M. M. SUPPES.

SAFETY DEVICE FOR METAL MIXERS.

APPLICATION FILED JULY 27, 1910.

978,675.

Patented Dec. 13, 1910.

2 SHEETS—SHEET 1.

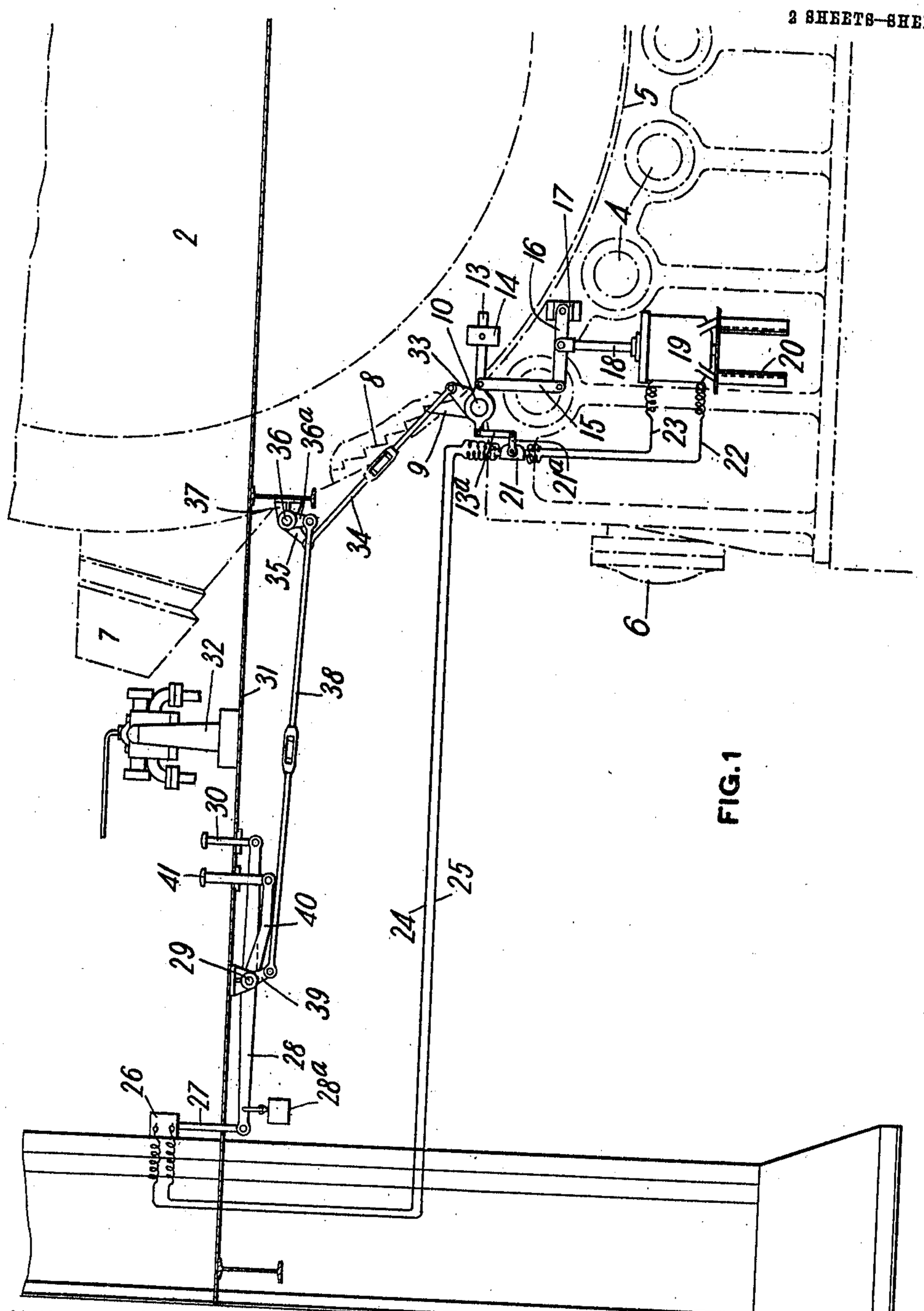

FIG.1

WITNESSES

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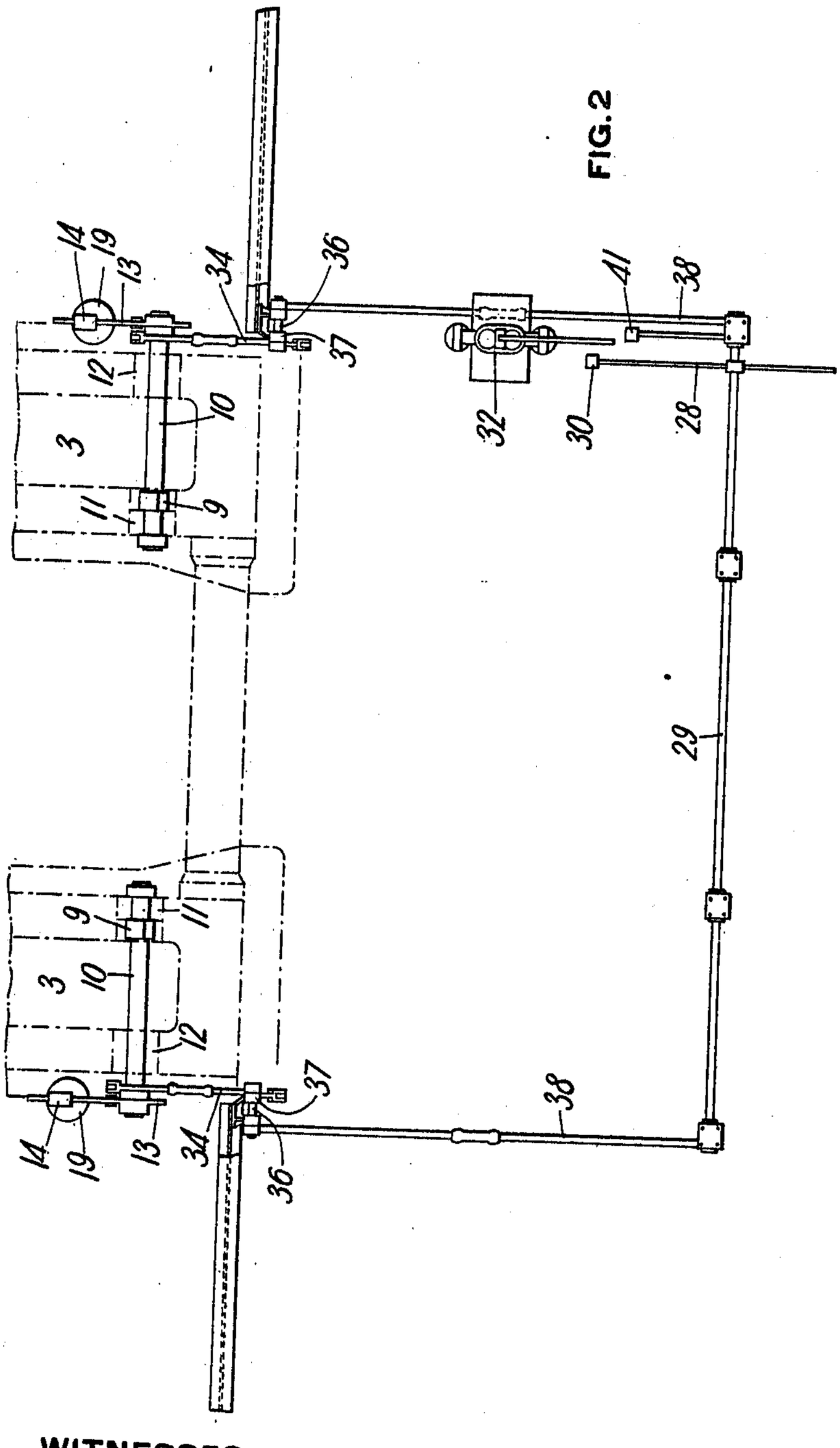
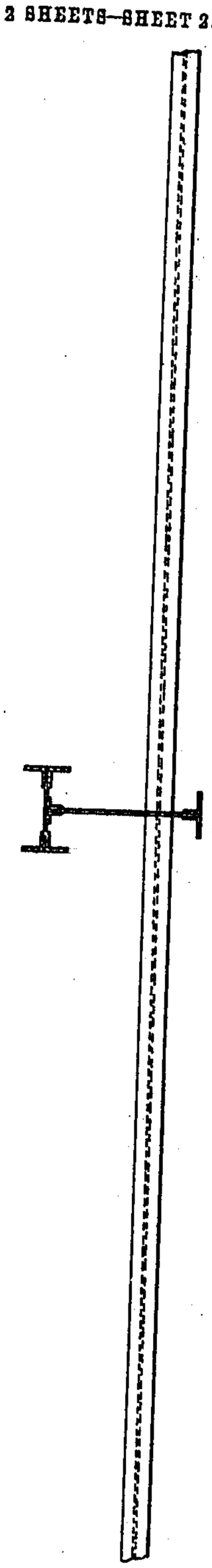
2 SHEETS—SHEET 2.

FIG. 2





WITNESSES

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UNITED STATES PATENT OFFICE.

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SAFETY DEVICE FOR METAL-MIXERS.

978,675. Specification of Letters Patent. **Patented Dec. 13, 1910.**

Application filed July 27, 1910. Serial No. 574,074.

To all whom it may concern:

Be it known that I, MAX M. SUPPES, of Elyria, in the county of Lorain and State of Ohio, have invented a new and useful Safety Device for Metal-Mixers, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this specification.

My invention relates to the operation of metal mixers and similar metallurgical vessels used for refining, storing or handling molten metal, and arranged to be tilted or rotated in being emptied.

One object of my invention is to provide a safety device for controlling the tipping or turning movement of such vessels, and for preventing tipping or rotation of the vessels except at times when such movement is desired and is being made at the will of the operator.

Another object of the invention is to provide mechanism for operating the safety device having power means for moving the locking mechanism into its inoperative position and having means whereby the apparatus is held by the operator in inoperative position until released.

A further object of this invention is to provide a safety device having means by which it is automatically moved into and maintained in its operative locking position, except when prevented from moving into such position by the operator.

In the accompanying drawings, Figure 1 is a sectional side elevation showing a rotating metal mixer having a safety locking device constructed and arranged in accordance with my invention. Fig. 2 is a plan of the apparatus shown in Fig. 1 showing the construction and arrangement of the safety device, in operative position, as applied to a metal mixer, the mixer vessel being indicated in broken lines in the drawings, for the sake of clearness.

Referring to the drawings, 2 designates a cylindrical metal mixer or other metallurgical vessel used as a container for molten metal and 3, 3, are cradles each having antifriction rollers 4 which are arranged to engage with the track rings 5, 5, on the periphery of the vessel. The vessel 2 is provided with the usual refractory lining and the customary charging and pouring openings through which the metal is charged and withdrawn. The vessel shown is rotatably mounted upon the cradles 3, 3, a piston in the fluid pressure cylinders 6, forming the mixer turning mechanism, being operatively secured to the vessel for that purpose. This construction being old and well-known is not further described. The vessel 2 is provided with a pouring spout 7 through which the metal is poured when the spout 7 is depressed or lowered by rotating the vessel 2 on the cradles 3 in emptying metal from the vessel.

On the periphery of the vessel and on each side of the vessel, a series of ratchet teeth 8 are provided which coöperate with the tilting pawls 9 to form the safety locking device by which the vessel is held against rotation, these pawls being mounted upon the rocking shafts 10 which are secured in bearings 11 and 12 provided in a suitable location on the stationary cradles 3.

Secured on the outer ends of the rocking shafts 10 are the lever arms 13, each having a counter-weight 14 adjustably secured thereon. The arms 13 are keyed or otherwise secured to the shafts 10 so as to rock therewith and connected to the lever arms 13 by links 15 are lever arms 16, one end of these arms being pivoted to the brackets 17 which are secured on the cradles 3. The arms 16 are connected at an intermediate point in their length by rods 18 to the cores of the solenoids 19 secured on the brackets 20 which are mounted on the side of the cradles 3. Also secured on the cradles 3 are the electric switches 21 which are connected by the wires or conductors 22 and 23 with the coil of the solenoids 19. The switches 21 are also connected by feed wires 24 and 25 with a second switch 26 which is mounted in a suitable location adjacent to the place at which the operator is stationed. The operating mechanism for these switches 21 is connected by the switch arm 21^a and link 13^a to one end of the pivoted lever arms 13, these switches being provided for a purpose hereinafter described.

The operating mechanism of the switch 26 is connected by a link 27 with one end of the lever 28 which is pivotally mounted on the shaft 29, and the opposite end of the lever 28 is connected to a pin 30 forming a treadle which projects upwardly through the operating platform 31 at a point adjacent to the operating valve 32 by which the supply of fluid pressure to the cylinders 6 is controlled in tipping or rocking the ves-

sel 2. Also secured on the end of the shafts 10 are the lever arms 33, the outer ends of which are connected by the rods 34 with one end of a lever arm 35, which is pivoted on the pins or shafts 36 which are mounted in the brackets 37, these brackets being secured to a supporting beam for the operating platform 31. The shafts 36 have keyed thereto the levers 36[a] which are connected by rods 38 with the outer ends of lever arms 39 which are keyed or otherwise secured to the pawl operating shaft 29. A lever arm 40 is also keyed or otherwise secured to the shaft 29 and one end of the lever arm 40 extends into proximity to the pin or treadle 30 and is provided with a similar pin or treadle 41 which also extends upwardly through the floor of the platform 31.

The operation of my improved apparatus is as follows: The mixer vessel 2 is rotated or tipped on the cradles 3 by means of the fluid pressure cylinders 6 at the will of the operator when fluid pressure is admitted to one or the other of the cylinders 6 through the operating valve 32. When it is desired to lower the pouring spout 7 on the vessel 2 so as to pour metal therefrom, the operator will tread upon and depress the treadle 30. This movement of the treadle 30 through the lever 28 and connecting rod 27, will throw the electric switch 26 into position so as to energize the coils of the solenoids 19. When these coils are energized, the solenoid cores will be lifted and through the connecting rods 18 will raise the outer ends of the pivoted lever arms 16, and through the connecting links 15, lift the counter-weight end of the lever arms 13 on the shafts 10. This movement of the solenoid cores moves the shafts 10 so as to throw the pawls 9 out of engagement with the ratchet teeth 8. The movement of the pawls 9 out of engagement with the ratchet teeth 8 will, through the shaft 10, lever arm 33, connection 34, the lever arms 35 and 36[a], connection 38 and lever arms 39 and 40, move the treadle 41 into its depressed position. The operator then removes his foot from the treadle 30 to the treadle 41 so as to hold the pawl 9 out of engagement with the ratchet teeth 8, the lever 28 then being returned to its normal position by the counter-weight 28[a]. As the counter-weight end of the lever arm 13 is lifted its opposite end is lowered and, through the connecting link 13[a] and arm 21[a] on the switch 21, shuts off the supply of current to the solenoid coils 19, in this way preventing overheating or possible burning out of these coils by continued use. When it is desired to again lock the vessel in the desired position, the operator will remove his foot from the treadle 41. The counter-weights 14 on the ends of the counter-weight levers 13 will then act to rock the shafts 10 and move the pawls 9 into engagement with the ratchet teeth on the vessel 2 and these counter-weights together with the counter-weight effect of the solenoid cores, will then hold the pawls in locking engagement with the ratchet teeth until again caused to move outwardly by the operator.

It will be noted that by reason of the shape of the ratchet teeth, the mixer or vessel can be moved to elevate the pouring spout 7 without moving the pawls outwardly by means of the pawl operating mechanism.

The above described operations are repeated from time to time, when it is desired to move the mixer vessel on its cradles to pour metal out of the vessel.

The advantages of my invention will be apparent to those skilled in the art. The apparatus is simple and is easily kept in repair. By its use the possibility of overturning or tipping of the mixer by accident or through carelessness is prevented and consequent possible loss of life, damage to the surrounding property, and loss of molten metal, is prevented. The pawl is arranged to automatically engage with the ratchet teeth and lock the vessel in a stationary position, except at times when the pawl is moved and held out of engagement with the ratchet teeth. The employment of the solenoids as shown for actuating the pawl operating mechanism insures easy and positive movement of the pawls.

Modifications in the construction and arrangement of the parts may be made within the scope of the appended claims.

I believe myself the first to provide a ratchet and pawl locking mechanism for securing vessels or containers for molten metal in a stationary position and the term "tipping" as used herein, is intended to cover movement of any vessel whether tilted, rocked, rotated, or otherwise moved to pour molten metal therefrom.

I claim:—

1. In a tipping vessel for handling molten metal a safety device comprising ratchet teeth on the vessel, a pawl arranged to engage with the ratchet teeth to hold the vessel against tipping movement, means for moving said pawl out of engagement with the teeth and a solenoid connected to said pawl moving means for mechanically moving said pawl into inoperative position.

2. In a tipping vessel for handling molten metal, a safety device comprising ratchet teeth on the vessel, a pawl arranged to engage with the teeth and hold the vessel against tipping, means for moving the pawl out of engagement with said ratchet teeth, and a counter-weight for moving said pawl into and holding it in its operative engagement with the ratchet.

3. In a tipping vessel for handling molten metal, a safety device comprising ratchet

teeth on the vessel, a pawl arranged to engage with the ratchet teeth and hold the vessel against tipping, means for moving the pawl out of engagement with said ratchet teeth, a counter-weight for moving into and holding said pawl in its operative engagement with the ratchet teeth, and a solenoid connected to said pawl moving means for mechanically moving the pawl into inoperative position.

4. In a tipping vessel for handling molten metal, a safety device comprising a ratchet and pawl arranged to hold the vessel stationary, a solenoid operatively connected thereto for moving the pawl out of engagement with the ratchet and a lever mechanism for moving the pawl out of engagement with the ratchet by which the pawl is held in inoperative position.

5. In a tipping vessel for handling molten metal, a safety device comprising a ratchet and pawl arranged to hold the vessel stationary, a solenoid operatively connected thereto for moving the pawl out of engagement with the ratchet, a lever mechanism for moving the pawl out of engagement with the ratchet by which the pawl is held in inoperative position, and a counter-weight on the lever mechanism for moving and holding the pawl into engagement with the ratchet.

6. In a tipping vessel for handling molten metal, a ratchet on the vessel, a pawl operatively connected to said ratchet and arranged to hold the vessel in a plurality of tipped positions, and a solenoid connected to said pawl for moving said pawl into inoperative position.

7. In a tipping vessel for handling molten metal, a ratchet on the vessel, a pawl operatively connected to said ratchet and arranged to hold the vessel in a plurality of tipped positions, a solenoid connected to said pawl for moving the pawl into inoperative position, and a counter-weight for moving said pawl into operative engagement with the ratchet.

In witness whereof, I have hereunto set my hand.

MAX M. SUPPES.

Witnesses:
D. W. LAWRENCE,
CARL EYERICK.