Nov. 14, 1950 F. VETORINO 2,529,643

CYLINDER DOOR BAND LOCK

Filed Aug. 3, 1946

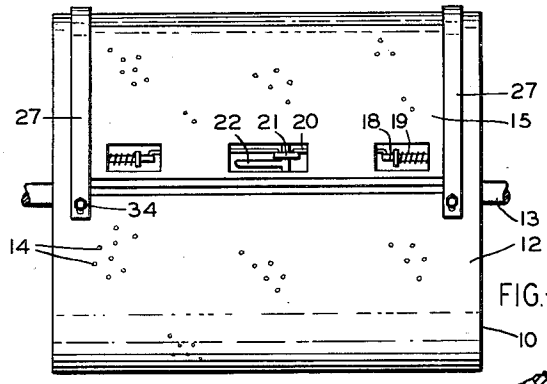


FIG.-1

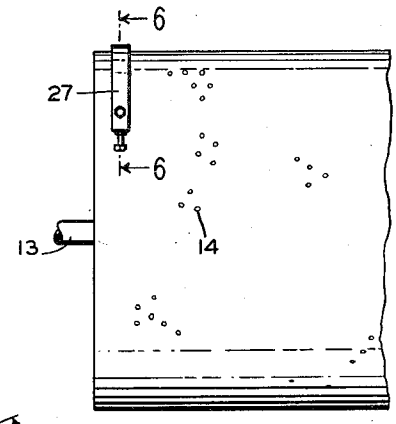


FIG.-2

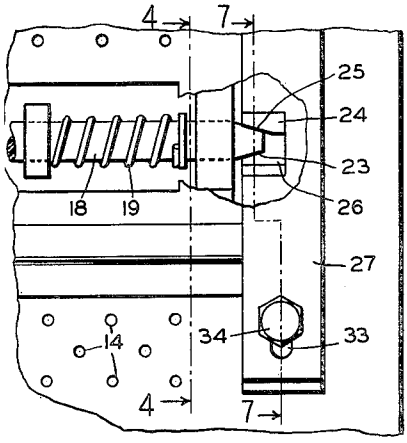


FIG.-3

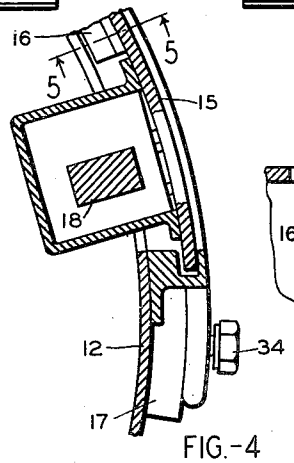


FIG.-4

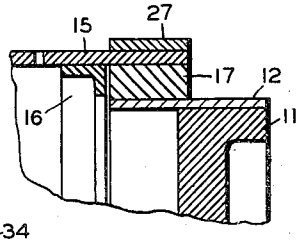


FIG.-5

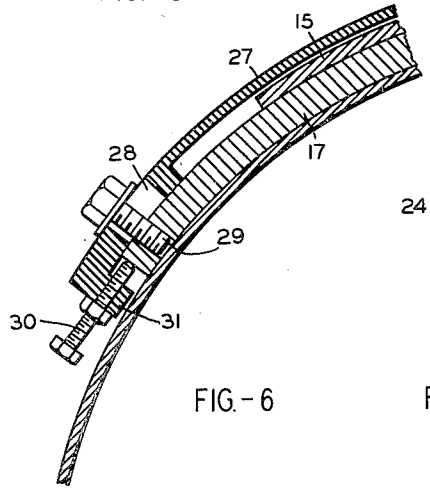


FIG.-6

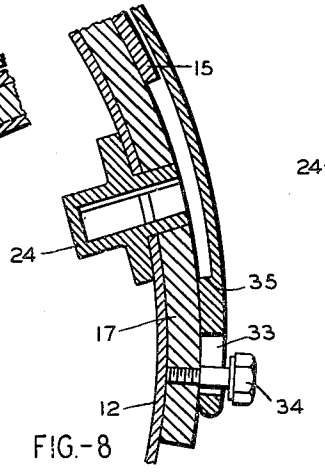


FIG.-8

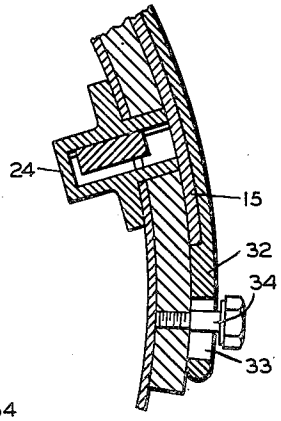


FIG.-7

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CYLINDER DOOR BAND LOCK

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5 Claims. (Cl. 220—41)

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The invention relates to apparatus for clamping and locking closed the doors of the work receiving cylindrical drums of washing machines, drying tumblers or like machines used in the laundry and dry cleaning industries.

In one common form of machines of this class, the work is held within a cylindrical drum having a charging opening in its cylindrical wall, the door for which slides in curved guides along the side edges of the opening. Some sort of lock is required to lock or hold the door closed, and usually clamping bands or straps are provided, effective upon the side edges of the door for clamping the door firmly and securely to the drum, thus avoiding chatter, vibration and wear, and preventing the work from being pinched beneath the door edges and thus possibly injured.

One object of the invention is to generally improve prior constructions for the purpose and to provide an extremely simple construction in which movement of the door itself toward closed position tightens the clamping bands, with such effect supplemented, where necessary or desirable, by the effect of the locking mechanism.

Another object is to provide improved mechanism of the character described in which a locking bolt, carried by the door, is effective, not only to lock the door, but also to complete the last stages of its movement to fully closed position, and the clamping effect is produced entirely by door movement.

Further objects of the invention in part are obvious and in part will appear more in detail hereinafter.

In the drawings, Fig. 1 represents a front elevation of a washing machine drum or cylinder, with the door in closed, locked position;

Fig. 2 is a rear elevation of one end of the cylinder;

Fig. 3 is a detail plan view, on a larger scale, of one corner of the closed and locked door, parts being broken away;

Fig. 4 is a detail sectional view on the line 4—4, Fig. 3;

Fig. 5 is a cross section on the line 5—5, Fig. 4;

Fig. 6 is a sectional elevation, on a larger scale, on the line 6—6, Fig. 2, but showing the door open;

Fig. 7 is a sectional elevation on the line 7—7, Fig. 3; and

Fig. 8 is a similar section, but showing the door partly open.

The invention may be used in any machine including a rotatable work containing cylinder or

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drum provided with a sliding door, such as a drying tumbler or a washing machine used in laundries or dry cleaning plants. For convenience, and in no sense of limitation, the invention has been shown applied to a washing machine.

Referring to Figs. 1 and 5, 10 indicates generally a washing machine drum consisting of two circular end heads 11 supporting a cylindrical wall 12. The drum heads are provided, centrally, with shaft or trunnion members 13, by means of which it is supported for rotation about its central longitudinal axis. Since the machine shown is a washing machine the cylindrical wall 12 is made of plate metal provided with perforations 14 for the circulation or flow of the cleaning liquid therethrough. The charging opening in the cylindrical wall of the drum, through which work is introduced into and removed from its chamber, is closed by a sliding door 15, usually also made of perforated plate metal. A lateral door guide 16 is usually provided along each of the side edges of the door opening, and the door plate extends beyond the guide, as shown in Fig. 5, lying above a guide strip or track member 17, welded or otherwise solidly secured to the wall 12.

Near its lower edge the door is provided with two locking bolts 18, movable inwardly and outwardly, horizontally, one at each end of the door. These bolts, and their operating mechanism, generally speaking, may be of any suitable or conventional form, such as shown for example in Patent No. 1,964,114, granted June 26, 1934, to Frank A. Gerlach and John Bohlander. As shown, the bolts are biased to outward, or locking position, by compression springs 19 and are connected by links 20 to an operating member 21 actuated by a handle 22 which, in locked position of the door, lies within a recess or cavity beneath the exposed surface of the door plate. The outer ends of the bolts, in the present construction, are tapered or beveled on their front and rear surfaces, as shown at 23, two bevels being provided on opposite faces to enable the bolt to be turned over to supply a new working face, when one thereof becomes worn. At two points along the side edges of the door opening, one near the lower edge of the opening and another further back, the track member 17 is provided with a keeper 24 to receive the locking end of the bolt, the rear face 25 of the recess 26 of said keeper being beveled to correspond with the bevel of the bolt, as shown in Fig. 3. The lower keepers are used to lock the door in closed position and

the upper keepers to lock it in open position, during loading and unloading of the drum.

As before stated the side edges of the door travel above and along the track member 17. They also lie beneath clamping bands 27, which are narrow strips of heavy sheet metal and which serve, when the door is closed, to clamp its side edges to the track member 17 and thus prevent chatter and jar and possible pinching or wear of work between the door and drum. Each clamping band 27, at its rear end, is provided with an elongated opening 28 through which a clamping bolt 29 may be screwed into the track member 17 there firmly securing the rear end of the clamping band in place. An adjusting screw 30 is mounted in a projection 31 at the rear end of the band, by means of which the band may be adjusted longitudinally to any desired position in which full clamping effect is secured when the door reaches home position, as will later appear.

The front end of each clamping band is provided with a thickened portion 32 (Fig. 7) having an elongated slot 33 through which extends the shank of a bolt 34. This is not a clamipng bolt, but a simple guide to confine the front end of each clamping band, but yet permit it to have longitudinal or fore and aft motion. The thickened portion 32 of each band provides a shoulder or abutment 35 adapted for engagement with the lower or front edge of the sliding door, as shown in Fig. 7.

With this arrangement, assuming the door open and held open by engagement of its bolts in the upper keepers, when a load of work has been introduced into the drum, the handle 22 is actuated to withdraw the bolts from the upper keepers. Then the door is moved down toward closed position. This is a heavy door, requiring a little effort to start it. But when its closing motion is started it moves toward closed position with considerable momentum. As it reaches closed position the ends of its front edge engage the abutments 35 of the two clamping bands, and move those bands forwardly or downwardly, or in the direction in which the door is moving, thus tightening the bands and firmly clamping the door to the tracks on which it travels. Usually the momentum of the door itself is sufficient to produce a satisfactory clamping effect. However, when door movement stops, the lock operating handle 22 is released, whereupon springs 19 advance the locking bolts into locking position. The beveled rear surfaces of the bolts, as they enter the keeper recess 26 engage the beveled faces of the keeper recesses, thus exerting an additional tendency to further move the door forwardly or in the door closing direction, thus increasing the clamping effect.

Usually, when the door is open, the clamping band lies in loose contact with the guide 17 or may even bulge slightly away from the guide, as shown in Fig. 8. Adjusting screws 30 may be manipulated to vary the position of the clamping bands, so that as the bands are being applied, the slots 33 lie in such position as to permit full band movement from the position shown in Fig. 8 to that shown in Fig. 7, thus securing maximum clamping effect.

As before stated the clamping effect is produced entirely by door motion, or in other words, the door itself actuates the clamping bands. However, locking bolts, carried by the door itself, are also utilized to produce a clamping effect, in addition to their ordinary function of locking the door.

The construction is quite simple, but yet is efficient and satisfactory and will operate as intended over long periods of time without requiring attention. But if wear occurs, as upon the ends of the locking bolts, the bolts readily may be turned over to present new surfaces to the keeper members.

Further advantages of the invention will be apparent to those skilled in the art.

What I claim is:

1. In combination, a work holding drum having a cylindrical wall provided with a charging opening, a door for said opening slidable circumferentially of the drum, and a clamping band mounted on the drum and extending over a side edge of the door, said door and band being provided with cooperating engaging abutment members, the band member of which lies in the path of closing movement of the door member, whereby during the final stage of travel of the door to door closed position the said door member engages and advances the band member and thus clamps the band tightly upon the door.

2. In combination, a work holding drum having a cylindrical wall provided with a charging opening, a door for said opening slidably circumferentially of the drum, a clamping band mounted on the drum and extending over a side edge of the door, said door and band being provided with cooperating interengaging abutment members so located and arranged that during final stage of door closing movement the door abutment member engages the band abutment member and thereby tightens the clamping band upon the door, and interengaging door locking parts on the door and drum including beveled surfaces so arranged that advance of the locking parts to locking position completes door closing movement and thereby produces maximum clamping effect of said band upon the door.

3. In combination, a work holding drum having a cylindrical wall provided with a charging opening, a door for said opening slidable circumferentially of the drum, and a clamping band mounted on the drum and extending over a side edge of the door, said band having one end fixed to the drum and the other end freely movable longitudinally of the band, and being provided near its freely movable end with an abutment located in the path of movement of a part of the door when it closes, whereby closing door movement applies the band to the door and clamps it firmly to the drum.

4. In combination, a work holding drum having a cylindrical wall provided with a charging opening, a door for said opening slidable circumferentially of the drum, a clamping band mounted on the drum and extending over a side edge of the door, said band having one end fixed to the drum and the other end freely movable longitudinally of the band, and being provided near its freely movable end with an abutment located in the path of movement of a part of the door when it closes, whereby closing door movement applies the band to the door and clamps it firmly to the drum, a beveled locking bolt mounted upon the door, and a keeper therefor mounted upon the drum in such position that advance of the bolt to locking position completes door closing movement and also produces maximum clamping effect of said band.

5. In combination, a work holding drum having a cylindrical wall provided with a charging

opening, a door for said opening slidable circumferentially of the drum, cooperating relatively movable locking members on the door and drum one of which includes a beveled surface arranged to complete door closing movement as the locking members move relatively toward door locked position, and a movable door clamping device having an abutment member located in the path of closing movement, circumferentially of the drum, of a part of the door, whereby as the door completes the final stage of its circumferential closing motion said part engages the said abut-

ment and actuates the clamping device to clamp the door in closed position.

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