or by changing the gear wheels in a well known manner. So also the spring may be employed in connection with the telescoping feature irrespective of the particular rotation of the chamber walls.

I have called the parts A and C and E, each a disk, for the sake of perspicuity. If the machine were very small and light, one or more of said disks may be in reality a wheel having spokes, the intervening diaphragmatic parts being omitted for lightness, I desire that it be understood throughout the specification and claims that the term disk shall include such skeleton frame.

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

1. In a machine for molding dough, the combination of a closed annular chamber having three principal interengaging walls

adapted to telescope into one another, with means for rotating two of these principal walls independently in the same direction at differing rates of speed around the axis of the annular chamber, and means for applying yielding pressure between the two movable walls.

2. In a machine for molding dough, the combination of a closed annular chamber having the form in cross section of a truncated cone, and having three principal interengaging walls adapted to telescope into one another, and a minor wall forming the apex of the truncated cone, with means for rotating two of these principal walls independently in the same direction at differing rates of speed around the axis of the annular chamber, and means for applying yielding pressure between the two movable walls.

3. In a machine for molding dough, the combination of a closed annular chamber having three principal interengaging walls adapted to telescope into one another, with means for rotating two of these principal walls independently in the same direction at differing rates of speed around the axis of the annular chamber, and means for applying yielding pressure between the two movable walls, the third wall being stationary and provided with a hopper and an exit chute.

4. In a machine for molding dough, the combination of a closed annular chamber having three principal interengaging walls adapted to telescope into one another, with means for rotating two of these principal walls independently in the same direction at differing rates of speed around the axis of the annular chamber, and means for applying yielding pressure between the two movable walls, the third wall being stationary and provided with a hopper and an exit chute, the exit chute being located at a distance of ninety degrees from the hopper.

5. In a machine for molding dough, the combination of a closed annular chamber having three principal interengaging walls adapted to telescope into one another, with means for rotating two of these principal walls independently in the same direction at differing rates of speed around the axis of the annular chamber, and a spring holding one of the opposing rotatable walls in engaging telescopic position adapted to permit said wall to yield elastically within limits under the pressure of the dough rolled in said chamber.

6. In a machine for molding dough, a stationary annular wall E^3, and a frame for supporting it, a disk A, provided with a right angled flange A^3, and an inclined flange A^2 having a right angled flange A^4, in juxtaposition with the stationary wall E^3, a disk C provided with a right angled flange C^2, the latter provided with the inclined flange C^3, one of whose edges carries the flange C^4 located close to the stationary wall E^3, the wall E^3 and the flanges A^2 and C^3 forming a chamber S, the disk A having shaft B, connected to the beveled gear wheel B^2, in turn engaging a gear wheel F^2 on shaft F, and the disk C having the tubular shaft D embracing the shaft B, and connected to the gear wheel D^2, in turn engaging gear wheel F^3 on the shaft F, and elastic means for enabling the part A^2 of the chamber to elastically yield and lift upon pressure by the lump of dough in the chamber.

7. In a machine for molding dough, a stationary annular wall E^3, and a frame for supporting it, a disk A, provided with a right angled flange A^3, and an inclined flange A^2 having a right angled flange A^4, in juxtaposition with the stationary wall E^3, a disk C provided with a right angled flange C^2, the latter provided with the inclined flange C^3, one of whose edges carries the flange C^4 located close to the stationary wall E^3, the wall E^3 and the flanges A^2 and C^3 forming a chamber S, the disk A having shaft B, connected to the beveled gear wheel B^2, in turn engaging a gear wheel F^2 on shaft F, and the disk C having the tubular shaft D embracing the shaft B, and connected to the gear wheel D^2, in turn engaging gear wheel F^3 on the shaft F, and elastic means for enabling the part A^2 of the chamber to elastically yield and lift upon pressure by the lump of dough in the chamber, the stationary wall E^3 provided with disk E^2, in turn provided with sleeve E^9, located between a hub bearing of the disk C and the hub of gear wheel D^2, and holding the same apart.

8. In a machine for molding dough, a stationary annular wall E^3, and a frame for supporting it, a disk A, provided with a right angled flange A^3, and an inclined flange A^2 having a right angled flange A^4 in juxtaposition with the stationary wall E^3, a disk C provided with a right angled flange C^2, the latter provided with the inclined flange C^3, one of whose edges carries the flange C^4 located close to the stationary wall E^3, the wall E^3 and the flanges A^2 and C^3 forming a chamber S, the disk A having shaft B, connected to the gear B^2, in turn engaging a gear wheel F^2 on shaft F, and the disk C, having the tubular shaft D embracing the shaft B and connected to the gear wheel D^2, in turn engaging gear wheel F^3 on the shaft F, and the coiled spring G located below and against the shaft B, and the set screw H, H^3, against the spring.

9. In a machine for molding dough, a stationary annular wall E^3, and a frame for

supporting it, a disk A, provided with a right angled flange A^3, and an inclined flange A^2 having a right angled flange A^4, in juxtaposition with the stationary wall E^3, a disk C provided with a right angled flange C^2, the latter provided with the inclined flange C^3, one of whose edges carries the flange C^4 located close to the stationary wall E^3, the wall E^3 and the flanges A^2 and C^3 forming a chamber S, the disk A having shaft B, connected to the beveled gear wheel B^2, in turn engaging a gear wheel F^2 on shaft F, and the disk C having the tubular shaft D embracing the shaft B and connected to the gear wheel D^2, in turn engaging gear wheel F^3 on the shaft F, the stationary wall E^3 provided with disk E^2, in turn provided with sleeve E^9, located between a hub bearing of the disk C and the hub of gear wheel D^2 and holding the same apart, and a sleeve E^6, fixed to the frame, and upholding the hub BH of gear wheel B^2, and having in its bottom a female screw thread, and a set screw H, H^2, H^3, engaging said female screw thread, and a spring G compressed between said set screw and the said foot of the shaft B.

10. In a machine for molding dough, a stationary annular wall E^3, and a frame for supporting it, a disk A, provided with a right angled flange A^3, and an inclined flange A^2 having a right angled flange A^4, in juxtaposition with the stationary wall E^3, a disk C provided with a right angled flange C^2, the latter provided with the inclined flange C^3, one of whose edges carries the flange C^4 located close to the stationary wall E^3, the wall E^3 and the flanges A^2 and C^3 forming a chamber S, the disk A having shaft B, connected to the beveled gear wheel B^2, in turn engaging a gear wheel F^2 on shaft F, and the disk C having the tubular shaft D embracing the shaft B and connected to the gear wheel D^2, in turn engaging gear wheel F^3 on the shaft F, the stationary wall E^3 provided with disk E^2, in turn provided with sleeve E^9, located between a hub bearing of the disk C and the hub of gear wheel D^2 and holding the same apart, and a sleeve E^6, fixed to the frame, and upholding the hub BH of gear wheel B^2, and having in its bottom a female screw thread, and a set screw H, H^2, H^3, engaging said female screw thread, and a spring G compressed between said set screw and the said foot of the shaft B, this sleeve E^6 provided with a bearing receiving the adjacent end of the said shaft F.

11. In a machine for molding dough, an annular wall E^3 and a disk for supporting it, a disk A provided with a right angled flange A^3 and an inclined flange A^2, having a right angled flange A^4 in juxtaposition with the stationary wall E^3, a disk C provided with a right angled flange C^2, the latter provided with the inclined flange C^3, one of whose edges carries the flange C^4 located close to the stationary wall E^3, and the flanges A^2 and C^3 forming a chamber S, and gear wheels connected to power for enabling the gear wheels to rotate two of said disks.

12. In a machine for molding dough, an annular wall E^3 and a disk for supporting it, a disk A provided with a right angled flange A^3 and an inclined flange A^2, having a right angled flange A^4 in juxtaposition with the stationary wall E^3, a disk C provided with a right angled flange C^2, the latter provided with the inclined flange C^3, one of whose edges carries the flange C^4 located close to the stationary wall E^3, and the flanges A^2 and C^3 forming a chamber S, and gear wheels connected to power for enabling the gear wheels to rotate two of said disks, and to rotate one of said disks faster than the other.

JOEL MOORES.

Attest:
G. E. Pugh,
Charles H. Speegel.