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July 9, 1946. W. THOMAS 2,403,883

AMMUNITION CONVEYER

Original Filed Sept. 23, 1936 5 Sheets-Sheet 1

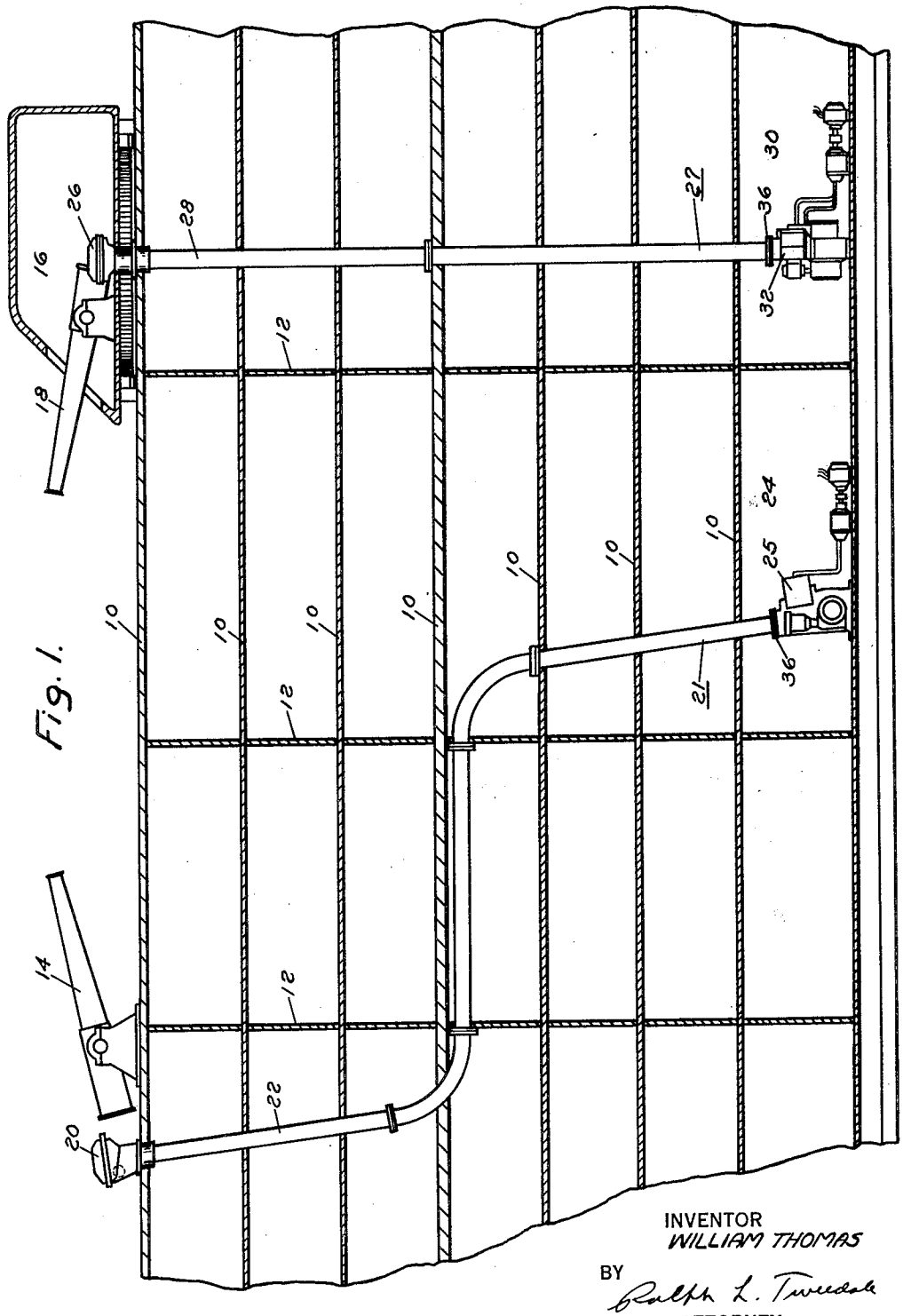


Fig. 1.

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AMMUNITION CONVEYER

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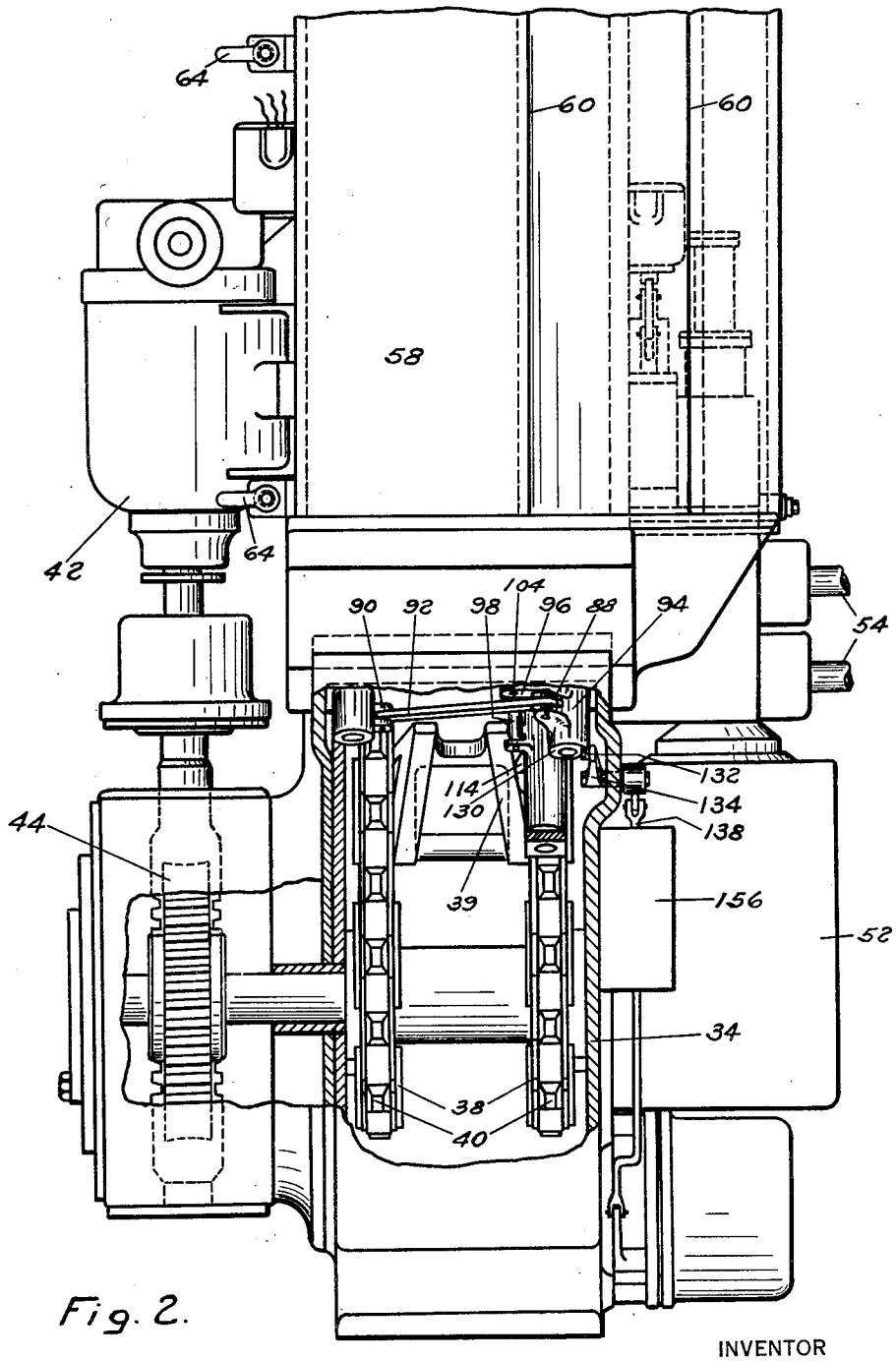


Fig. 2.

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AMMUNITION CONVEYER

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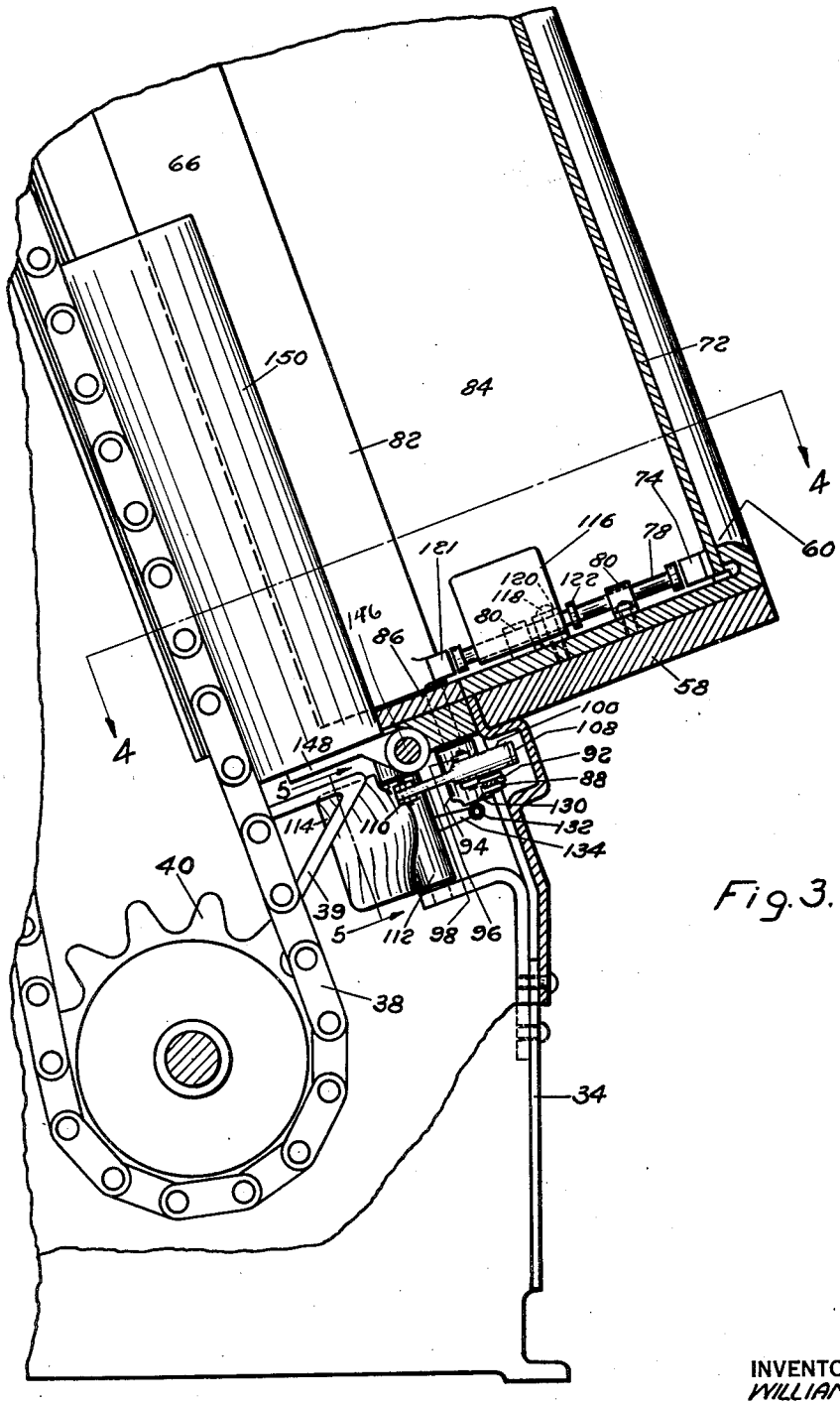


Fig. 3.

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AMMUNITION CONVEYER

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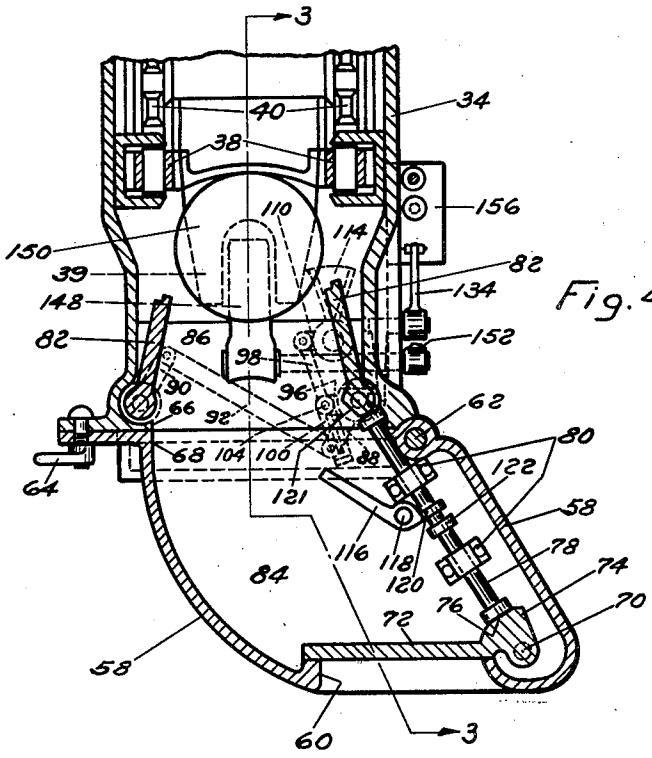


Fig. 4.

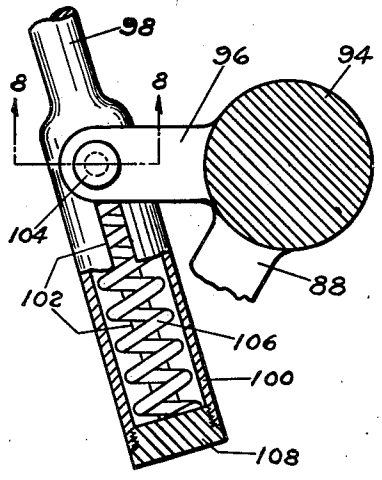


Fig. 7.

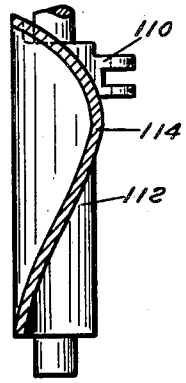


Fig. 5.

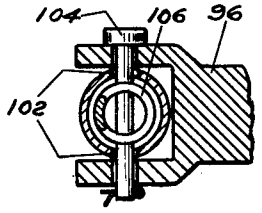


Fig. 8.

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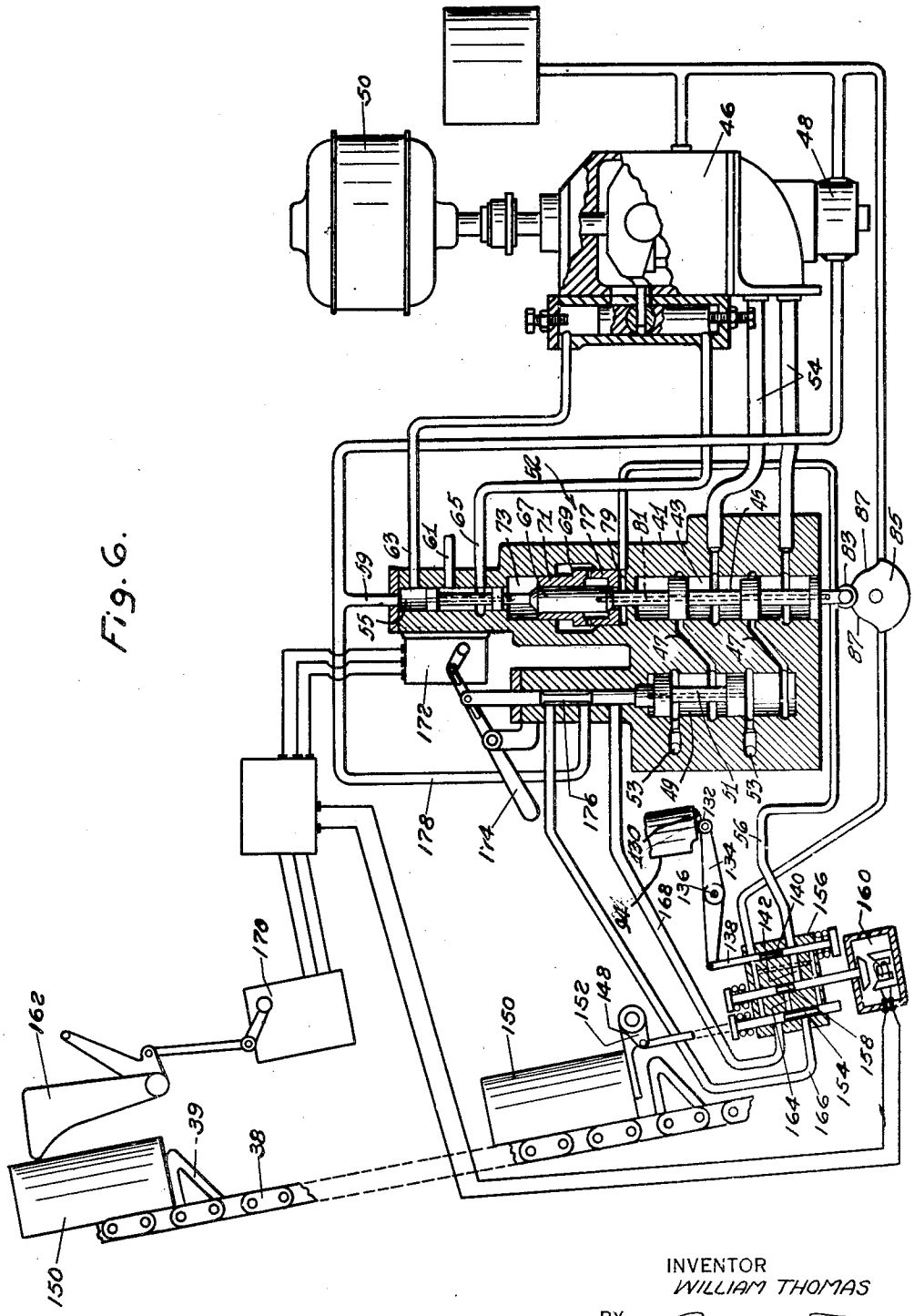
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Fig. 6.



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UNITED STATES PATENT OFFICE

2,403,883

AMMUNITION CONVEYER

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Application September 23, 1936, Serial No. 102,156
Renewed October 28, 1939

13 Claims. (Cl. 89—46)

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This invention relates to power transmissions and more particularly to a conveyer for delivering articles from one station to another wherein a fire hazard is present at one station and in which it is desired to prevent the possibility of flame transmission between the two stations at all times, while permitting the continued passage of articles between the stations. The invention is particularly adapted to delivering ammunition aboard ship from an ammunition storage compartment to a position at the guns for use therein, although it will be understood that the invention may be adapted to other uses wherein similar conditions and problems are encountered.

It is customary in war vessels to locate the ammunition magazines or storage chambers in the lower part of the ship where the possibility of their contents being exploded by enemy projectiles is most remote. The guns which use the ammunition being situated on the upper decks of the ship, either in turrets or on deck mountings, it is necessary to provide means for conveying ammunition from the magazine to a position near the guns where it may be readily placed in the guns as needed.

Various types of conveyers have been heretofore provided for this purpose and where high rates of delivery to rapid firing guns are required, the so-called dredger type ammunition hoists have marked advantages over other types in use. Such a hoist usually comprises an endless chain conveyer which is encased in a continuous tubular hoist trunk or casing extending through the ship from the loading station in or adjacent the magazine to the unloading station adjacent the gun. This continuous hoist trunk provides a conduit which introduces the possibility of flame transmission to the magazine whenever accidental explosions occur at the gun or whenever an enemy projectile explodes in or near the hoist trunk.

In order to break this continuous path for flame travel to the magazine, it has been found necessary heretofore to deliver the ammunition in two stages by two entirely independent ammunition hoists with a transfer station where the ammunition is carried manually from the delivery end of the lower hoist to the loading end of the upper hoist. This construction, while satisfactory from the standpoint of safety of the installation and effectiveness to prevent the transmission of flare-backs to the magazine, adds considerably to the weight and cost of the installation since each of the two sections of the hoist must be provided with its own independent drive mechanism. Furthermore additional crew is required for handling ammunition at the transfer station, which not only increases the number of men required for each gun to be fired but presents also a retarding element in the delivery of

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ammunition since it introduces one more place for unavoidable human errors and delays to interfere with the intended operation of the hoist.

It is an object of the present invention to provide a conveyer particularly adapted for delivery of ammunition directly between a loading station adjacent the magazine and an unloading station adjacent the gun by which ammunition may be delivered through a continuous closed casing whereby transmission of flare-backs to the loading station may be prevented without requiring an intermediate transfer station.

It is also an object to provide a conveyer for delivering articles between two stations which are separated by a flame-proof wall having an opening at one station adjacent the conveyer and in which is incorporated means for passing articles through the opening while maintaining a flame-proof seal at all times.

A further object is to provide a loading station for a conveyer whereby articles may be loaded on the conveyer including means for maintaining a flame-proof seal around the conveyer at all times.

Further objects and advantages of the present invention will be apparent from the following description, reference being had to the accompanying drawings wherein a preferred form of the present invention is clearly shown.

In the drawings:

Fig. 1 is a diagrammatic cross section of a ship incorporating a preferred form of the present invention.

Fig. 2 is a front view of the loading station of the ammunition hoist, a portion of the mechanism being broken away to show the interior.

Fig. 3 is a fragmentary cross section on line 3—3 of Fig. 4.

Fig. 4 is a cross section on line 4—4 of Fig. 3.

Fig. 5 is a fragmentary cross section on line 5—5 of Fig. 3.

Fig. 6 is a diagrammatic view of the driving and controlling mechanism for the conveyer illustrated in Fig. 1.

Fig. 7 is a fragmentary view of a detail of the mechanism.

Fig. 8 is a cross section on line 8—8 of Fig. 7.

Referring now to Fig. 1 there is indicated diagrammatically a portion of a longitudinal section of a war vessel having superimposed decks 10 of usual construction, the spaces between which are divided by partitions 12 into suitable compartments. Indicated at 14 is a deck gun and at 16 a revolving turret having two or more guns 18 mounted thereon in the usual fashion. Adjacent the gun 14 is mounted the delivery head 20 of a dredger type ammunition hoist 21 having a trunk 22 extending downwardly through the vessel to a compartment 24 which may be either a magazine compartment for the storage of ammu-

nition or a handling room adjacent such a compartment and in which is located the loading end 25 of the hoist 21 together with suitable driving mechanism for the hoist. In the turret 16 is mounted a delivery head 26 of a second dredger type ammunition hoist 27 having a trunk 28 extending vertically downward to a compartment 30 similar to the compartment 24, in which is located the loading end 32 and the necessary driving mechanism for the hoist 27. The hoist trunk 28 is shown secured to the top deck 10 at the center of rotation of the turret 16 and is stationary relative to the turret although it will be understood that the ammunition hoist 27 may be mounted to revolve with the turret 16 if desired.

Referring now to Figs. 2 through 6 wherein the construction of the loading ends 25 and 32 is illustrated in detail, there is shown a casing 34 forming the lower end of the hoist trunk to which the casing 34 may be tightly sealed at the flange 36. The casing 34 serves not only to enclose the drive sprockets 40 and hoist chain or conveyer band 38, having conveyer lugs 39, but also as a mounting for the hoist driving and control mechanism. The latter may be of any suitable construction. The form of drive mechanism and control therefor illustrated comprises a fluid motor 42 adapted to drive the sprockets 40 through a worm drive 44. A variable displacement pump 46 and auxiliary pump 48 are driven by an electric motor 50 to supply fluid to the motor 42 through a control unit 52. The control unit 52 is constructed to control the displacement of the pump 46 and to control communication between the pump 46 and the motor 42 through conduits 54 in a manner to provide for automatically moving the hoist chain 38 through one flight whenever a starting "shot" of fluid from the auxiliary pump 48 is admitted to the device 52 through a control conduit 56.

For this purpose the control unit 52 comprises a body 41 having a cylindrical bore 43 in which is mounted a spool valve 45 for the purpose of blocking or opening the passage of oil between the conduits 54 and conduits 47. A second cylindrical chamber 49 carries a spool valve 51 for the purpose of reversing the flow between the conduits 47 and a pair of conduits 53 which lead to the fluid motor 42. The body 41 also has at its upper end a bore 55 in which is mounted a spool valve 57 for controlling the stroke regulating fluid motor of the pump 46. A conduit 59 extends from the auxiliary pump 48 to the upper end of the bore 55 while a conduit 61 enters the bore 55 at its mid-portion. The valve 57 is adapted to selectively control and reverse the connections of the conduits 59 and 61 with a pair of conduits 63 and 65 leading to opposite ends of the stroke regulating mechanism at the pump 46. The valves 45 and 57 are formed integrally upon a common stem having an enlarged portion 67 around which is slidably mounted a lift piston 69. The latter has a cylindrical upper portion 71 slidably fitted in a chamber 73 which communicates with the upper end of the bore 55 through a passage 75 formed in the spool of valve 57. The piston 69 has a portion 77 of larger diameter than the portion 71 and slidably fitted in a chamber 79 to which the conduit 56 leads. The bottom wall of the piston 69 is provided with an opening forming a clear passage around the stem of valve 45 and having a seat on which the enlarged portion 67 of the stem is adapted to rest for the purpose of closing this passage. The space inside the piston 77 communicates with the tank through a passage 81 formed in the stem of the valve 45. At its lower end the valve stem has a roller 83 acting as a follower for a cam 85. The latter is connected by a suitable drive means not shown to the shaft of the sprockets 40 so that the cam 85 makes one revolution while the chain 38 travels through one flight distance. The cam 85 has a depression in which the roller 83 is shown at rest. In this position the valve 45 is completely closed while the valve 57 connects the conduit 63 to the pressure line 59 and the conduit 65 to the tank line 61. To either side of this depression are elevated portions 87 which hold the valves in such a position that the valve 45 is opened to a considerable degree while the valve 57 still connects conduit 63 with conduit 59 and conduit 65 with conduit 61. The remainder of the periphery of the cam 85 is raised still further so as to completely open the valve 45 and to reverse the connections at the valve 57. When the valves are raised to this upper extreme position the valve stem has been lifted higher than it is possible to lift the piston 69, so that the enlarged portion 67 lifts away from the seat in the bottom wall of the piston 69. The cam 85 and its drive mechanism are enclosed in a suitable oil-tight housing not shown, the interior of which is connected to tank.

The entire arrangement of the control unit 52 is such that whenever a shot of oil is admitted through the conduit 56 to the chamber 79, the piston 69 is lifted due to the enlarged portion 67 being on its seat in the bottom wall of the piston 69. The piston 69 and both valves 45 and 57 are accordingly lifted to a position just short of the highest position to which the cam would lift them. Thus the valve 45 is opened and the valve 57 is reversed to cause the stroke of the pump 46 to be increased at a rate determined by the volumetric capacity of the auxiliary pump 48. Oil is delivered to and returned from the fluid motor 42 through the conduits 54, 47, and 53, thus causing the motor 42 to operate, turning the cam 85. The latter will contact the roller 83 after about ¼ of a revolution when the highest part of the cam strikes the roller 83, thus lifting the valves 45 and 57 a further amount. This additional lift raises the enlarged portion 67 off from the seat in the bottom wall of the piston 69, thus permitting the oil trapped in the chamber 79 to escape through the opening in the bottom wall of the piston 69 and through the passage 81 to tank. As soon as the cam has completed an approximate ½ revolution in addition, the roller 83 drops down to the cam portion 87, thus reversing connections at valve 57 but not completely closing the valve 45. The stroke of the pump 46 is thus reduced at a rate determined by the capacity of pump 48 causing the motor 42 to decelerate. When the cam 85 has completed a revolution, the roller 83 returns to the position shown in the drawings, completely closing the valve 45. At this time the enlarged portion 67 again comes to rest on its seat in the bottom wall of piston 69, thus placing the apparatus in condition for restarting whenever another shot of oil is introduced to the conduit 56. It will be noted that should a shot of oil be introduced to the conduit 56 before the cam 85 has made one revolution, the lift piston 69 will not rise because a free path is opened from the chamber 79 to tank through the passage in which the enlarged portion 67 seats. It will also be noted that oil pressure from the auxiliary pump is constantly exerted over the upper end of the valve 57 creating a bias for the entire stem assembly in the downward direction. Likewise this pressure is exerted over the annular area at

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the top of the portion 71 of the lift piston 69 biasing the latter downwardly whenever pressure is relieved in the chamber 79 by the opening of the passage through the bottom wall of the piston 69.

The casing 34 is provided on its front face with an outward extension 58 having an opening 60 of proper size and shape to permit a piece of ammunition to pass therethrough. The extension 58 is hinged to the casing 34 at 62 along one edge thereof and is adapted to be clamped in sealing engagement therewith by suitable securing means 64. The extension 58 is so shaped as to provide a chamber for receiving a piece of ammunition preparatory to transferring the same to the conveyer chain 38. The casing 34 is provided with an opening 66 adjacent the extension 58 which is provided with a similar opening 68 in register with the opening 66 when the extension 58 is clamped to the housing 34 as illustrated in the drawings.

The extension 58 carries pivoted at 70 a swinging door 72 adapted to close and seal the opening 60 when in the position shown in Fig. 4. The door 72 is preferably biased by a spring, not shown, into closed position. Adjacent the bottom of the door 60 there is formed integrally therewith an interlocking cam 74 having a flattened portion 76 adapted to coact with a locking bar 78. The bar 78 is slidably mounted in bearings 80 and at its opposite end extends into the opening 66. Adjacent the opening 66 is mounted a pair of swinging flapper doors 82 biased by springs, not shown, to close the opening 66 and with the extension 58 and the door 72 to maintain the chamber 84 sealed against the passage of flame when both the doors 82 and 72 are closed. The pivots of the doors 82 extend beneath a ledge 86 formed in the housing 34 and carry levers 88 and 90 which are interconnected by a link 92 for causing the flapper doors to operate in synchronism. The lever 88 is formed on a hub 94 which carries a lever 96, which is bifurcated as shown in Fig. 8, and coacts with a link 98 through a lost motion connection. For this purpose the link 98 is formed with a tubular extension 100 having longitudinal slots 102 at the top and bottom thereof through which a pin 104 secured to the lever 96 extends. A spring 106 positioned by an end cap 108 yieldingly urges the pin 104 toward the upper end of the slot in Fig. 7. The opposite end of the link 98 is pivoted to an arm 110 formed on a trip member 112. The member 112 is provided with a cam blade 114 positioned in the path of the lugs 39 in such a manner that the trip 112 will be moved clockwise in Fig. 4 whenever a lug 39 passes the same.

A trip lever 116 is pivoted to the floor of the extension 58 at 118 and carries an arm 120 embracing the lock bar 78. A collar 122 is provided on the latter whereby the lock bar will be moved downwardly in Fig. 4 to engage the flat 76 whenever the trip lever 116 is moved upwardly in Fig. 4 by the positioning of a piece of ammunition within the chamber 84. The other end of the lock bar 78 engages a cam 121 carried by one of the flapper doors 82. The length of bar 78 is such as to permit either door 72 or doors 82 to open but not both.

The hub 94 carries at its lower end a cam 130 adapted to actuate through a roller follower 132, a lever 134 pivoted to the casing 34 at 136. The opposite end of the lever 134 is connected to actuate a stem 138 of a flapper door interlock valve 140 which is adapted to close communication between conduit 56 and a conduit 142 formed in a valve block 156 (see Fig. 6) whenever the flapper doors 82 are open.

Pivotally mounted in the casing 34 adjacent the upper edge of the ledge 86 at 146 is a lower trip arm 148 adapted to be depressed by a piece of ammunition such as 150 when it is placed in position on the hoist chain 38. The lower trip 148 is connected by an arm 152 to a lower trip valve 154 mounted in valve block 156. An upper trip valve 158 is also mounted in the block 156 and is adapted to be actuated by a solenoid 160 which in turn is controlled by an upper trip 162 located at the delivery end of the hoist. The valve 154 is adapted to connect a conduit 164 with a conduit 166 when the trip 148 is depressed and to connect conduit 164 with a conduit 168 when the trip 148 is raised. The valve 158 is adapted to open communication between the conduit 164 and the conduit 142 whenever the solenoid 160 is energized and to close communication when the solenoid is deenergized.

The solenoid 160 is under the control of upper trip 162 through a three-way switch 170 which is connected in circuit with a three-way switch 172 adapted to be actuated by a reversing lever 174. When the reversing lever 174 is set to hoist ammunition as illustrated in Fig. 6, the switch 172 connects the solenoid to the switch 170 so that the solenoid will be energized whenever the trip 162 is released by the removal of ammunition from the delivery end of the hoist. With reverse lever 174 set for lowering ammunition the switch 172 connects the solenoid 160 to the switch 170 for opposite action. The lever 174 also controls a reversing valve 176 for selectively connecting either the conduit 166 or the conduit 168 with a conduit 178 leading from the auxiliary pump 48, as well as controlling valve 51 for reversing operation of motor 42.

In operation, with motor 50 and pumps 46 and 48 running and with the hoist at rest due to the presence of a piece of ammunition at the delivery station, trip 162 keeps the solenoid 160 deenergized so that pressure fluid from the pump 48 is blocked off from the conduit 56 at the valve 158. Assuming a piece of ammunition to have dropped from the chamber 84 and to lie on the chain 38 and the lower trip 148, as shown in the drawings, and assuming the flapper doors 82 to have closed; as soon as the ammunition is removed from the delivery station, trip 162 is released to energize solenoid 160 opening valve 158 to admit pressure fluid to the conduits 142 and 56. The control unit 52 in response to the admission of pressure fluid through the conduit 56 causes the fluid motor 42 to drive the sprockets 40 and chain 38 through one flight; that is, through the distance required to bring the next lug 39 into rest position as illustrated in the drawings.

During this operation of the hoist chain 38 another piece of ammunition may be manually placed in the chamber 84 through the door 72 which springs closed when the ammunition is in position in the chamber 84. As soon as the door 72 closes, the trip arm 116 moves upwardly in Fig. 4 to hold the lock bar 78 against the flat 76, thus locking the door 72 against opening until the ammunition is removed from the chamber 84. Near the end of the hoist flight the next lug 39 comes into contact with the cam blade 114 to actuate the latter clockwise in Fig. 4 and thus open the flapper doors 82 permitting the ammunition to drop into position on the lower trip 86 and the hoist chain 38. Before coming to rest the lug 39

passes the cam blade 114 permitting the flapper doors 82 to again close under their spring bias whereupon the hoist is ready for a second cycle. This may take place immediately if the piece of ammunition delivered to the upper end of the hoist is removed by the time the lug 39 reaches rest position.

If at any time during the operation of the hoist, an accidental explosion should occur adjacent the gun or in the hoist trunk itself due to a hit by an enemy shell the transmission of flare-backs or flame travel of any kind to the compartments 24 and 30 is effectively prevented at the loading stations 25 and 32. It will be noted that both the flapper doors 82 and the outer door 72 will be urged into tighter sealing engagement with the openings 66 and 60 by any gas pressure created within the hoist trunk. Due to the action of the lock bar 78 it is impossible for both the doors 72 and 82 to be open at the same time.

Should the outer door 72 be opened at the time when a lug 39 actuates the cam blade 114, the lost motion connection between the lever 96 and the link 98 permits the member 112 to rotate without opening the flapper doors 82. For this purpose the spring 106 preponderates over the normal spring bias of the flapper doors so that during normal operation the spring 106 fails to yield when the cam blade 114 is actuated. When the flapper doors are locked closed by the lock bar 78, however, the spring 106 yields and permits the flapper doors 82 to remain closed. Thereafter the hoist may be started by manually actuating the flapper doors 82 by an emergency hand lever, not illustrated.

While the form of embodiment of the invention as herein disclosed, constitutes a preferred form, it is to be understood that other forms might be adopted, all coming within the scope of the claims which follow.

What is claimed is as follows:

1. In a conveyer for delivering ammunition between a loading station adjacent a storage compartment and a station for use and having an endless flexible ammunition conveyer band, a flame-proof casing surrounding the conveyer band and means for driving the conveyer band, the combination with the conveyer of means forming an opening in said casing at the loading station, and a pair of inwardly swinging flame-tight closure means together being adapted to effectively maintain said opening sealed against the passage of flame and against gas pressure inside the casing at all times, said closure means being spaced apart sufficiently to provide with the casing a chamber into which a piece of ammunition may be placed through one of said closure means and from which the article may be transferred to the conveyer through the other closure means.

2. In a conveyer for delivering ammunition between a loading station adjacent a storage compartment and a station for use and having an endless flexible ammunition conveyer band, a flame-proof casing surrounding the conveyer band and means for driving the conveyer band, the combination with the conveyer of means forming an opening in said casing at the loading station, a pair of inwardly swinging flame-tight closure means each alone being adapted to effectively maintain said opening sealed against the passage of flame and against gas pressure inside the casing, said closure means being spaced apart sufficiently to provide with the casing a chamber into which a piece of ammunition may be placed through one of said closure means and from which the article may be transferred to the conveyer through the other closure means, and means for interlocking the operation of said closure means whereby neither may be opened when the other is opened.

3. In a conveyer for delivering ammunition between a loading station adjacent a storage compartment and a station for use and having an endless flexible ammunition conveyer band, a flame-proof casing surrounding the conveyer band and means for driving the conveyer band, the combination with the conveyer of means forming an opening in said casing at the loading station, a pair of swinging closure means each alone being adapted to effectively maintain said opening sealed against the passage of flame, said closure means being spaced apart sufficiently to provide with the casing a chamber into which a piece of ammunition may be placed through one of said closure means and from which the article may be transferred to the conveyer through the other closure means, and means for maintaining the outer closure means closed when a piece of ammunition is positioned in said chamber.

4. In a conveyer for delivering ammunition between a loading station adjacent a storage compartment and a station for use and having an endless flexible ammunition conveyer band, a flame-proof casing surrounding the conveyer band and means for driving the conveyer band, the combination with the conveyer of means forming an opening in said casing at the loading station, a pair of inwardly swinging flame-tight closure means together being adapted to effectively maintain said opening sealed against the passage of flame and against gas pressure inside the casing at all times, said closure means being spaced apart sufficiently to provide with the casing a chamber into which a piece of ammunition may be placed through one of said closure means and from which the article may be transferred to the conveyer through the other closure means, and means for opening the inner closure means periodically in predetermined relation to the operation of the conveyer.

5. In a conveyer for delivering articles between two stations the combination of an endless flexible conveyer band, means for driving said conveyer band, means forming a flame-proof wall between said conveyer band and one of said stations, said wall having an opening adjacent the conveyer band through which articles may pass, and a pair of inwardly swinging flame-tight closure means together being adapted to effectively maintain said opening sealed against the passage of flame and against gas pressure inside the casing at all times, said closure means being spaced apart sufficiently to provide with the casing a chamber into which an article may be placed through one of said closure means and from which the article may be transferred to the conveyer through the other closure means.

6. In a conveyer for delivering articles between two stations the combination of an endless flexible conveyer band, means for driving said conveyer band, means forming a flame-proof wall between said conveyer band and one of said stations, said wall having an opening adjacent the conveyer band through which articles may pass, a pair of inwardly swinging flame-tight closure means each alone being adapted to effectively maintain said opening sealed against the passage of flame and against gas pressure inside the casing, said closure means being

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spaced apart sufficiently to provide with the casing a chamber into which an article may be placed through one of said closure means and from which the article may be transferred to the conveyer through the other closure means, and means for interlocking the operation of said closure means whereby neither may be opened when the other is opened.

7. In a conveyer for delivering articles between two stations the combination of an endless flexible conveyer band, means for driving said conveyer band, means forming a flame-proof wall between said conveyer band and one of said stations, said wall having an opening adjacent the conveyer band through which articles may pass, a pair of swinging closure means each alone being adapted to effectively maintain said opening sealed against the passage of flame, said closure means being spaced apart sufficiently to provide with the casing a chamber into which an article may be placed through one of said closure means and from which the article may be transferred to the conveyer through the other closure means, and means for maintaining the outer closure means closed when an article is positioned in said chamber.

8. In a conveyer for delivering articles between two stations the combination of an endless flexible conveyer band, means for driving said conveyer band, means forming a flame-proof wall between said conveyer band and one of said stations, said wall having an opening adjacent the conveyer band through which articles may pass, a pair of inwardly swinging flame-tight closure means together being adapted to effectively maintain said opening sealed against the passage of flame and against gas pressure inside the casing at all times, said closure means being spaced apart sufficiently to provide with the casing a chamber into which an article may be placed through one of said closure means and from which the article may be transferred to the conveyer through the other closure means, and means for opening the inner closure means periodically in predetermined relation to the operation of the conveyer.

9. In a conveyer for delivering ammunition between a loading station adjacent a storage compartment and a station for use and having an endless flexible ammunition conveyer band, a flame-proof casing surrounding the conveyer band and means for driving the conveyer band, the combination with the conveyer of means forming an opening in said casing at the loading station, and a pair of inwardly swinging flame-tight closure means comprising doors opening toward said conveyer band together being adapted to effectively maintain said opening sealed against the passage of flame and against gas pressure inside the casing at all times, said closure means being spaced apart sufficiently to provide with the casing a chamber into which a piece of ammunition may be placed through one of said closure means and from which the article may be transferred to the conveyer through the other closure means.

10. In a conveyer for delivering articles between two stations the combination of an endless flexible conveyer band, means for driving said conveyer band, means forming a flame-

proof wall between said conveyer band and one of said stations, said wall having an opening adjacent the conveyer band through which articles may pass, and a pair of inwardly swinging flame-tight closure means comprising doors opening toward said conveyer band together being adapted to effectively maintain said opening sealed against the passage of flame and against gas pressure inside the casing at all times, said closure means being spaced apart sufficiently to provide with the casing a chamber into which an article may be placed through one of said closure means and from which the article may be transferred to the conveyer through the other closure means.

11. In a conveyer for delivering ammunition between a loading station adjacent a storage compartment and a station for use and having an endless flexible ammunition conveyer band, a flame-proof casing surrounding the conveyer band and means for driving the conveyer band, the combination with the conveyer of means forming an opening in said casing at the loading station, a removable housing member adapted to form a chamber adjacent said opening, a pair of doors mounted to swing in said opening, operating means for said doors including a trip lever engageable with said conveyer band, means forming a second opening to said chamber, a door mounted in said housing and biased to close the second opening, and a trip engageable by a piece of ammunition when positioned in said chamber for preventing the opening of the second door.

12. In a conveyer for delivering ammunition between a loading station adjacent a storage compartment and a station for use and having an endless flexible ammunition conveyer band, a flame-proof casing surrounding the conveyer band and means for driving the conveyer band, the combination with the conveyer of means forming an opening in said casing at the loading station, a removable housing member adapted to form a chamber adjacent said opening, a pair of doors mounted to swing in said opening, operating means for said doors including a trip lever engageable with said conveyer band, means forming a second opening to said chamber, a door mounted in said housing and biased to close the second opening, and a lock bar operable by the first pair of doors when opened to prevent opening of the second door.

13. In a conveyer for delivering ammunition between a loading station adjacent a storage compartment and a station for use and having an endless flexible ammunition conveyer band, a flame-proof casing surrounding the conveyer band and means for driving the conveyer band, the combination with the conveyer of means forming an opening in said casing at the loading station, a removable housing member adapted to form a chamber adjacent said opening, a pair of doors mounted to swing in said opening, operating means for said doors including a trip lever engageable with said conveyer band, means forming a second opening to said chamber, a door mounted in said housing and biased to close the second opening, and a lock bar operable by the second door when opened for preventing opening of the first pair of doors.

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