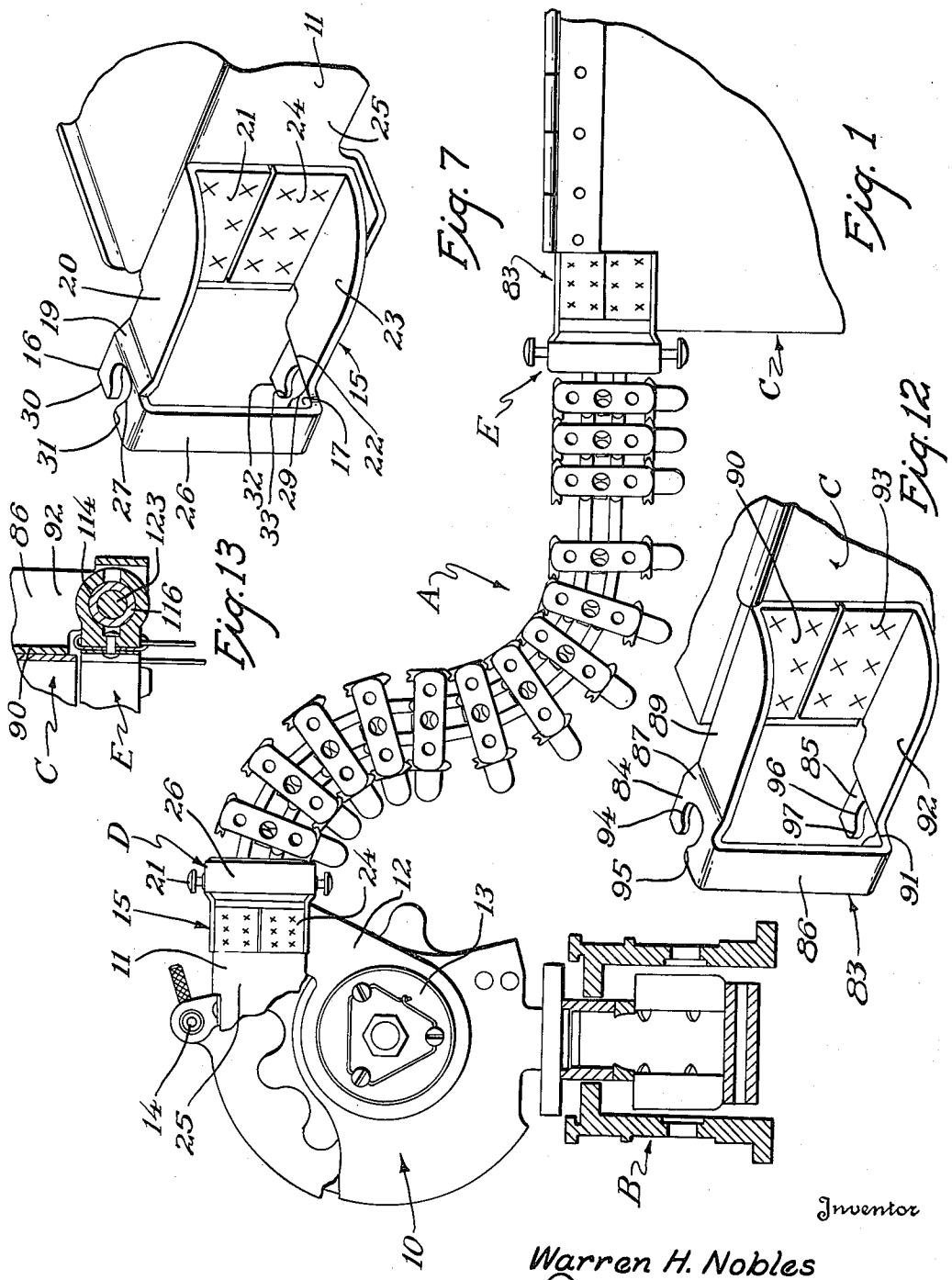
April 3, 1956 W. H. NOBLES 2,740,180

ADAPTER FOR AMMUNITION CHUTES

Filed March 6, 1950 4 Sheets-Sheet 1



Inventor

Warren H. Nobles

By Robert M. Dunning

ATTY.

April 3, 1956 W. H. NOBLES 2,740,180

ADAPTER FOR AMMUNITION CHUTES

Filed March 6, 1950 4 Sheets-Sheet 2

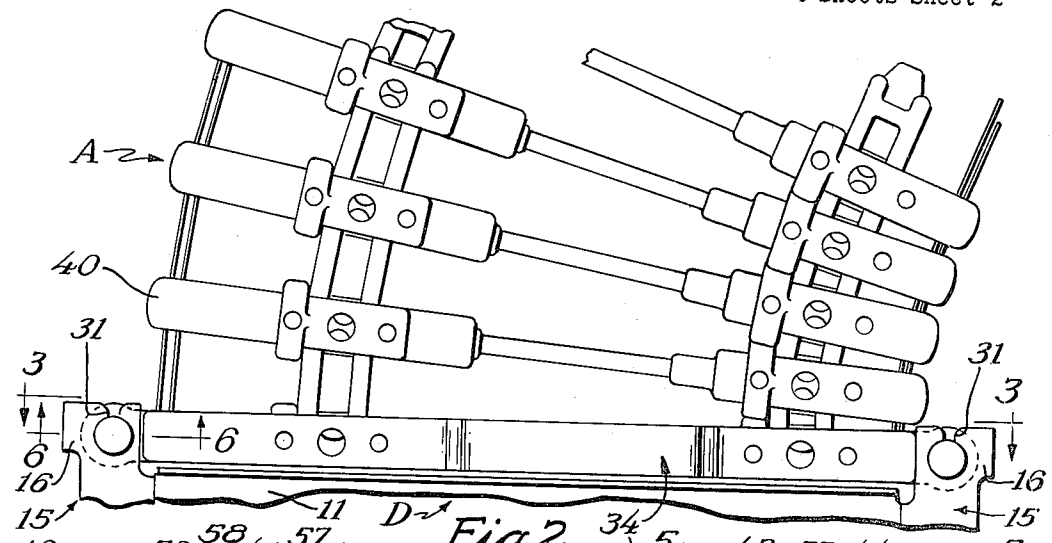


Fig. 2

Fig. 3

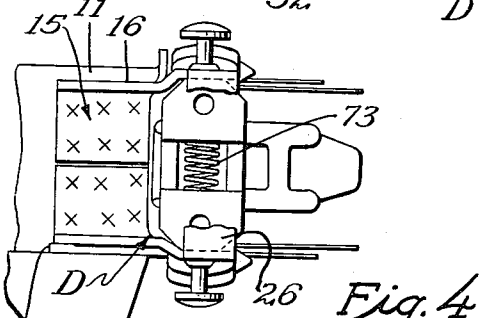


Fig. 4

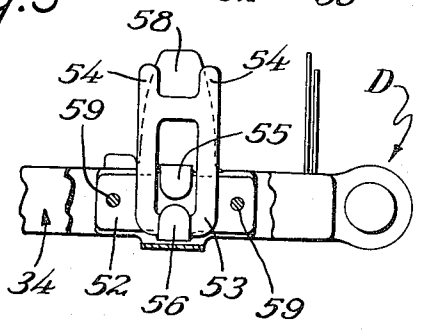


Fig. 5

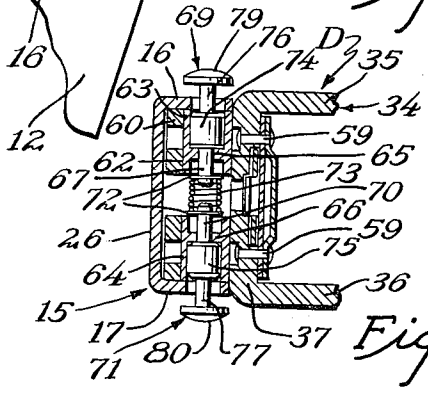


Fig. 6

Inventor

Warren H. Nobles

By Robert M. Denning

ATTY.

April 3, 1956 W. H. NOBLES 2,740,180

ADAPTER FOR AMMUNITION CHUTES

Filed March 6, 1950 4 Sheets-Sheet 3

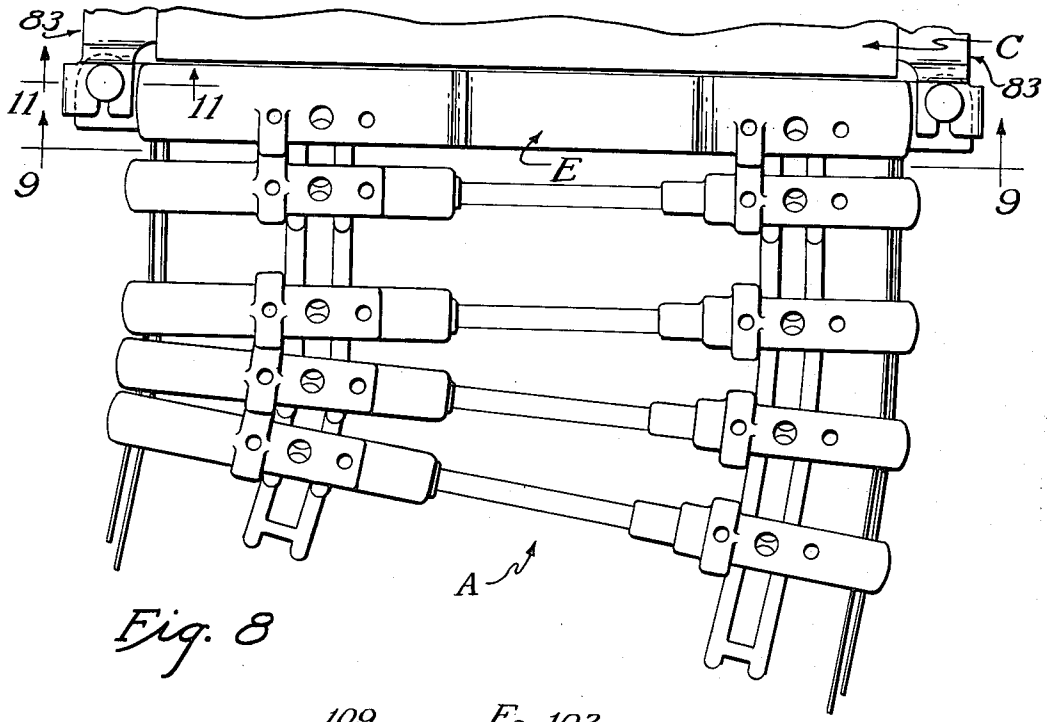


Fig. 8

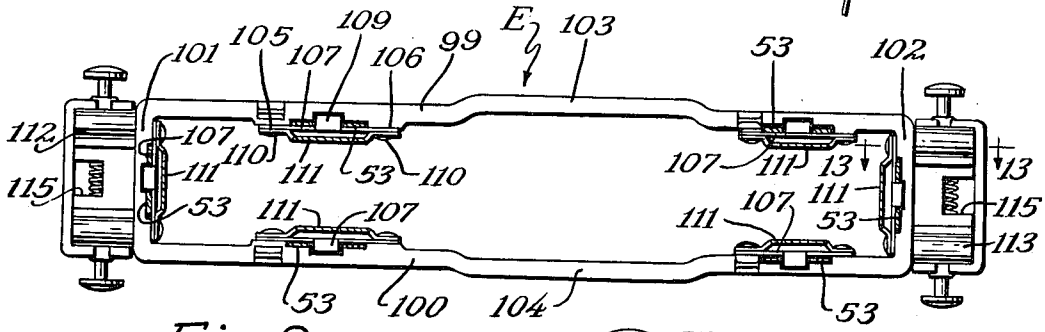


Fig. 9

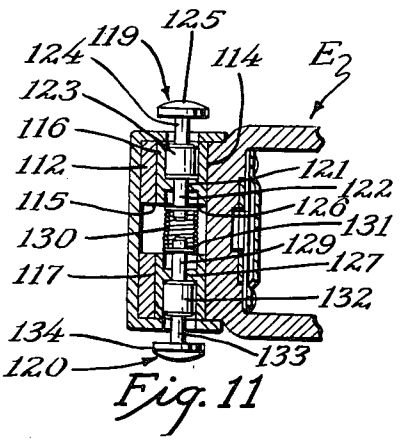


Fig. 11

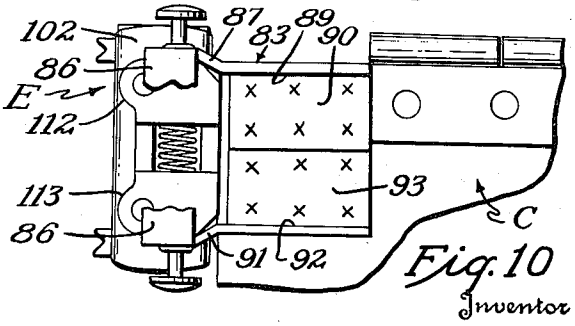


Fig. 10

Inventor

Warren H. Nobles

By Robert M. Dunning

ATTY.

April 3, 1956 W. H. NOBLES 2,740,180

ADAPTER FOR AMMUNITION CHUTES

Filed March 6, 1950 4 Sheets-Sheet 4

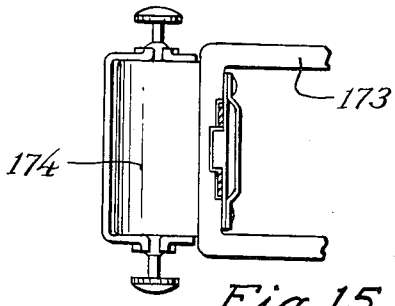


Fig. 15

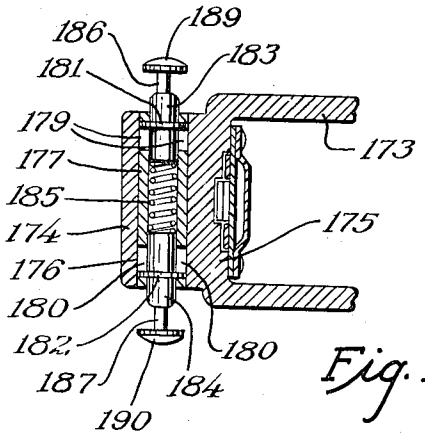


Fig. 16

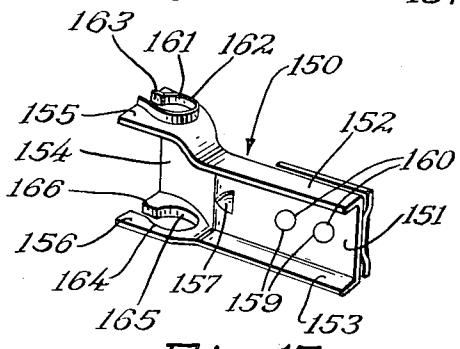


Fig. 17

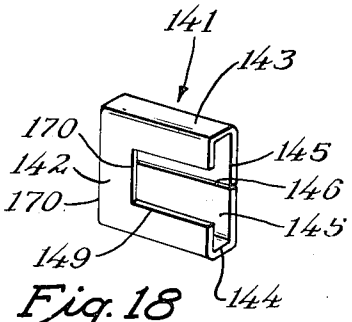


Fig. 18

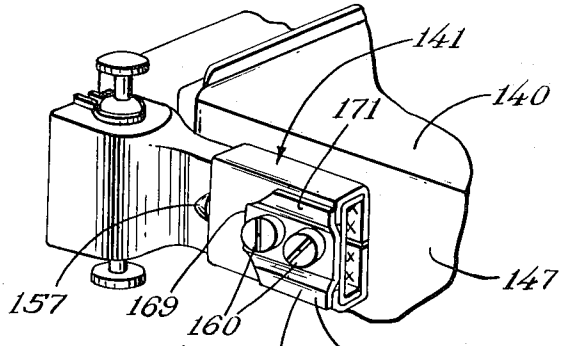


Fig. 14

INVENTOR

Warren H. Nobles

BY Robert M. Dunniaer

ATTORNEY

United States Patent Office 2,740,180
Patented Apr. 3, 1956

2,740,180

ADAPTER FOR AMMUNITION CHUTES

Warren H. Nobles, St. Paul, Minn.

Application March 6, 1950, Serial No. 147,883

10 Claims. (Cl. 24—230)

My invention relates to an improvement in adapter for ammunition chutes wherein it is desired to provide a simple and effective means for attaching an ammunition chute to a gun and to an ammunition container.

In my application Serial No. 564,777 filed November 23, 1944, now Patent Number 2,488,679 issued November 22, 1949, I disclosed an ammunition chute which is designed for use in connecting an ammunition supply box to a gun to deliver shells from the box to the gun. One end of the chute was connected to the supply box, while the other end was connected to the gun. In view of the limited space available, chutes of this type must often be capable of extreme flexibility. Furthermore, because of the fact that time is an extremely critical factor in the use of such devices, it is necessary to provide a chute which may be connected or disconnected in a minimum of time. In the event some part of the apparatus becomes damaged, or in the event it becomes necessary to change chutes in operation, it is of utmost importance that these changes may be made in a minimum of time. The present device comprises a means of attaching the ends of the chute to the gun or to an ammunition box so that the chute may be connected or disconnected with little difficulty and in a minimum of time.

A feature of the present invention lies in the provision of a chute adapter which is designed to fit a suitable connecting mechanism on the gun inlet or on the ammunition box. This adapter may be connected in an extremely short period of time and still when once in place can not become accidentally disengaged.

A feature of the present invention lies in the provision of a chute adapter which includes pairs of spring urged pins designed to engage in suitable apertures in the shell inlet to the gun and the bracket leading to the ammunition box. These pins are held by spring force engaged in their proper apertures. However, by merely pressing the spring urged pins together the pins may be disengaged from the apertures to permit removal of the chute.

A feature of the present invention lies in the provision of a chute adapter which includes spring urged pins which are designed to engage in apertures in a suitable fitting and in producing a reduced diameter portion on these pins which is slidable through a relatively narrow slot communicating with each aperture. As a result the pins may be pressed together until the reduced diameter portions of the pins register with the slots and the slots will act to guide the pins into the apertures. This arrangement greatly simplifies the operation of attaching the chute in place.

An added feature of the present invention lies in the provision of an adapter which may form an end connection with a chute and to which the chute may be flexibly anchored. While opposite ends of the chute require adapters of slightly different form because of the specific form of the chute employed, the two adapters are shown generally similar in arrangement.

These and other objects and novel features of my invention will be more clearly and fully set forth in the following specification and claims.

In the drawings forming a part of my specification:

Figure 1 is a side elevation view of a portion of an ammunition chute connected at one end to a gun and at its other end to an ammunition box.

Figure 2 is a top plan view of an end of the chute showing the end thereof designed for attachment to the gun.

Figure 3 is an end view of the adapter designed for attachment to the gun, the position of the section being indicated by the line 3—3 of Figure 2.

Figure 4 is a side elevation view of the adapter designed for connection with the gun.

Figure 5 is a top plan view of a portion of the adapter shown in Figures 2 and 4, portions of the adapter being broken away to illustrate the construction thereof, the position of the section being indicated by the line 5—5 of Figure 3.

Figure 6 is a sectional view through the adapter and gun attachment bracket, the position of the section being indicated by the line 6—6 of Figure 2, and showing spring pressed pins in inward position in contrast to the pins being in an outward position as shown in Figures 3, 9, 10, 14 and 16.

Figure 7 is a perspective view of the bracket mounted upon the gun for connection with the adapter on the chute.

Figure 8 is a top plan view of the end of the chute designed for attachment to the ammunition box.

Figure 9 is a front elevation view of the adapter connected to the chute end, the position of the section being indicated by the line 9—9 of Figure 4.

Figure 10 is a side elevation view of the adapter shown in Figures 8 and 9.

Figure 11 is a sectional view through the adapter illustrated in Figures 8 through 10, the position of the section being indicated by the line 11—11 of Figure 8, and showing spring pressed pins in inward position in contrast to the pins being in an outward position as shown in Figures 3, 9, 10, 14 and 16.

Figure 12 is a perspective view of the type of bracket secured to the ammunition box for attachment with the adapter shown in Figure 8.

Figure 13 is a sectional view through a portion of an adapter, the position of the section being indicated by the line 13—13 of Figure 9.

Figure 14 is a perspective view of a modified form of adapter connection.

Figure 15 is an elevation view of the adapter shown in Figure 14.

Figure 16 is a sectional view through the adapter shown in Figure 15.

Figure 17 is a perspective view of one portion of the adapter bracket.

Figure 18 is a perspective view of the fixed portion of the adapter bracket.

The chute A is of a type illustrated in my previously filed application for patent above referred to. The chute construction may be changed, as the adapters are suitable for use with chutes of various types. However, in order that the application be thoroughly understood the manner in which the adapter is connected to a chute of my design is illustrated in the drawings. The chute A is employed to connect a gun B with an ammunition box C. The particular style or type of gun and ammunition box is not of importance as these devices may be changed substantially. The gun may be entirely changed in design or style and the ammunition box may be changed in shape or design to fit the particular location. Thus the specific construction of these elements will not be described in detail.

It will be noted that the gun B is provided with a gun

feeding device 10 which accepts the shells and delivers them to proper position in the gun. The feed device illustrated is not of importance in the present invention but is shown to indicate the manner in which my adapters are used.

The feed device 10 is provided with a removable tubular inlet 11 which is generally rectangular in cross section and through which the shells pass in entering the feed device. The tubular inlet is supported by side brackets 12 which encircle a cylindrical projection 13 on each side of the feed device. The inlet 11 is also detachably connected at 14 to the feed device so that the entire inlet apparatus may be removed when necessary.

The chute A is designed for attachment to the gun inlet. As best illustrated in Figure 2 of the drawings the generally rectangular inlet member 11 is provided with an attaching bracket 15 on each side thereof. The attaching brackets 15 are constructed as best illustrated in Figure 7 of the drawings, one such bracket being mounted on either side of the inlet and the brackets being reversed in form. Each bracket 15 includes a top plate 16 and a bottom plate 17 which are arranged in parallel spaced relationship. The top plate 16 is connected along the off-set 19 with a top flange 20. The flange 20 is provided with an integral anchor flange 21 bent at right angles thereto.

The bottom plate 17 is connected along the off-set 22 to a bottom flange 23. An anchoring flange 24 extends from an edge of the bottom flange 23 and is in co-planar relation with the anchoring flange 21. The anchor flanges 21 and 24 extend in abutting relation or substantially so. These flanges 24 and 21 are spot welded or otherwise secured to the side wall 25 of the inlet member 11.

A strap 26 connects the top plate 16 and the bottom plate 17 to add to the rigidity of the apparatus and to hold the plates in parallel relationship. Both the plates are apertured, the top plate 16 having an aperture 27 therethrough while the bottom plate 17 is provided with an aperture 29 therethrough. The aperture 27 is connected to the forward edge 30 of the plate 16 by a slot 31. The aperture 29 is likewise connected to the front edge 32 of the plate 17 by a slot 33. The slots 31 and 33 are in parallel relationship.

The adapter D, designed for attachment to the inlet brackets 15, is best illustrated in Figures 2 through 6 of the drawing. The adapter D comprises a generally rectangular frame 34 having generally parallel top and bottom members 35 and 36 and generally parallel connecting ends 37 and 39. The top and bottom members are shown as being slightly off-set in the center portion so as to be absolutely free of interference with the shells E and to fit the general shape of the gun inlet 11.

The link structure connecting the adapter D with the first section 40 of the chute A is best shown in Figure 2 of the drawings. The various links of the chute are connected together at spaced points about the entire periphery of the sections so as to form flexible connecting means. All of the connecting link structure is substantially similar in form and accordingly only one example of the linkage is specifically illustrated. It will be noted that the top member 35 of the adapter frame 34 is provided with spaced downward projections 41 and 42 and a similar pair of spaced projections 43 and 44. The bottom member 36 of the adapter frame 34 is provided with a pair of spaced upward projections 45 and 46 and a similar pair of spaced upward projections 47 and 49. The end wall 37 of the adapter frame 34 is provided with a notch 50 similar in width to the space between the projections of each pair. The end wall 39 is likewise provided with a notch or groove 51 similar in width to the space between the projections of each pair. A flexible connecting linkage is connected to the projections on each pair and to overlie the notches 50 and 51. All of the linkages in question are similar to that illustrated in Figure 5 of the drawings.

A plate 52 bridges the space between the downward projections 43 and 44 so as to leave a space above the same. A generally rectangular link 53 lies in the space between the projections 43 and 44, thus lying between the plate 52 and the body of the adapter frame. The rectangular link 53 is preferably provided with end extensions 54 which are designed to overlap with the next adjacent link.

A pair of upwardly extending opposed hooks 55 and 56 are provided on the plate 52. These hook shaped projections are in co-planar opposed relationship and act to confine the link 53 so that it can only move in a longitudinal direction between predetermined limits. The hooks 55 and 56 normally extend into a relatively narrow groove 57 intermediate between the projections 43 and 44 so that the link 53 is held in place by the body of the adapter frame. The link such as 53 may be removed by depressing one of the hooks 55 or 56 as described in the previous mentioned application.

A guide plate 58 is secured to the projections 43 and 44 immediately beneath the plate 52. This guide plate 58 is designed to extend into overlapping relation with a similar guide plate on the next adjacent frame section so as to provide a continuous guide for the shells passing through the chute. The guide plate 58 extends in one direction only from the adapter frame 34 as illustrated in Figure 5. Rivets 59 or other suitable means are provided for attaching the plate 52 and the guide plate 58 to the projections 43 and 44.

The linkage above described is similar to that described in the application for patent above referred to and shows the manner in which a chute of this type may be flexibly connected to the adapter. Other types of flexible chutes might also be attached to the adapter, the specific construction of the adapter frame being changed to some extent to allow the chute to be attached thereto.

Each end wall 37 and 39 of the frame 34 is provided with an outwardly projecting body portion. A body portion 60 projects outwardly from the end wall 37 of the frame, while a similar projecting portion 61 projects outwardly from the end wall 39 thereof. A vertical passage 62 extends through each body portion as indicated in Figure 6 of the drawings. In view of the fact that both body portions are similar in form, although reversed, but one end thereof is illustrated specifically in the drawings.

A bushing 63 is driven into the aperture 62 from the upper end thereof and a similar bushing 64 is driven into the same from the lower end thereof. The bushing 63 is provided with a partition wall 65 therein intermediate the ends thereof and the bushing 64 is provided with a similar partition wall 66. A relatively small diameter opening extends through each of the partition walls 65 and 66 to accommodate the reduced diameter end of a corresponding spring urged connecting pin. The small diameter end 67 of a connecting pin 69 extends through the partition wall 65, while the small diameter end 70 of a connecting pin 71 extends through the partition wall 60.

Split washers 72 are mounted upon the ends 67 and 70 of the connecting pins 69 and 71 and a compression spring 73 extends between these washers to urge the pins 69 and 71 normally apart. The pin 69 is provided with a larger diameter portion 74 which is slidably supported in the bushing 63. The pin 71 is provided with a large diameter portion 75 which is slidable in the bushing 64. The large diameter portions 74 and 75 are connected by reduced diameter shank portions 76 and 77 respectively, to operating heads 79 and 80.

It will be seen that the inward movement of the pins 69 and 71 is limited by engagement of the large diameter portion 74 and 75 thereof with the partition walls 65 and 66. The outward movement of the pins is limited by engagement of the washers 72 with the partition walls. The pins are shown in inward position in Figure 6 of the drawings and when in their normal position the large diameter portions 74 and 75 project out of the bushings 63 and 64. The bushings 63 and 64, and relatively sim-

ilar arrangements as hereinafter described, provide sockets within which the pin portions 74 and 75 are slidably mounted.

It will be noted that the body portions 60 and 61 are centrally notched as indicated at 81 and 82 so as to provide access to the inner ends of the pins 69 and 70 and so that the spring 73 may be easily mounted in place.

It will also be noted from an examination of Figure 6 of the drawings that aligned apertures are provided through the aperture 63 and at right angles to the axis thereof so that the rivets 59 hold the bridge plate 52 and guide plate 58 in place. These openings are closed by the bushings 63 and 64 when the bushings have been inserted.

The manner in which the adapter D is connected to the brackets 15 is believed easily understood from the foregoing description. The pins 69 and 71 at opposite ends of each adapter are urged together by the thumb and forefinger until the enlarged diameter portions 74 and 75 of these pins are moved into the retracted position illustrated in Figure 6 of the drawings. With the pins in this position the adapter may be inserted into the brackets 15, the reduced diameter neck portions 76 and 77 of the pins sliding through the slots 31 and 33 communicating with the apertures 27 and 29. When the adapter is in proper position the inward pressure upon the pins 69 and 71 is released, permitting the spring 73 to urge the pins apart. This action causes the enlarged diameter portions 74 and 75 of these pins to enter the apertures 27 and 29.

The springs 73 hold the pins in this position. It will be noted that when the pins are in this position the adapter D is locked to the brackets 15 as the large diameter portions 74 and 75 of the pins can not pass outwardly through the slots 31 and 33. Thus the adapter can not be accidentally disengaged from the brackets when once it is in place. However, when it is desired to detach the chute from the gun, it is only necessary to compress the pins 69 and 71 at opposite ends of the adapter inwardly until the pins are in retracted position, whereupon the adapter may be disengaged from the slots with no difficulty.

The chute A is provided with an adapter E which is designed to engage with cooperable brackets upon the ammunition box C. The adapter E is generally similar to the adapter D previously described and works in a generally similar manner. However, the adapters D and E differ in certain detail construction and accordingly the adapter E as well as the ammunition box brackets will be described in some detail.

In Figure 12 of the drawings I disclose a bracket 83 which is of the type employed on opposite sides of the ammunition box C. The two brackets 83 are similar in construction but are reversed in arrangement, one such bracket projecting from each side of the ammunition box on opposite sides of the opening in the box. The ammunition box opening is not illustrated in detail in the drawings but is shown as being located at an upper corner of the box so that the ammunition may be fed into the chute from the box.

Each bracket 83 includes a top attachment plate 84 and a bottom attachment plate 85. The two plates 84 and 85 are connected by a connecting strap 86 which joins an edge of each plate. The top plate 84 is connected by an off-set 87 to a top flange 89. A mounting flange 90 extends downwardly from an edge of the top flange 89.

The bottom attachment plate 85 is connected by an off-set 91 to a bottom flange 92 provided with a mounting flange 93 along one edge thereof. The mounting flange 93 is preferably arranged in opposed co-planar realtion with the flange 90. The flanges 90 and 93 are spot welded or otherwise attached to the side wall of the ammunition box C.

The top plate 84 is provided with an aperture 94 therethrough which is connected by a slot 95 to the forward edge of the attachment plate 84. The bottom attachment plate 85 is provided with an aperture 96 axially aligned

with the aperture 94 and connected by a slot 97 to the forward edge of the attachment plate 84.

With reference now to Figures 8 through 11 of the drawings, it will be noted that the adapter E is generally similar in shape to the adapter D previously described. The adapter E comprises a generally rectangular frame through which the ammunition may slide. This frame includes a top frame member 99, a bottom frame member 100 and side frame members 102 and 101. The top and bottom frame members are provided with central off-set portions 103 and 104 respectively, which space the adapter from the ammunition and fit the contour of the portion of the ammunition box to which the adapter E in effect forms the last link or section of the chute A. The top frame member 99 is provided with spaced downwardly extending projections 105 and 106. A retaining plate 107 bridges the space between the projections 105 and 106 and is provided with downwardly projecting lugs or fingers 109 which extend through the last rectangular link 53 of the chute to hold this link connected thereto. The bridge plate 107 is identical to the bridge plate 52 previously described and is held in place by rivets 110. A guide plate 111 overlies the plate 107 and is overlapped by the guide plate 57 of the next adjacent chute section. The guide plate 111 is identical to the guide plates 58 previously described with the exception of the fact that the guide plate 59 does not project beyond the edge of the adapter.

In a similar manner other links 53 connect spaced points about the periphery of the rectangular frame to the next adjacent chute section. Each link 53 is held in place by a plate 107 identical with the plate 52 previously described and each plate 107 is bridged over by a guide plate 111. In this manner the adapter D is connected to the remainder of the chute A to form the end section thereof.

As illustrated in Figures 9, 10 and 11 of the drawings bosses or thickened body portions 112 and 113 are provided on each of the frame side members 101 and 102. These thickened body portions are provided with parallel apertures 114 therethrough of the type best illustrated in Figure 11 of the drawings. The body portions 113 and 114 are centrally notched as indicated at 115, this notch communicating with the aperture 114 at the mid-point thereof. A bushing 116 is pressed into an upper end of each aperture 114 and a similar bushing 117 is pressed into the lower end of each aperture 114. Connecting pins 119 and 120 are slidably mounted in the bushings 116 and 117 respectively to slide longitudinally of these bushings.

The bushing 116 is provided with a partition 121 intermediate its ends and this partition is apertured to accommodate the reduced diameter end 122 of the pin 119. A larger diameter pin portion 123 is slidable in the bushing 116 above the partition wall 121. The large diameter pin portion 123 is connected by the reduced diameter neck 124 to the head 125 of the pin. The reduced diameter end 122 is grooved near its lower extremity to accommodate a split washer 126 which limits the upward movement of the pin by engagement with the partition wall 121.

The bushing 117 is provided with a partition wall 127 which is apertured to accommodate the reduced diameter end 129 of a pin 120. This reduced diameter end is grooved near its upper end to accommodate a split washer 131 which limits downward movement of the pin by engagement with the partition wall 127. A spring 130 is interposed between the split washers 126 and 131 so as to normally urged the pins 119 and 120 outwardly.

The pin 120 is provided with an enlarged diameter portion 132 which slides within the bushing 117 and this portion is connected by a reduced diameter neck 133 to the head 134 of the pin. The necks 124 and 133 of the pins are of sufficiently small diameter to slide through the slots 95 and 97 of the attachment plates 84 and 85 of the mounting brackets 83. The large diame-

er portions 123 and 132 of these pins are of proper liameter to fit snugly within the apertures 94 and 96.

The manner of connecting the adapter E is identical with the manner of attaching the adapter D. When it is desired to attach the adapter E to the brackets 83, the pins 119 and 102 are pressed together between the thumb and forefinger and the reduced diameter necks 124 and 133 of the pins are inserted through the slots or grooves 95 and 97 until the pins are in registry with the apertures 94 and 96 of the bracket attachment plates. The inward pressure is then released and the spring 130 urges the pins apart and forces the enlarged diameter portions of the pins into the apertures 94 and 96. While in this position the adapter can not be disengaged from the brackets 83.

It will be noted that my adapters operate similarly at each end of the ammunition chute and may be easily connected and disconnected from either the gun or the ammunition box. Thus either end of the chute may be attached or disconnected with a similar operation and the operation may be accomplished in an extremely short period of time. My adapters are virtually fool-proof in operation and will effectively remain in place against accidental disengagement. It is necessary to press inwardly both of the opposed connected pins at each end of the chute before the chute may be disengaged, thereby eliminating accidental disconnection.

As shown in Figure 6, in conjunction with Figures 1, 3, 4, and 7, the pin mounting barrel portions 60 and 61 abut against the offset or shoulder portions 19 and 22 to align the pin portions 74 and 75 with apertures in plates 16 and 17, respectively, as described. Further, as similarly illustrated in Figure 10, in conjunction with Figures 8, 9, 11, and 12, the pin mounting barrel portions 112 and 113 abut against the offset or shoulder portions 87 and 91 to align the pin portions 123 and 132 with apertures 94 and 96 in plates 84 and 85, respectively, as described.

In Figures 14 through 18 of the drawings I disclose a modified form of adapter construction which is designed for attachment to adapter brackets previously in use. In the constructions which have been previously employed, the adapters fit into rectangular box like structures of the type illustrated in Figure 18 of the drawings. One such adapter is spot welded or otherwise connected to each side of the ammunition box on the gun inlet such as 11. The structure shown in these figures of the drawings may be attached to this type of bracket in place of the adapters previously used.

In Figure 14 of the drawings I disclose a tubular member 140 which may be either the ammunition feed box or the tubular inlet to the gun. Mounted on either side of the inlet 140 is a box like fixture 141 of the type best illustrated in Figure 18 of the drawings. This box like structures includes an outer wall 142, top and bottom walls 143 and 144 and an inner wall 145. This inner wall 145 is usually split between its upper and lower edges as indicated at 146 so that the mixture 141 may be formed of a single piece of material. The inner wall 145 is spot welded or otherwise affixed to each side wall 147 of the tubular member 140 as indicated in Figure 14. The outer wall 142 is provided with a rectangular notch 149 communicating with one end thereof as best shown in Figure 18.

The bracket 150 which is used with this structure includes a channel shaped body having a vertical wall 151 and generally parallel top and bottom flanges 152 and 153 respectively. The outer wall 151 is bulged or rounded outwardly at one end as indicated at 154. The top and bottom flanges are also rounded upwardly and downwardly respectively as indicated at 155 and 156. Thus the end of the bracket 150 is enlarged to accommodate a chute attachment of the general type previously described.

The bracket wall 151 is provided with an outward projection 157 which serves as a limiting shoulder in a manner which will be later described in detail. The wall 151 is also provided with a pair of spaced apertures 159 which are threaded to accommodate clamping bolts 160.

The end 155 of the bracket flange 152 is provided with an aperture 161 extending therethrough. The aperture is encircled by a peripheral upstanding flange 162. The aperture 161 communicates with the end of the flange by means of a slot 163. The end 156 of the flange 153 also is provided with an aperture 164 which is encircled by a peripheral flange 165. The aperture 164 comunicates with the adjacent end of the flange by a slot 166.

The apertures 161 and 164 are axially aligned to accommodate the fixture in the manner which will be later described. A clamping plate 167 is used in conjunction with the bracket, the general shape of the clamping plate being indicated in Figure 14 of the drawings. This clamping plate 167 is designed to fit partially in the notch 149 of the fixture 141. The end 169 of the clamping plate fits against the end 170 of the notch 149 to limit movement of the clamping plate and the bracket to which it is secured in one direction. The projecting shoulder 157 engages against the end 170 of the fixture 141 to limit relative movement of the bracket in the opposite direction. The side edges 171 and 172 of the clamping plate 167 are off-set from the center of the plate so as to overlie the front wall 142 of the fixture 141 on either side of the notch 149. By use of the bracket 150 the chute may be connected to an ammunition box or a gun inlet without modifying the structure previously employed. With new installations it is preferred that the brackets be spot welded or riveted directly to the amunition box and the gun inlet. However, in using the chute with guns and ammunition boxes to which the fixtures 141 have been applied, my bracket permits attachment without modification of the existing structure.

In Figures 15 and 16 of the drawings I disclose a slightly different form of attaching mechanism from that previously described. At the same time, however, the operation of the structure is not materially changed. In these figures, I disclose a generally rectangular frame 173 similar to the rectangular adapter frames previously described. The frames 173 are connected to the linkage mechanism in the manner previously described. At each end of the frame I provide the adapter attaching mechanism which in general is similar to the structures previously described. A rounded enclosure 174 is secured to each end wall 175 of the frame. The enclosure 174 is provided with a cylindrical bore 176 extending entirely therethrough. A sleeve 177 is pressed into the bore 176 so as to be held firmly in place. A pair of opposed slots 179 are provided in the sleeve 177 near the upper end of the sleeve and a similar pair of slots 180 are arranged in diametrically opposed relation near the lower end of the sleeve. These slots 179 and 180 are designed to slidably accommodate pins 181 and 182 respectively. The pins extend through the cylindrical bodies, connecting pins 183 and 184. A spring 185 is positioned between the inner ends of the two pins so as to normally urge them apart. The pins 181 and 182 limit the slidable movement of the connecting pins 183 and 184.

The connecting pins are provided with reduced diameter portions 186 and 187 respectively. These reduced diameter portions support the heads 189 and 190 of the bars. By pressing inwardly on the pin heads the pins may be resiliently urged together.

The structure thus described is designed to engage in the brackets 150. The pins 183 and 184 fitting within the apertures 161 and 164. The pins are of too large diameter to pass through the slots 163 and 166, thereby holding the adapter frame connected to the brackets. However, by pressing the pins 183 and 184 inwardly at both ends of the adapter frame, the reduced diameter portions of the pins become aligned with the bracket slots 163 and 164, permitting the adapter frame to be removed.

This structure has the advantage of eliminating certain parts previously required, and thus reducing the cost of construction. The peripheral flanges 162 and 165 encircling the bracket apertures reinforce these apertures and provide a better locking engagement between the adapters and the brackets. Furthermore, the adapter brackets may be used with fixtures of a conventional type now in use.

In accordance with the patent statutes, I have described the principles of construction and operation of my adapter for ammunition chutes, and while I have endeavored to set forth the best embodiment thereof, I desire to have it understood that obvious changes may be made within the scope of the following claims without departing from the spirit of my invention.

I claim:

1. A detachable connector including two body parts, one of said body parts including a pair of generally parallel plates and means supporting said plates in parallel spaced relation, the other of said body parts including barrel means designed to extend snugly between said plates with the axes thereof normal to the plane of said plates, a pair of pins slidably supported in said barrel, means resiliently urging said pins apart, stop means on said pins limiting their outward movement from said barrel, a portion of relatively small cross sectional area adjacent to the end of each pin, a portion of larger cross sectional area on said pins inwardly of said relatively smaller area portions, apertures in said plates at opposite ends of said barrel means, and slots connecting each aperture with a corresponding adjacent edge of the plate, said slots being of proper size to permit the passage therethrough of said smaller cross sectional area portions of said pins and too narrow to accommodate the larger cross sectional area portions, said larger cross sectional area portions of said pins fitting within said apertures.

2. The structure described in claim 1 and including enlarged heads on said pins designed to limit inward movement thereof.

3. The structure described in claim 1 and including body abutting means on at least one of said plates to limit movement of said other body part between said plates.

4. The structure described in claim 1 and including shoulder means on at least one of said plates to limit movement of said other body part between said plates.

5. A disconnectable fastener including two main body parts, one of said body parts including a pair of generally parallel plates and means holding said plates in parallel spaced relation, the other of said body parts including a body snugly engageable between said plates, said plates having aligned apertures therethrough, slots connecting each of said apertures with a corresponding edge of the plate in which the aperture is located, said other body part including a pair of opposed pin holding sockets, a pair of pins slidably supported for movement axially of the said sockets in a direction normal to the plane of said plates, each pin including a reduced cross sectional area portion near the outwardly extending end of the pin, and a larger cross sectional area portion inwardly of said reduced area portion, said reduced area portion being of proper dimensions to fit through said slots in said plates and said larger cross sectional area portion being of too large dimensions to fit through said slot, said large diameter portion being of proper size to be accommodated within said apertures, means normally urging said pins outwardly, and means restricting outward movement of said pins so that said larger cross sectional area portion of each pin is engaged within its corresponding aperture in said plate.

6. The structure described in claim 5 and in which each of said sockets is provided with an axial aperture, an extension of relatively small cross sectional area as compared to said larger area portion extending through said aperture, and means on said extensions for limiting outward movement of said pins.

7. The structure described in claim 5 and including axial extensions extending inwardly from each of said pins, each of said sockets having apertures at the base thereof to accommodate said extensions and in which said means normally urging said pins outwardly is interposed between said extensions.

8. A detachable connection including two main parts, one of said parts including a pair of plates and means supporting said plates in parallel spaced relation, said plates having substantially aligned edges on one side thereof, said plates having apertures therethrough in alignment, and slots connecting each of said apertures with said edges of said plates, the other part including a member designed to extend snugly between said plates, a tubular barrel extending through said member with its axis substantially normal to the plane of said plates, a pin slidably supported in each end of said barrel, a spring interposed between said pin for normally urging said pins outwardly, cooperative stop means limiting the outward movement of said pins from said barrel, said pins having relatively small outer portions designed to extend through said slots, and relatively larger inner portions designed to engage in said apertures, but wider than said slot and a notch in said barrel intermediate the ends thereof exposing a portion of said spring.

9. The structure described in claim 8 and including partitions in said barrel through which the inner portions of said pins extend, and including means on the inner portions of said pins between which said spring is engaged.

10. The structure described in claim 8 and including enlarged heads on said pins at the outer ends thereof to limit inward movement thereof.

References Cited in the file of this patent

UNITED STATES PATENTS

267,060	Buell	Nov. 7, 1882
464,201	Rowland	Dec. 1, 1891
871,422	Leonard	Nov. 19, 1907
1,484,372	Edwards	Feb. 19, 1924
1,744,685	Nittel	Jan. 21, 1930
1,790,706	Hill	Feb. 3, 1931
1,920,408	Lafayette	Aug. 1, 1933
2,419,315	Elliott	Apr. 22, 1947
2,477,264	Pearson et al.	July 26, 1949
2,568,229	Gardes	Sept. 18, 1951

FOREIGN PATENTS

218,779	Great Britain	July 17, 1924
31,330	Netherlands	Nov. 15, 1933