Feb. 25, 1930. H. DEVLIN 1,748,543

FLOUR DUSTER

Filed July 22, 1925 6 Sheets-Sheet 1

Fig. 1

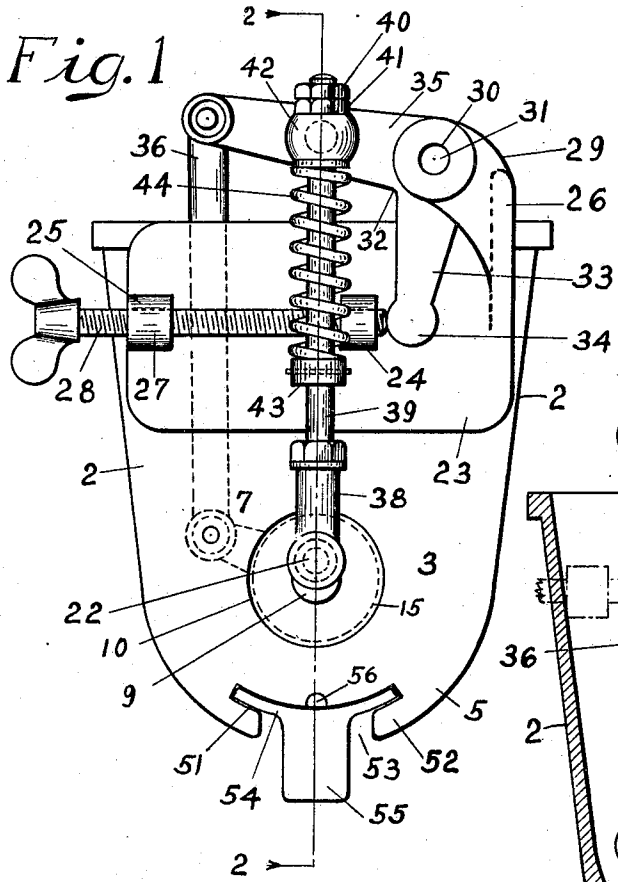


Fig. 3

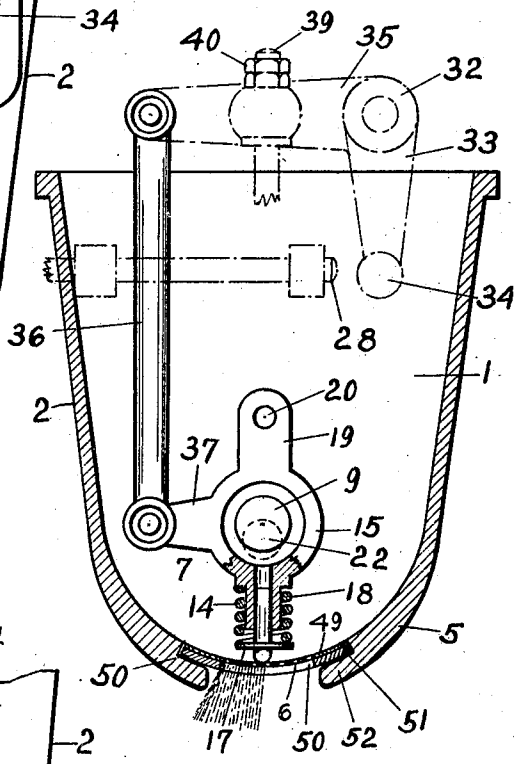
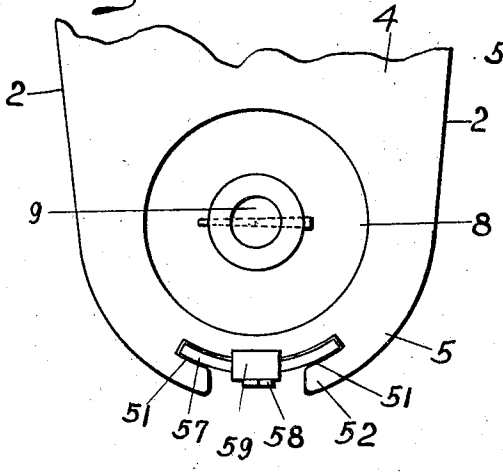


Fig. 6



INVENTOR.
HENRY DEVLIN
BY Newell & Spencer
ATTORNEYS.

Feb. 25, 1930. H. DEVLIN 1,748,543

FLOUR DUSTER

Filed July 22, 1925 6 Sheets-Sheet 2

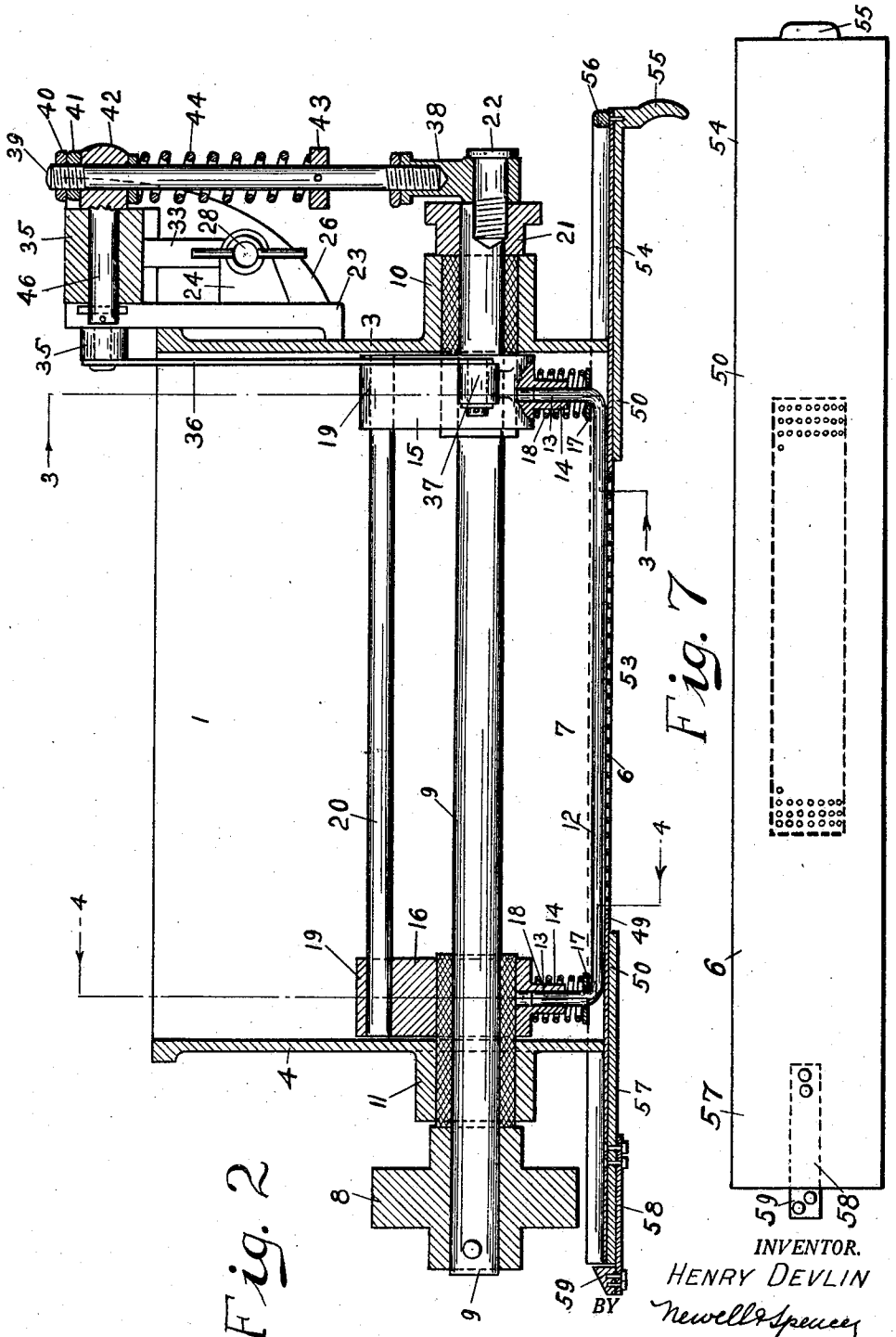


Fig. 2

Fig. 7

INVENTOR.
HENRY DEVLIN
BY Newell & Spencer
ATTORNEYS.

Feb. 25, 1930. H. DEVLIN 1,748,543

FLOUR DUSTER

Filed July 22, 1925 6 Sheets-Sheet 3

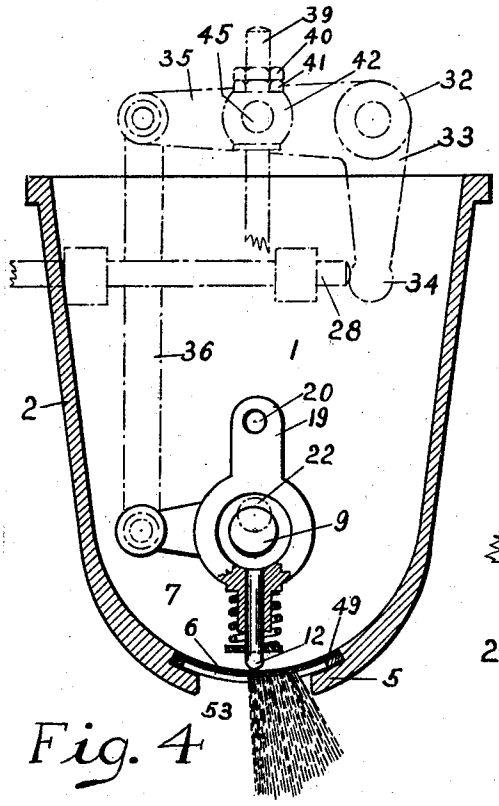


Fig. 4

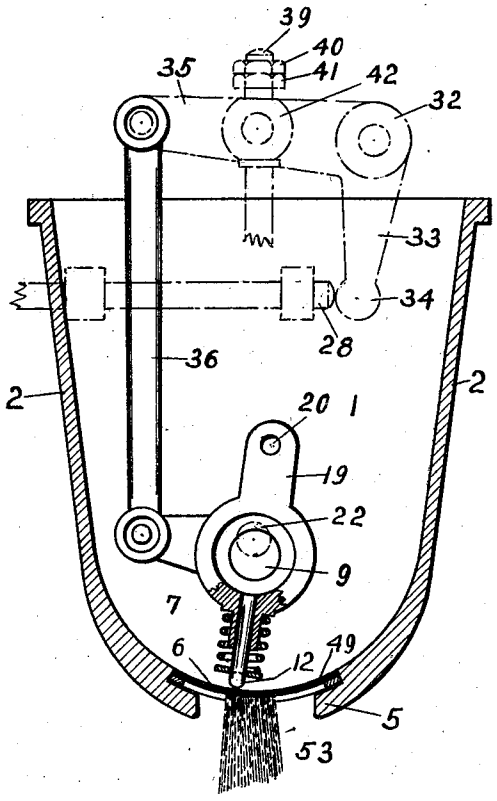


Fig. 5

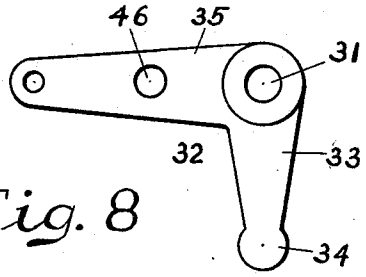


Fig. 8

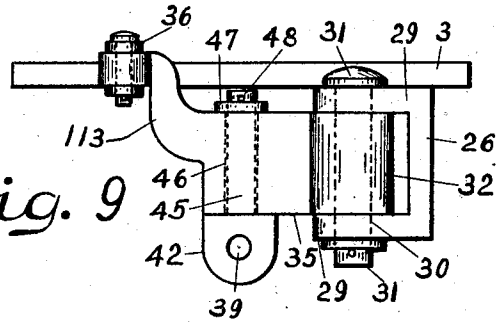


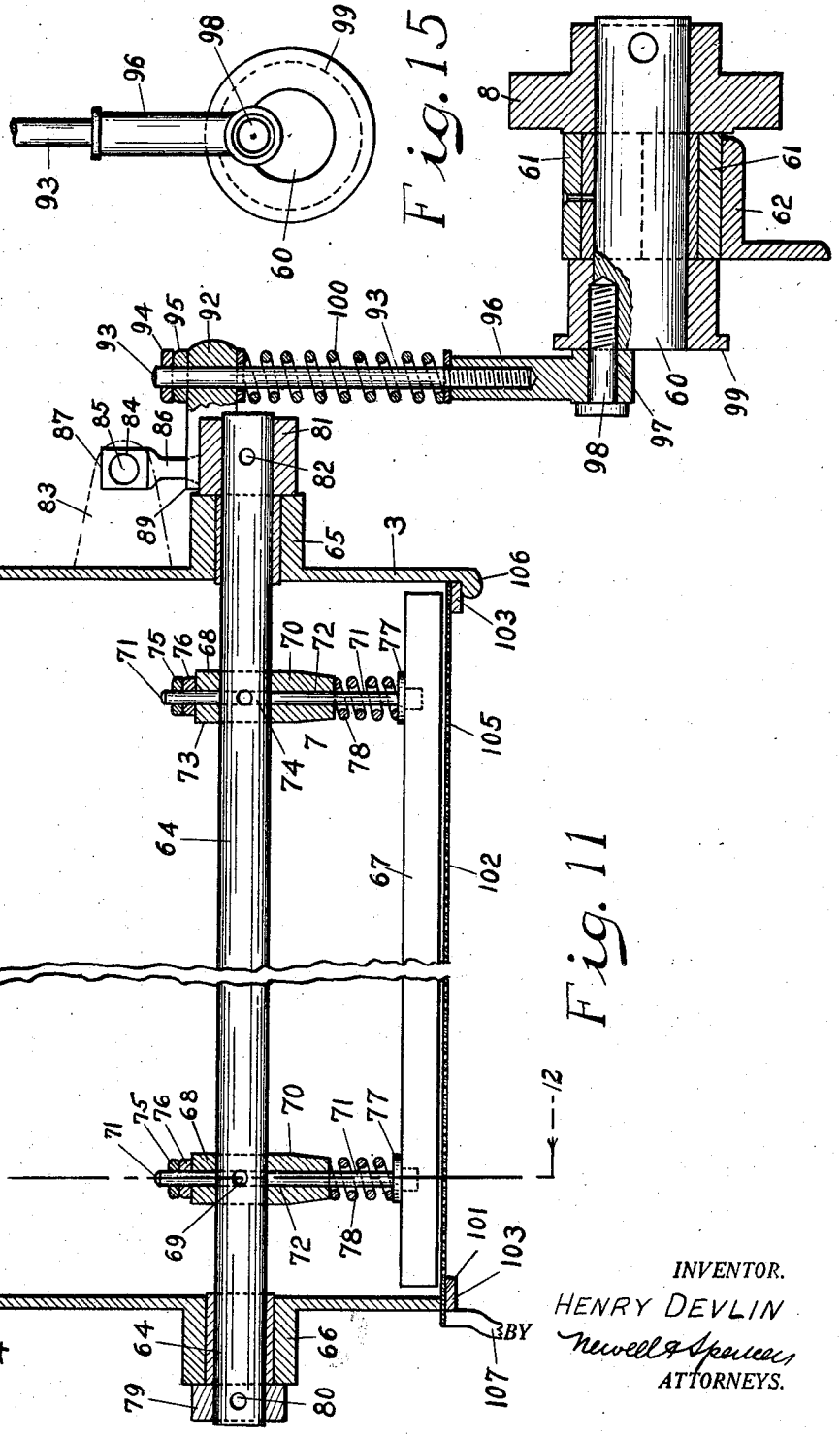
Fig. 9

INVENTOR.
HENRY DEVLIN
BY Newell & Spencer
ATTORNEYS.

Feb. 25, 1930. H. DEVLIN 1,748,543

FLOUR DUSTER

Filed July 22, 1925 6 Sheets-Sheet 4



Feb. 25, 1930. H. DEVLIN 1,748,543

FLOUR DUSTER

Filed July 22, 1925 6 Sheets-Sheet 5

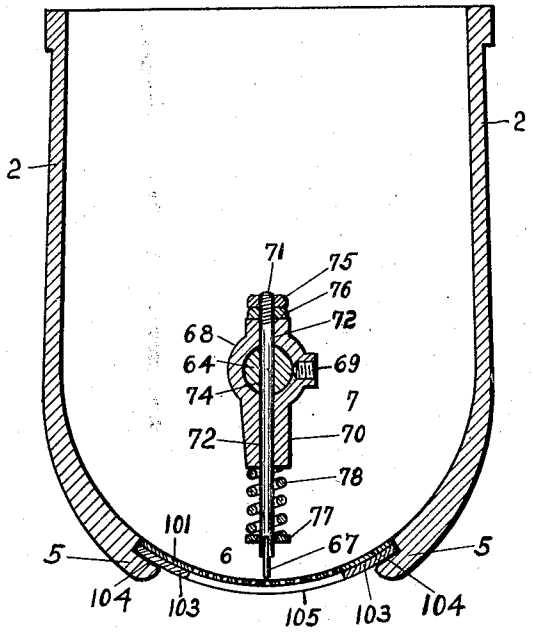


Fig. 12

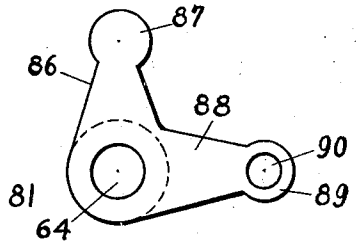


Fig. 16

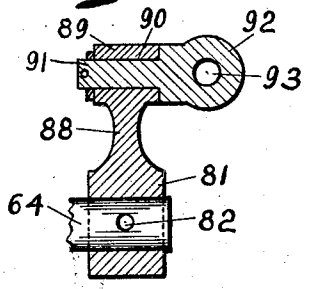


Fig. 17

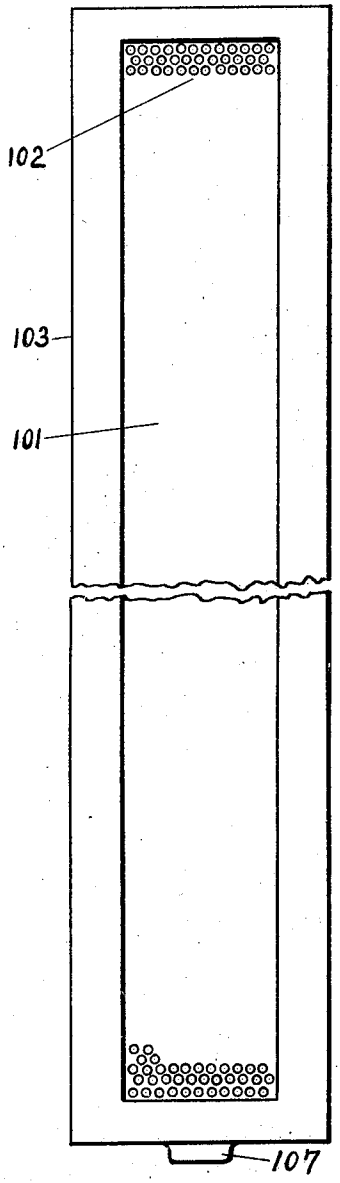


Fig. 14

INVENTOR.
HENRY DEVLIN
BY Newell & Spencer
ATTORNEYS.

Feb. 25, 1930. H. DEVLIN 1,748,543

FLOUR DUSTER

Filed July 22, 1925 6 Sheets-Sheet 6

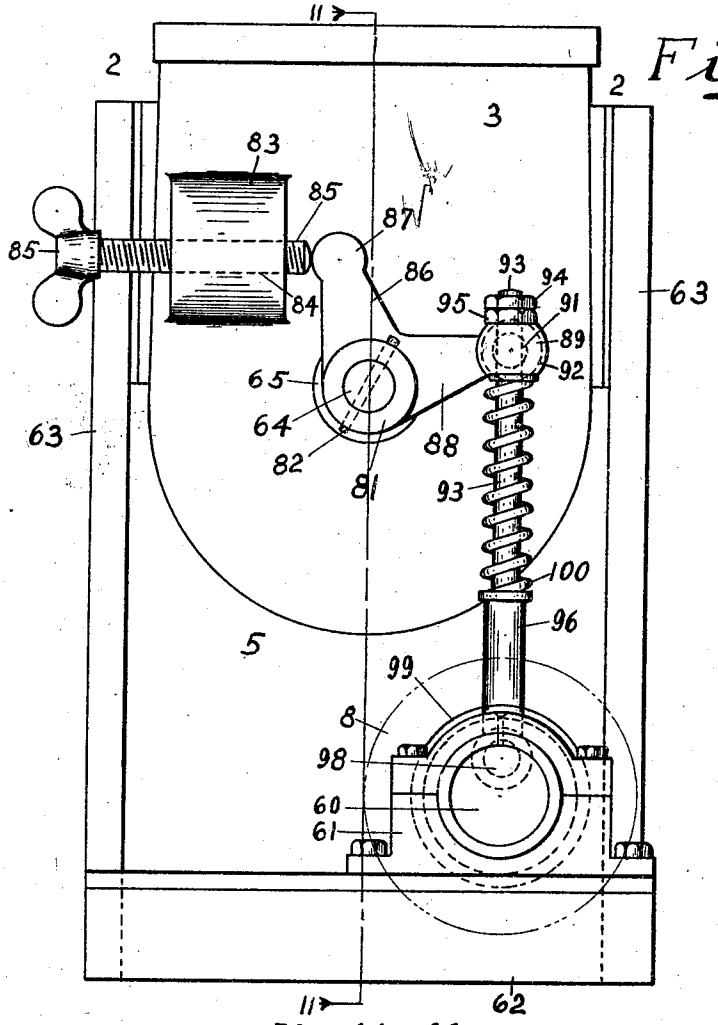


Fig. 10

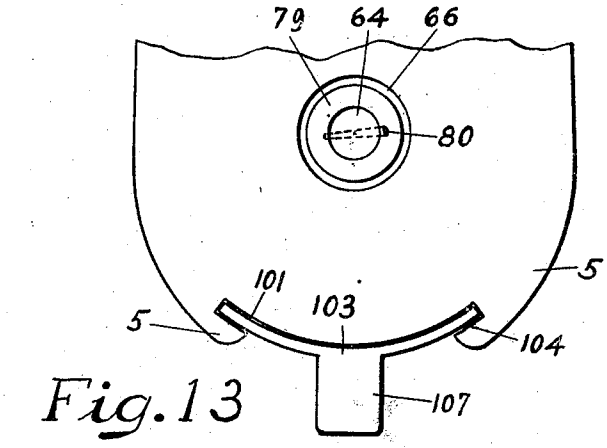
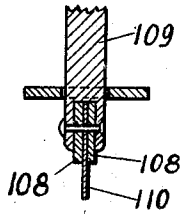


Fig. 13

Fig. 18



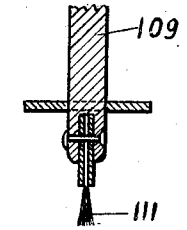


Fig. 19

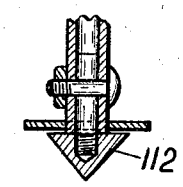


Fig. 20

INVENTOR.
HENRY DEVLIN
BY Newell & Spencer
ATTORNEYS.

Patented Feb. 25, 1930 1,748,543

UNITED STATES PATENT OFFICE

HENRY DEVLIN, OF SAGINAW, MICHIGAN, ASSIGNOR, BY MESNE ASSIGNMENTS, TO BAKER PERKINS COMPANY, INC., OF SAGINAW, MICHIGAN, A CORPORATION OF NEW YORK

FLOUR DUSTER

Application filed July 22, 1925. Serial No. 45,155.

This invention relates to powder sprinkling devices, usually called flour dusters, and particularly to those for use in bakeries.

It is an object of this invention to provide a powder sprinkling machine having a flexibility of adjustment so that it may readily be adapted to the various uses to which it may be put.

It is generally necessary in sprinkling powdery substances to regulate the amount used as well as the direction in which it is sprinkled, easily and quickly. It is, therefore, an object of this invention to provide a duster having an arrangement such that, by a relatively simple adjustment, the amount of powder ejected and the direction in which the powder is ejected may be controlled.

Briefly, powder dusting machines of the type disclosed in this invention comprise a trough for containing powder in the bottom of which is inserted a screen through which the powder is dusted. To secure a uniform flow of powder, an agitator is provided, positioned in the trough so that it may sweep to and fro over the screen, gently ejecting the powder.

It is a further feature to arrange the screen so that its active portion may be adjustably positioned in the trough and the powder may then be sprinkled wherever desired.

An important feature of the invention is the arrangement, whereby the agitating device of the machine may be stopped quickly, while its driving gear continues to revolve.

These and other features will be apparent from a consideration of the accompanying drawings which represent generally examples of flour dusters used in bakeries in connection with dough dividers, rounders, molding machines, biscuit cutting machines and the like.

Fig. 1 is an end view of one form of flour duster in accordance with this invention showing the external arrangement for adjustment;

Fig. 2 is a section on line 2—2 of Fig. 1 showing the internal structure of the agitator;

Fig. 3 is a section on line 3—3 of Fig. 2;

Fig. 4 is a section on line 4—4 of Fig. 2;

Fig. 5 is a section similar to Fig. 3 showing the agitator in a different position;

Fig. 6 is a fragmentary end view showing the driving means;

Fig. 7 is a plan view of the screen;

Figs. 8 and 9 are detailed views of the lever arrangement for transmitting motion;

Fig. 10 is an end view of a modification;

Fig. 11 is a longitudinal vertical section of the modification of Fig. 10;

Fig. 12 is a section on line 12—12 of Fig. 11;

Fig. 13 is a fragmentary end view of the modification of Fig. 10;

Fig. 14 is a plan view of the screen of Fig. 11;

Figs. 15, 16, and 17 are detail views of the lever arrangement as shown in Fig. 10; and

Figs. 18, 19 and 20 show modified forms of agitator blades.

Referring specifically to Figs. 1-9, which represent a flour duster preferably used in dough molding machines and the like, a trough 1, adapted to contain powdery material to be dusted, comprises side walls 2, and end walls 3 and 4. In the bottom 5 of the trough, an opening extends its full length the walls of the opening being so recessed as to permit the insertion of a sifting screen 6. An agitator 7 having a blade 12 moves across the screen forcing the powder through it.

Extending through the trough and journalled in suitable bearings 10 and 11 on its outer end walls, is a shaft 9, which is adapted to be rotatably driven by a pulley wheel 8 keyed thereto, a suitable belt or other device connecting it with a prime mover.

Loosely mounted on shaft 9 are sleeves 15 and 16 arranged at their lower ends with tube-like projections 14 into which the holders 13 of the blade 12 are slidably inserted. Flat discs 17, mounted upon and surrounding the holders 13 and the lower flat portions of the sleeves 15 and 16, enclose between them springs 18 to press blade 12 gently against screen 6, thus not only assuring effective blade action but also providing protection to the blade and screw against hard substances found in the powder.

A rod 20 extends between projections 19 of sleeves 15 and 16, thereby increasing the

rigidity of the structure and providing means for stirring the upper layers of powder to insure ready flow through the screen.

A collar 21 is securely mounted on shaft 9 by means of screw bolt 22, the latter being eccentrically positioned in the collar.

Rigidly secured to the end wall 3 is a stout plate 23 for carrying the moving and controlling mechanism for the agitator. Mounted on the plate are two horizontally aligned projections 24 and 25, having screw threaded openings 27 therein to receive a long thumb screw 28.

A bracket 26, having in its upper part two arms 29, extending parallel to plate 23, is mounted on one side of the plate 23. A pivot 31 parallel to shaft 9 is supported in aligned openings 30 in the arms 29 and revolubly carries a bell crank lever 32. The downwardly pointing arm 33 ends in a thick circular disc 34 which is adapted normally to encounter the end of screw 28. The arm 35 of the bell crank has a sidewise projection 113 (Fig. 9) which extends across the top edge of the trough and terminates in a hinged connection with a link rod 36 whose opposite end is hinged to a projection 37 on sleeve 15 (Fig. 3). Motion of the bell crank lever about its fulcrum pin 31 thus transmits motion through rod 36 to sleeve 15 which in turn controls the motion of the agitator blade 12.

In order to impart a rocking motion to the bell crank lever, there is provided a rod 39, screw threaded at both ends, the lower end of which is screwed into a socket 38 rotatably mounted on the projecting end of eccentric bolt 22. The upper end of rod 39 carries a screw nut 40, a washer 41, and a collar 42 slidably mounted beneath the washer. A spring 44 surrounding the rod 39 and supported at its lower end by means of disc 43 rigidly secured to the rod holds the collar 42 resiliently against washer 41. A pin 45 extends sidewise from the collar 42, through an opening 46 in the mid portion of arm 35 and is held in position by washer 47 and pin 48 (Fig. 9).

The screen 6, referred to above, is composed of a suitable perforated material or net 49 secured to a surrounding frame 50. The frame is adapted to slide like a shutter in recesses 51 formed in the reenforced walls 52 surrounding the opening 53 in the bottom of the trough. The screen and frame is a portion of a cylinder whose center lies along the center line of shaft 9. The frame 50 extends beyond the end walls of the trough by imperforate portions 54 and 57. The former is provided at its end with a handle 55 to facilitate sliding and a stop pin 56 to limit the motion towards the trough. The frame is prevented from sliding too far in the opposite direction by means of a stop block 59 which is mounted upon the projecting free end of resilient member 58 secured at its other end to the frame portion 57 by screws or rivets.

By springing stop block 59 down below the under surface of the trough the screen may be readily withdrawn from the trough by handle 55.

In the manner described the screen may be moved over the articles to be dusted and the lengthwise position of the screen adjusted to supply articles of varying length with powder, without undue waste, that is, if it is desired to sprinkle an article or group of articles whose overall length is less than the length of the screen the article may be placed at one end of the trough 1 and the screen 6 moved towards it so that one end of the screen projects beyond the end wall of the trough. Then only such length of the screen is active as is necessary to sprinkle the article.

It is also a function of the invention to regulate the sidewise emission of powder so that the particular area to be covered may be determined. This is accomplished by regulating the position and length of the stroke of the agitator blade.

The driving mechanism for the agitator preferably is so arranged that the maximum stroke of the blade is equal to substantially half the width of the screen. This arrangement, of course, is merely for convenience as it is obvious that a maximum stroke of any length may be provided without departing from the spirit of the invention.

The screw nut 40 on rod 39 is adjusted at such a distance from the eccentric bolt 22 that, when the bolt is at its highest point, the blade 12 lies along the left edge of the screen 6 (Fig. 3). With the bolt at its lowest point, the blade is positioned substantially mid-way of the screen (Fig. 3). For each revolution of the shaft 9, the blade traverses this distance twice.

By screwing down nut 40, collar 42 and arm 35 are lowered so that, with bolt 22 at its highest point the blade 12 is located on the centre line of the screen. Subsequent motion of the bolt to its lowest position carries blade 12 over the right side of the screen (Fig. 4).

The length of the stroke of blade 12 may be altered by changing the distance of travel of disc 34. This in turn limits the travel of link rod 36 by which blade 12 is oscillated. This is accomplished by means of screw 28 the tip of which acts as a stop for disc 34. The lost motion between rod 39 and bell crank lever 32 is then consumed in compressing spring 44 on the upward motion of rod 39 which slides through collar 42 until washer 41 encounters the nut 40. Moving screw 28 inwardly against disc 34 lowers arm 35, and collar 42 thus decreasing the effective length of rod 39 between collar 42 and socket 38. Link rod 36 at the same time changes the position of the blade to the right.

It is evident, therefore, that by continued movement of the screw 28 against disc 34 the length of stroke of the blade may be reduced little by little until the motion of the blade is finally stopped. However, shaft 9 continues to revolve since rod 39 is free to move through collar 42.

It should be noted that spring 44 is of such strength that, under propulsion from disc 43, it will readily lift the arm 35 and its associated mechanism, but is not strong enough to prevent the rotation of shaft 9 when, by means of screw 28, the bell crank has been prevented from moving.

By quickly turning the screw 28 inwardly the duster is shut off easily and practically at once, while the machine, to which it is attached, works on without interruption.

In the modification of the invention as disclosed in Figs. 10–17 inclusive, the general principles involved are the same, but the driving shaft is mounted without the trough. This modification is especially useful for biscuit cutting machines and the like, in which a broad and continuous sheet of dough is to be sprinkled with flour.

The shaft 60 revolubly driven by any suitable means, rotates in bearing block 61 supported on angle iron 62 of framework 63. The motion of the shaft is transmitted by means of an eccentric bolt 98 and rod 93 (similar to bolt 22 and rod 39) to a bell crank 81. The latter is keyed at its fulcrum by means of a pin 82 to a shaft 64 extending lengthwise of the trough 1, suitably journalled in bearings 65 and 66 and held in position at either end by means of collars 79 and 81 and pins 80 and 82.

The agitator 7 comprises a thin strip-like blade 67 extending lengthwise of the trough and carried by means of holders 71 inserted respectively in the aligned openings 74 in shaft 64, and 72 in the sleeves 68 and its projections 70 and 73. The sleeves 68 are rigidly secured to shaft 64 by means of set screws 69. The holders 71 are screw threaded at their upper ends to receive screw nuts 75 and washers 76 and are surrounded at their points of contact with the blade by the discs 77 between which and the projections 70 springs 78 are arranged, thus pressing the blade gently against the screen.

The tip of thumb screw 85 turning in the screw threaded opening 84 in bracket 83 mounted on the end wall 3 of the trough is arranged to engage the disc like end 87 of the upwardly pointing arm 86 of the bell crank 81. Arm 86 is so arranged and of such length that it contacts with the tip of screw 85 in all positions.

Bell crank arm 88 is disposed sidewise and is reinforced at its end by a disc 89 having an opening 90 through which pin 91 extends horizontally from the collar 92 sliding on rod 93.

As described with respect to rod 39, there is provided for rod 93 a screw nut 94, washer 95, socket 96, and spring 100, all having similar functions to the corresponding parts associated with rod 39. Eccentric bolt 98 carries rotatably mounted thereon socket 96 and is so positioned on shaft 60 that blade 67 may sweep across the full width of screen 101. As before explained, tuning the nut 94 alters the position of the blade sidewise while adjustment of the thumb screw 85 controls the length of stroke of the blade and the starting and stopping of the agitator independently of the rotation of shaft 60.

While the screen construction shown in Figs. 1 to 9 may be equally well employed in this modification, a different arrangement has been shown, one which may be used effectually in dusting machines in which the material to be dusted passes beneath the screen of uniform width and in the same position on a conveyor. No provision, therefore, has been made for adjusting the position of the screen lengthwise. The screen comprises a plate 101, having perforations 102 extending practically its whole length, mounted on a frame 103 slidably mounted in recesses 104 at the sides of the opening 105 in the reinforced portion of the trough bottom 5. As before, the cross-section of the screen and frame is arcuate.

The screen is prevented from sliding too far inwardly by extending the lower part of end wall 3 to provide a support 106 on which the frame 103 rests. A handle 107 is provided at the other end of the frame to facilitate removal of the screen for cleaning and replacing.

Various forms of agitator blade may be employed in these agitators, that shown in Fig. 2 being a metal rod, while a metal strip is used in Fig. 11. Figs. 18, 19, and 20 disclose other forms. That of Fig. 18 comprises two thin strips of metal 108, gripped by holder 109 and enclosing a strip of leather or rubber 110. In Fig. 19 a small narrow brush 111 replaces the leather or rubber strip while a wedge 112 is shown in Fig. 20.

What I claim as new is:

1. In a flour dusting machine, a trough, recesses in the lower walls thereof, a screen comprising a thin perforated plate mounted on a surrounding frame adapted to slide shutter-like in said recesses, said frame extending beyond the end walls of said trough, means comprising an imperforate member at one end of said frame provided with a handle and a stop pin, an imperforate member at the other end of said frame, a spring secured to the bottom of said member and projecting therebeyond, and a removable stop block for controlling the distance said screen is adjusted.

2. In a flour dusting machine, a trough, recesses in the lower walls thereof, a screen,

a supporting frame for said screen adapted to slide shutter-like in said recesses, and a spring controlled stop adapted to engage the end wall of said trough for securing said frame in position.

3. In combination, a trough, a screen in said trough, an agitator blade adapted to move over said screen, a bell crank lever connected to said blade, a revolving shaft, means to drive said blade with a to-and-fro motion comprising a connecting rod between said shaft and said lever eccentrically connected with said shaft, and means for adjusting the effective length of said rod, whereby the position of said blade over said screen may be predetermined.

4. In combination, a trough, a screen in said trough, an agitator blade adapted to move over said screen, a bell crank lever connected to said blade, a revolving shaft, screw-controlled means for transmitting a to-and-fro motion to said blade from said revolving shaft, and a screw externally positioned on said trough and adapted to cooperate with one arm of said bell crank for limiting the motion thereof, thereby regulating the length of stroke of said blade.

5. In combination, a trough, a screen in said trough, an agitator blade adapted to move over said screen, a rotating shaft, a bell crank lever for imparting a to-and-fro motion to said blade, one arm of said lever being revolubly connected to a collar, a connecting rod eccentrically mounted on said shaft and adapted to slide through said collar, means to arrest the motion of said rod through said collar in one direction, thereby swinging said lever in that direction about its pivotal point, means comprising a yielding connection for swinging said lever in the other direction about its pivotal point, screw-controlled means for arresting the motion of said lever in the latter direction, thereby halting the movement of said agitator blade, and means for taking up the resulting lost motion of said shaft and rod.

6. In a flour dusting machine, a trough, a screen, a continuously revolving shaft, an agitator in said trough loosely mounted on said shaft and adapted to move to and fro independently thereof adjacent said screen, and means to translate the revolving motion of said shaft into a to-and-fro motion of said agitator.

7. In a flour dusting machine, a trough, a screen, a continuously revolving shaft, an agitator in said trough loosely mounted on said shaft and adapted to move to and fro independently thereof adjacent said screen, means to translate the revolving motion of said shaft into a to-and-fro motion of said agitator, and means to arrest the motion of said agitator independently of the motion of said shaft.

8. In a flour dusting machine, a trough, a screen through which the flour is dusted, an agitator mounted in said trough for movement across said screen, means for imparting a to and fro movement to said agitator comprising a revolving shaft having a crank, a lever, a connecting rod for imparting movement from said crank to said lever, an adjustable connection between said rod and said lever, a spring for permitting said lever to yield in one direction with relation to said rod, and adjustable means for limiting the movement of said lever in the other direction.

9. In a flour dusting machine, a trough, a screen through which the flour is dusted, an agitator mounted in said trough for movement across said screen, means for reciprocating said agitator comprising a revolving shaft, a lever, a connection between the lever and shaft for oscillating the lever, means for adjusting the connection between the shaft and the lever for adjusting the movement of the agitator, and adjustable means for partially or completely stopping the movement of the lever to adjust or stop the movement of the agitator.

10. In combination, a trough having a discharge opening, a screen covering the discharge opening in said trough, an agitator blade arranged to move to and fro across said screen, and means for moving said blade comprising a continuously revolving shaft, a connection between the shaft and the agitator comprising positive means for moving the agitator in one direction and yielding means for moving the agitator in the reverse direction, means for adjusting said connection, and an adjustable stop for limiting the movement of the agitator imparted by said yielding means.

11. In a flour dusting machine, a trough having a discharge opening, a screen covering the discharge opening in said trough, a continuously revolving shaft, an agitator in said trough and adjacent said screen loosely mounted on said shaft and means for transmitting a to and fro swinging motion to said agitator from said revolving shaft, comprising a lever, a connecting rod for oscillating said lever from the shaft, and a link connecting the lever with the agitator.

12. In a flour dusting machine, a trough having a discharge opening therein, a screen covering said opening, an agitator located in said trough and movable across said screen, lever mechanism operatively connected to said agitator and driven through a yieldable connection, and a stop member movable into engagement with said lever mechanism to stop the movement of said agitator.

13. In a flour dusting machine, a trough having a discharge opening therein, a screen covering said opening, an agitator located in said trough and movable across said screen, lever mechanism for operating said agitator, continuously operating yieldable

drive mechanism for said lever mechanism, and an adjustable stop member movable into engagement with said lever mechanism to stop movement of said agitator during the continued rotation of said drive mechanism.

Signed at Saginaw, county of Saginaw, Michigan, this 15th day of July 1925.

HENRY DEVLIN.