April 21, 1942. G. JAEGER ET AL 2,280,513

DOOR STRUCTURE FOR MIXERS

Filed April 21, 1941 2 Sheets-Sheet 1

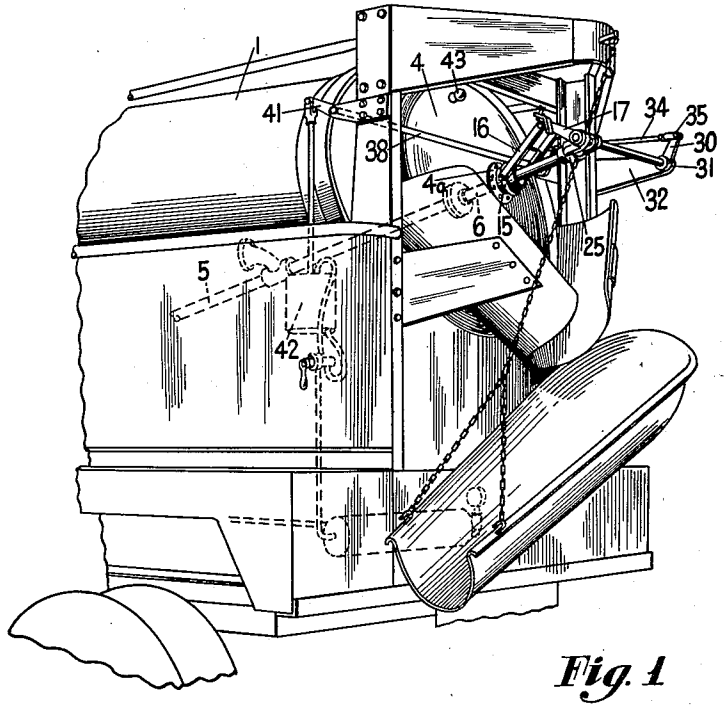


Fig. 1

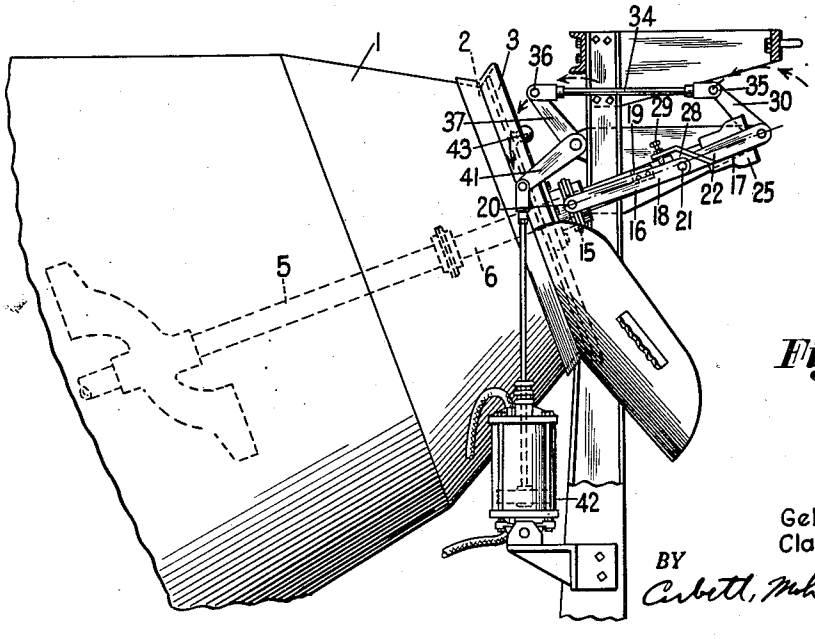


Fig. 2

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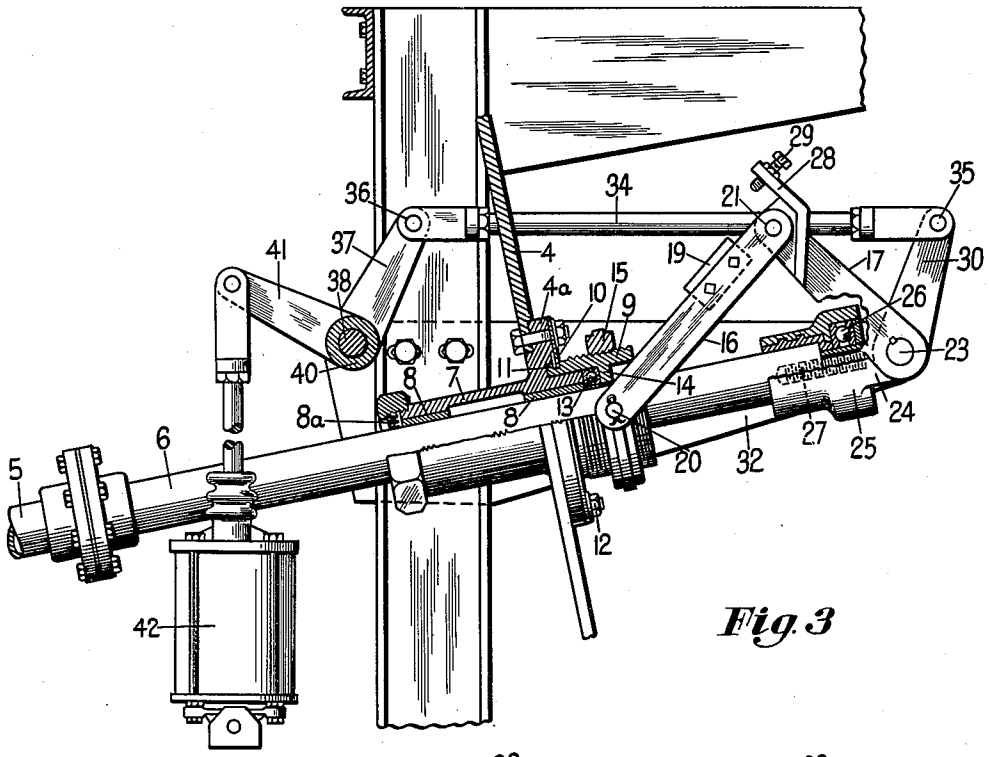


Fig. 3

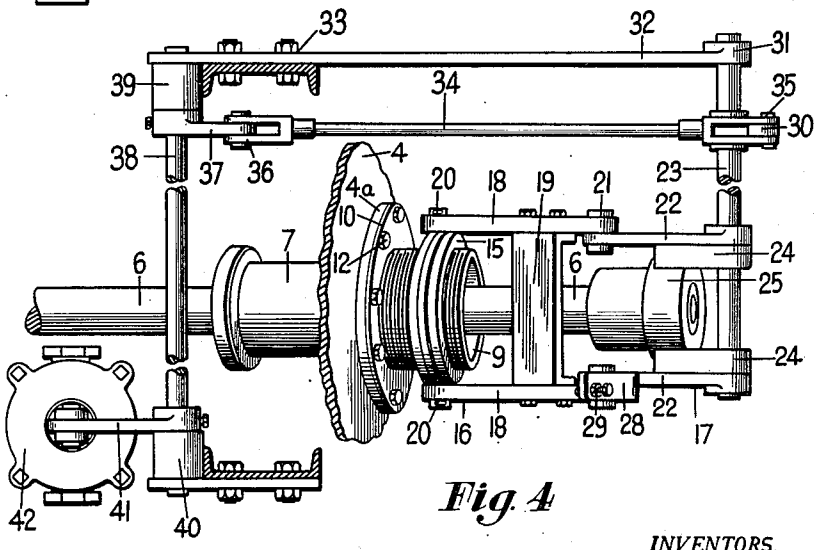


Fig. 4

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DOOR STRUCTURE FOR MIXERS

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Application April 21, 1941, Serial No. 389,592

7 Claims. (Cl. 259—176)

Our invention relates to a door structure for mixers. It has to do, more particularly, with the discharge door structure of a concrete mixer of the truck mixer type although it is not necessarily limited thereto.

In the co-pending application of Jaeger, Bohmer and Gerst, Serial No. 349,556 filed August 2, 1940, a vacuum operated door structure is disclosed which includes a toggle lock for holding the door in its closed position. Although the lock disclosed in said co-pending application works satisfactorily under normal conditions, we have found that there are some conditions encountered during use of it when it is not entirely satisfactory. The lock disclosed in said application is carried by part of the frame of the truck mixer. As long as the frame is not distorted or knocked out of line during use of the mixer, the lock is entirely satisfactory. However, if the frame becomes distorted or out of line, the lock does not work properly.

One of the objects of our invention is to provide a lock structure for a truck mixer door which is preferably of the toggle type and which is a self-contained unit supported independently of the truck mixer frame.

Another object of our invention is to provide a self-contained lock which is very effective for operating the door and which is very rugged and of such a nature that it will always function to effectively seat the door.

The preferred embodiment of our invention is illustrated in the accompanying drawings wherein similar characters of reference designate corresponding parts and wherein:

Figure 1 is a perspective view of the rear end of a truck mixer showing our toggle lock applied to the discharge door structure thereof.

Figure 2 is a side elevation showing our toggle lock structure.

Figure 3 is a detail partly in side elevation and partly in vertical section showing our toggle lock structure.

Figure 4 is a plan view of the structure shown in Figure 3.

With reference to the drawings, we have illustrated in Figure 1 a portion of a truck mixer which includes a rotatable mixing drum 1 of the usual type driven in any suitable manner. The rear end of the mixing drum has a discharge opening 2 (Figure 2) which is surrounded by an inclined annular flange 3 which is adapted to serve as a seat for the disc-like door 4. Supported centrally within the drum 1 is a water supply pipe 5. The rear end of this water supply pipe 5 is adapted to support the disc door 4.

The pipe 5 has a rearwardly extending extension 6 which projects through the opening 2 and is centrally disposed therewithin. This section 6 is in the form of a solid shaft which not only supports the door 4 but also supports the toggle lock and associated parts which we provide for controlling the door. For mounting the door 4 on the shaft 6 for movement between closed and opened positions, we preferably provide the structure illustrated best in Figures 3 and 4. As shown in these figures, the disc 4 has attached thereto at a central point a casting 4a which has an integral hub portion 7. The hub 7 is rotatably mounted on shaft 6 by means of a bronze bearing 8. A spring gasket 8a is incorporated in the inner end of the hub 7. The outer portion of the hub 7 has an exteriorly threaded sleeve 9 mounted thereon. This sleeve 9 is held in position on the outer end of hub 7 by means of a thin collar 10 which projects into an annular groove 11 formed in the inner end of sleeve 9. The collar 10 is bolted to casting 4a and disc door 4 by means of bolts 12. Thus, relative rotation of the sleeve 9 and the door structure will be permitted while the sleeve will always be kept in proper association with the door structure. A thrust bearing 13 of the ball bearing type is provided between the outer end of hub 7 and an inwardly projecting annular shoulder 14 formed on the sleeve 9.

The sleeve 9 has a threaded collar 15 mounted thereon. By rotating the collar 15 on the sleeve 9, its position on the sleeve may be changed. One link 16 of a toggle lock structure is connected to the collar 15 while the other link 17 is connected to the outer end of shaft 6. The link 16 consists of a pair of spaced arms 18 (Figure 4) which are connected in spaced relationship by means of a bracket 19. The inner ends of the arms 18 are pivotally connected at diametrically opposed points, as at 20, to the collar 15. The outer ends of the arms 18 are pivotally connected, as at 21, to the inner ends of a pair of spaced arms 22 which form the toggle link 17. The outer ends of the arms 22 have openings formed therein through which a transversely extending shaft 23 passes. The arms 22 are keyed on the shaft 23. This shaft 23 is rotatably carried by rearwardly extending bearing portions 24 which are formed at diametrically opposed points on the rear end of a sleeve member 25. The sleeve member 25 is rotatably carried by a ball bearing structure 26 which is held in posi-

tion on the rear end of shaft 6 by means of a screw 27. Thus, the sleeve 25 and the sleeve 9 which carry the toggle lock structure are supported on the shaft 6 in such a manner that rotation of the shaft is permitted without affecting the sleeves. One of the arms 22 of the toggle link 17 is provided with an extension 28, adjacent the pivot 21, which carries a set screw 29 adapted to serve as a stop to limit downward swinging movement of the links 16 and 17. At the extent of this movement, the screw will contact with the upper edge of the adjacent arm 18 of link 16. The screw is preferably so adjusted that when the toggle links 16 and 17 are swung downwardly to their final position, the pivot 21 will be below a line passing through the pivot points 20 and 23. Thus, the links will tend to remain in such positions.

The toggle lock is operated by means of the shaft 23. This shaft has an upstanding arm 30 keyed thereto adjacent its outer end. The extreme outer end of the shaft 23 fits in a bearing portion 31 carried on the rear end of a bar 32 which serves to brace the outer end of the shaft. This bar 32 is secured to a portion of the frame of the truck mixer, as at 33. A link 34 has its rear end pivotally connected to the upper end of arm 30, as at 35. The forward end of this link 34 is pivotally connected, as at 36 to the upper end of an arm 37 which is keyed on a transversely extending shaft 38. This shaft 38 is rotatably supported in a bearing 39 carried by bar 32 and a bearing 40 carried by the frame of the truck mixer. The shaft 38 has another arm 41 keyed thereto which is connected to a vacuum cylinder unit 42 which serves to rotate the shaft 38 and thereby operate the toggle lock. The vacuum cylinder unit 42 may be controlled in the manner set forth in said co-pending application, Serial No. 349,556.

In the operation of this door structure, it will be apparent that by properly controlling cylinder unit 42, the shaft 38 will be rotated and this will cause rotation of shaft 23. Rotation of shaft 23 will operate the toggle lock and will cause the door 4 to slide axially of the shaft 6 between open and closed positions. When the door reaches closed position, the pivot point 21 will be below pivot points 20 and 23 and, consequently, the door will be locked in position without maintaining vacuum in the unit 42. To adjust the effective length of the toggle lock it is merely necessary to rotate sleeve 9 and collar 15 relative to each other. During normal operation, the shaft 6 will rotate with the drum 1 and the door 4 will also rotate therewith. The sleeve 9 and sleeve 25 and, consequently, the toggle lock and associated parts will now rotate with the drum. As the door 4 nears closed position, it may be rotated relative to shaft 6 by means of a handle 43 in order to clean the door seat. This rotation may be effected without disturbing sleeve 9.

It will be apparent that all parts of the toggle lock and door control are supported by the shaft 6. Consequently, the unit is self-contained and its operation will not be affected by distortion of the truck mixer frame.

Various other advantages will be apparent from the preceding description, the drawings and the following claims.

Having thus described our invention, what we claim is:

1. In combination with a mixer having a frame carrying a drum having an opening formed therein, a door for movement between closed and opened positions relative to said opening, a support independent of said frame associated with said opening for supporting said door for such movement, and a toggle lock structure carried by said support independently of said frame.

2. In combination with a mixer having a frame carrying a drum having an opening formed therein, a door for movement between closed and opened positions relative to said opening, a centrally disposed support independent of said frame projecting through said opening and supporting said door for such movement, and a toggle lock structure connected to said door and to said support and supported by said support independently of said frame.

3. In combination with a mixer having a frame carrying a drum having an opening formed therein, a door for movement between closed and opened positions relative to said opening, a centrally disposed shaft supported independently of said frame projecting through said opening and supporting said door for axial movement thereon, a toggle lock structure for controlling opening and closing of the door, said toggle lock structure including a link connected to the door and a link connected to said shaft and being supported by said shaft independently of said frame, and means for operating said toggle lock structure.

4. In combination with a mixer having a frame carrying a drum having an opening formed therein, a door for movement between closed and opened positions relative to said opening, a centrally disposed shaft supported independently of said frame projecting through said opening and supporting said door for axial movement thereon, a toggle lock structure for controlling opening and closing of the door, said toggle lock structure including a link connected to the door and a link connected to said shaft and being supported by said shaft independently of said frame, said link connected to the door being connected thereto by means adjustable to vary the effective length of said link.

5. In combination with a mixer having a frame carrying a rotatable drum having an opening formed therein, a door for movement between closed and opened positions relative to said opening, a centrally disposed shaft supported independently of said frame projecting through said opening and being rotatable with said drum, a door mounted on said shaft for axial movement thereon, a toggle lock structure for controlling opening and closing of the door supported by said shaft independently of said frame, means for connecting said toggle lock structure to the door and to said shaft, said means comprising a sleeve which is connected to one of the toggle links and is connected to said door for relative rotary movement, said sleeve being supported on said shaft for axial movement, and a second sleeve connected to the other of the toggle links and being mounted on said shaft for rotary movement relative thereto in a fixed axial position, and means for operating said toggle lock structure.

6. In combination with a mixer having a frame carrying a rotatable drum having an opening formed therein, a door for movement between closed and opened positions relative to said opening, a centrally disposed shaft supported independently of said frame projecting through said opening and being rotatable with said drum, a door mounted on said shaft for axial movement thereon, a toggle lock structure for

controlling opening and closing of the door supported by said shaft independently of said frame, means for connnecting said toggle lock structure to the door and to said shaft, said means comprising a sleeve which is connected to said door for relative rotary movement and which is free to move axially of said shaft, a collar adjustable axially on said sleeve pivotally connected to the free end of one of the links of said toggle lock structure, and a second sleeve mounted on said shaft for rotary movement relative thereto in a fixed axial position and being pivotally connected to the free end of the other link of said toggle structure, and means for operating said toggle lock structure.

7. In combination with a mixer having a frame carrying a rotatable drum having an opening formed therein, a door for movement between closed and opened positions relative to said opening, a centrally disposed shaft supported independently of said frame projecting through said opening and being rotatable with said drum, a door mounted on said shaft for axial movement thereon, a toggle lock structure for controlling opening and closing of the door supported by said shaft independently of said frame, means for connecting said toggle lock structure to the door and to said shaft, said means comprising a sleeve which is connected to said door for relative rotary movement and which is free to move axially of said shaft, a collar adjustable axially on said sleeve pivotally connected to the free end of one of said links of said toggle structure, and a second sleeve mounted on said shaft for rotary movement relative thereto in a fixed axial position and being pivotally connected to the free end of the other link of said toggle structure, means for operating said toggle lock structure, and an adjustable means associated with the pivoted ends of said toggle link structure for limiting relative movement of said links.

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