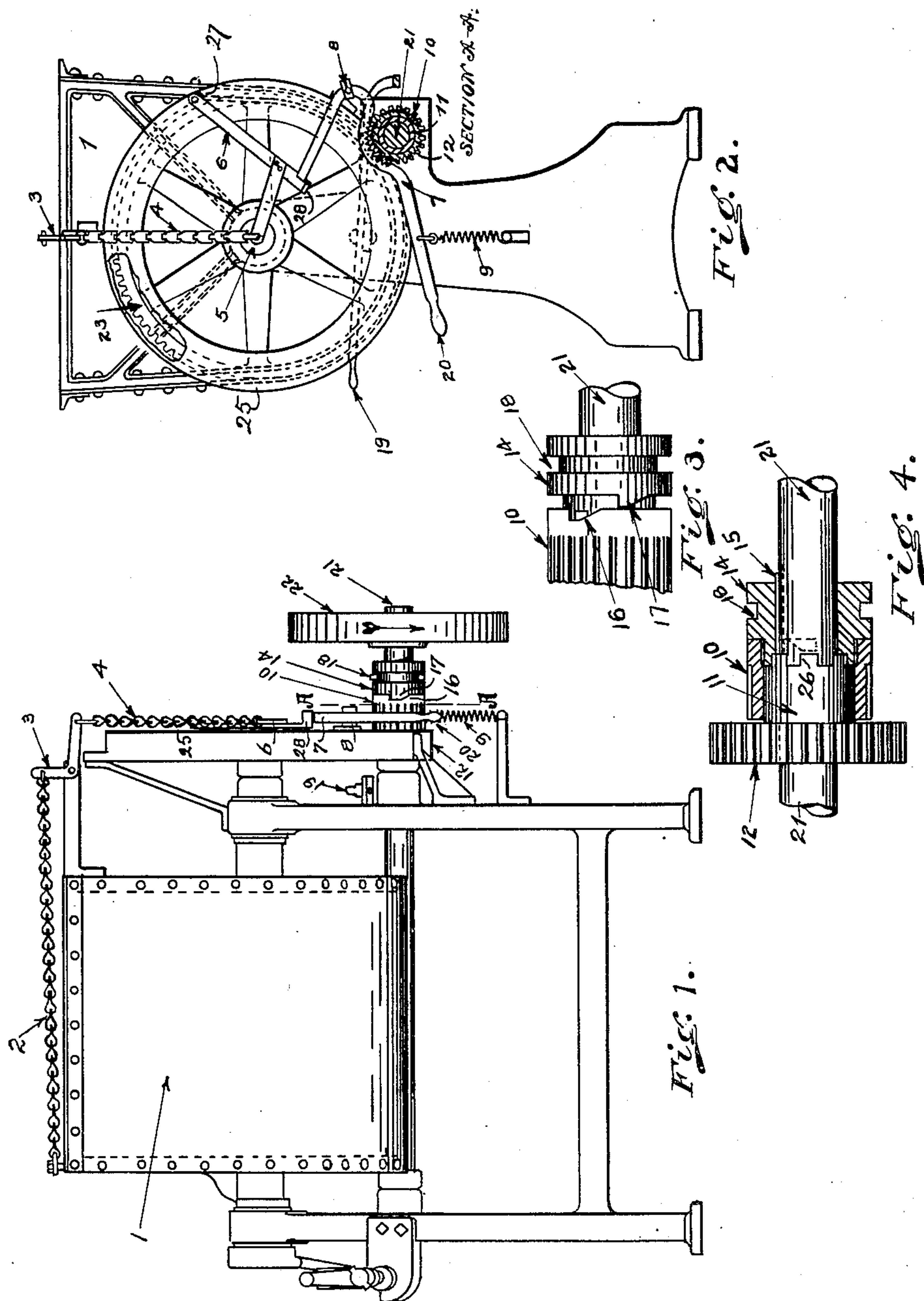


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SAFETY DEVICE.  
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969,318.

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# UNITED STATES PATENT OFFICE.

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## SAFETY DEVICE.

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*To all whom it may concern:*

Be it known that I, PAUL S. WARD, a citizen of the United States, and a resident of Covington, Kenton county, State of Kentucky, have invented certain new and useful Improvements in Safety Devices; and I do declare the following to be a clear, full, and exact description thereof, attention being called to the accompanying drawing, with the reference characters marked thereon, which forms also a part of this specification.

This invention relates to safety-appliances or guards intended to provide protection against possible injury liable to arise from any cause in connection with the handling of machinery, while in motion, as for instance inadvertent, accidental, or careless approach beyond safe limits of the moving machine-parts and where such machinery, by reason of position, construction, or manner of operation, cannot readily be incased.

My invention is particularly applicable to machines which do not require attendance in a certain particular manner and which do not operate with a certain fixed feed-motion, like presses for instance, where the operator is forced to occupy a certain fixed position to supply the machine. Mixing machines in general and particularly bakers' mixing machines involving an open trough in which kneading devices operate, belong to the class first referred to and here in view, because in such machines it is immaterial in what manner and from which position and from what side of the trough the materials to be mixed are supplied. These kneading-devices or arms are actuated by power-driven machine-elements and have been the cause of frequent accidents, since the trough in which they operate must of necessity be left open to permit observation of the operation and introduction of the materials to be mixed. The operation of such power-driven machinery is generally controlled by the means which control also the application of the power to it, clutches or other equivalent devices being used for the purpose.

My invention contemplates means embodying a safety-device of a certain construction which is operatively connected to this particular device (clutch) whereby the application of the power to the machinery and thereby the operation of this latter is

controlled, and which safety-device, when acted upon by abnormal conditions, or actions of the moving machinery, no matter from which direction is adapted to actuate automatically the power-controlling device, so as to cut off the power from the machine, to arrest thereby its further movement, preventing accidents and minimizing damages and serious consequences of irregularities.

In the following specification and particularly pointed out in the claims at the end thereof, will be found a full description of my invention, together with its operation, parts and construction, which latter is also illustrated in the accompanying drawing, in which:—

Figure 1, shows a front-view of a mixing-machine of the kind mentioned and provided with my safety-device. Fig. 2, is an elevation of that end of the same where the power is applied, it being the right end with reference to Fig. 1, parts of it being broken out and others shown in section taken on line A—A of Fig. 1. Fig. 3, shows on enlarged scale a clutch-device used in connection with the machine and whereby the application to it of the power is controlled. Fig. 4, shows this clutch in section and also one of the members of a gear-train whereby the internal stirring devices are rotated within the trough.

In the drawing, 1 designates the trough supported upon a suitable frame and serving to receive the materials to be mixed. These materials may be introduced from any side of the trough and no particular location is prescribed. Suitable stirring-devices (not shown) are provided within this trough and mounted upon a shaft 5, (see Fig. 2) whereby they are actuated. This shaft is driven by a gear-wheel 23, mounted upon it and inclosed by a gear-case 25, part of which is broken out in Fig. 2, to show this gear-wheel so incased. This gear-wheel is driven by a pinion 12, loosely mounted upon a shaft 21, supported upon the machine-frame. This shaft is power-driven, a pulley 22 being mounted upon it.

11 and 14, are complementary clutch-member having opposite clutch-faces 26, as shown in Fig. 4, the first forming a connected part of gear 12, so that both rotate together. The other clutch-part 14 is connected to rotate with power-driven shaft 21 by means of a spline 15, which permits lon-



longitudinal movement to either connect or disconnect the opposite clutch-faces. When connected as shown in Figs. 1 and 4, pinion 12 is locked to the power-driven shaft 21, and the stirring-devices within trough 1 are actuated. The adjusting movement of the clutch for this purpose is a positive one, being manually controlled by means of a lever 19, having the usual forked end which engages in a groove 18 of the movable clutch-member. These parts and their construction as described are of usual character found in this and in related classes of machinery and no novelty is claimed for them. To these devices I add the parts contemplated by my invention, they consisting of means whereby the clutch is also automatically controlled to cut out the power, such being done by a guard or safety-device properly located and which becomes active and moves the clutch in the manner stated whenever affected by an unusual or abnormal action of the machine or interfered with by an obstruction. The guard or safety-device, is flexible and in form of a chain 2, which is placed in a position where the nature of the machine requires it, viz. where accidents are most likely to occur. The location in this case is above the agitating devices operating in the open trough, and across which latter it is accordingly stretched as best shown in Fig. 1. One of its ends is connected to the trough and the other, by means of a bell-crank-lever 3 and intermediate mechanism, to the power-driven, movable clutch-member 14. This connection is of a nature that whenever guard 2 is acted upon in any manner which deflects it from its normal position in any direction, it will act by means of the bell-crank-lever and intermediate mechanism to be presently described, upon the movable clutch-member 14 in a manner to shift this latter out of contact with the other clutch-member. Instant stoppage of the moving machine-elements operating within trough 1 is the result. This intermediate mechanism consists of an arm 6, pivotally connected at one of its ends in a fixed position, to the gear-case for instance, as shown at 27. Its free end by means of a link 4 is connected to one end of bell-crank-lever 3, the other end of which is connected to guard 2. This arm is shaped to permit between its ends formation of a lateral projection 28 which serves as a catch to engage the free end of a trip-lever 7, pivotally supported by a bearing 8, which is connected to an immovable part of the machine, as to gear-case 25 for instance. This trip-lever has a handle 20, for manual manipulation.

Upon the loosely mounted clutch-member 11, there is loosely seated a collar 10, serrated on its outside and the relative positions of this collar and of trip-lever 7, are such that part of this latter is vertically

above the collar. This part is curved to be concentric with collar 10, and has on its underside serrations complementary to the serrations on the outside of collar 10. Normally the free end of trip-lever 7, rests upon catch 28 whereby the teeth on it are normally held out of contact with the teeth on collar 10 as shown in Fig. 2. This engagement with the catch is quite limited and is readily broken by a slight raise of arm 6, in case this latter is lifted by action of angle-lever 3 caused by interference with the position of the guard. This permits the free end of the trip-lever to slip off from the catch which detains it whereupon the serrated part of this lever drops upon collar 10 and engages the same. This drop may be accelerated by a spring 9. In the outer end of collar 10 there is a recessed cam-surface 16 of a shape best shown in Fig. 3, which in the driving position of the clutch is engaged by a complementary shaped cam-surface 17 on the movable clutch-member 14, as best shown in Fig. 1, the collar at this time rotating with this clutch-member. As soon however as the dropped trip-lever 7, prevents collar 10 from rotating with clutch-member 14, the latter, still moving on with the power-driven shaft, is forced laterally out of its position due to the particular, outwardly inclined shape of the opposite cam-surfaces. See Fig. 3. This lateral shift of clutch-member 14, separates it also from its complementary clutch-mate 11, whereby the power-driven operation of the moving machine-parts within trough 1, comes to a stop, the same as if the clutch had been positively operated by manipulation of clutch-lever 19. It will now be readily understood how any action affecting guard 2, in any manner and irrespective of direction will cause catch 28 to release the trip-lever and permit it to drop upon collar 10, causing this latter to break the clutch-connection. The machine may be readily started up again by re-locking the trip-lever to catch 28, its handle 20 being lifted up for the purpose, any causes having disturbed the normal position of guard 2 having first been removed. Thereafter the movable clutch-member 14 is again shifted into engagement with its mate 11, by means of clutch-lever 19, which is manipulated by hand in the usual way. While so shifted, the clutch-member first picks up collar 10 by inter-engagement of the opposite cams 16 and 17, after which the opposite clutch-faces 26 enter likewise into full reengagement. It is obvious that the clutch cannot be re-set, in the manner described, as long as the clutch-shifting collar 10 is prevented from rotation by the engagement with it of the trip-lever, from which it follows that this latter must always be lifted first which further implies restoration of the guard to normal conditions.



Troughs of mixing machines are usually supported for tilting, to permit evacuation of their contents, the tilting center being constituted by shaft 5, which forms the support for it. In such case the end of arm 6, where it connects to chain 4, should be in line with and opposite the tilting-center of the trough which is also the center of shaft 5, as best shown in Fig. 2. This prevents disturbance of the adjusted positions of the described clutch-releasing mechanism whenever the trough is tilted.

Having described my invention, I claim as new:

1. In a mixing machine, the combination of an open trough, machine-parts adapted to operate therein, a power-driven machine-element whereby they are moved, an adjustable device whereby the operative connection between the two is controlled, a flexible safety-appliance permanently attached at one of its ends in a fixed position and stretched transverse across the trough, and intermediate mechanism to which the other end of this appliance is attached and whereby it and the adjustable power-controlling device are operatively connected in a manner that any interference with the normal condition of the safety-appliance adjusts the power-controlling device to interrupt the operative connection between the power-driven machine-element and the machine-parts moved thereby.

2. In a mixing machine, the combination of an open trough, machine-parts adapted to operate therein, a power-driven machine-element operatively connected to these parts to move them, an adjustable device whereby this connection is controlled, a flexible safety-appliance stretched to extend across the trough above the operative machine-parts therein and mechanism to which one end of the appliance is attached and whereby it and the power-controlling device are connected and which, when the appliance is disturbed in any direction, operates the power-controlling device for the purpose of disconnecting the power-driven machine-element from the driven machine-parts.

3. In a mixing-machine, the combination of an open trough, agitating devices contained therein, a power-driven shaft to operate them, a clutch-device consisting of complementary members, one loosely mounted and one connected to rotate with the power-driven shaft, means to shift this latter clutch-member with reference to the loose clutch-member, a flexible safety-appliance stretched to extend across the open trough and mechanism whereby this appliance at one of its ends is operatively connected to the means for shifting the power-connected clutch-member and which mechanism, when actuated by reason of interference with the normal position of the appli-

ance operates to adjust the clutch-device to disconnect the power from the driven machinery.

4. In a mixing-machine, the combination of an open trough, agitating devices contained therein, a power-driven shaft to operate them, complementary clutch-members, one loosely mounted and one connected to the power-driven shaft, means to shift the connected clutch-member with reference to the loosely mounted clutch-member, a trip-lever which controls the operation of these means, a flexible safety-appliance stretched to extend across the open trough, and detaining means operatively connected to one end of the safety-appliance and adapted to prevent, under normal conditions, action of the trip-lever to operate the means for shifting the clutch-member.

5. In a mixing-machine, the combination of an open trough, agitating devices contained therein, a power-driven shaft to operate them, a clutch-device consisting of complementary members, one loosely mounted and one connected to the power-driven shaft and provided with a cam, a serrated collar provided with a cam complementary to the cam on the clutch-member, a trip-lever adapted to co-act with the collar mentioned for the purpose of adjusting the clutch by the action of the complementary cams, a flexible safety-appliance stretched to extend across the open trough, and a catch-device operatively connected to one end thereof and adapted to prevent under normal conditions this trip-lever to co-act with the collar.

6. The combination of an open mixing trough, a frame upon which it is supported in a manner permitting it to be tilted, agitating means supported in the trough, mechanism to rotate these means, a power-driven shaft, an adjustable controlling-device whereby the same is operatively connected to this mechanism, a trip-device adapted to actuate this controlling device, a catch which normally prevents action of the trip-device with reference to the controlling device, a safety-appliance disposed transversely with reference to the open trough and means connecting the same to the catch in a manner that any disturbance of its position causes said catch to release the trip-device, the point where these means connect to the catch being alined with and opposite the tilting-center of the trough, so that any adjustments of this latter on this center do not affect the relation between catch and trip-device.

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

PAUL S. WARD.

Witnesses:

A. M. PECK,

VINCENT H. BECKMAN.