April 4, 1944. F. G. MANSON ET AL 2,345,615

MULTIPLE WEIGHT AERIAL DELIVERY CONTAINER LAUNCHING RIG

Filed April 25, 1942 2 Sheets-Sheet 1

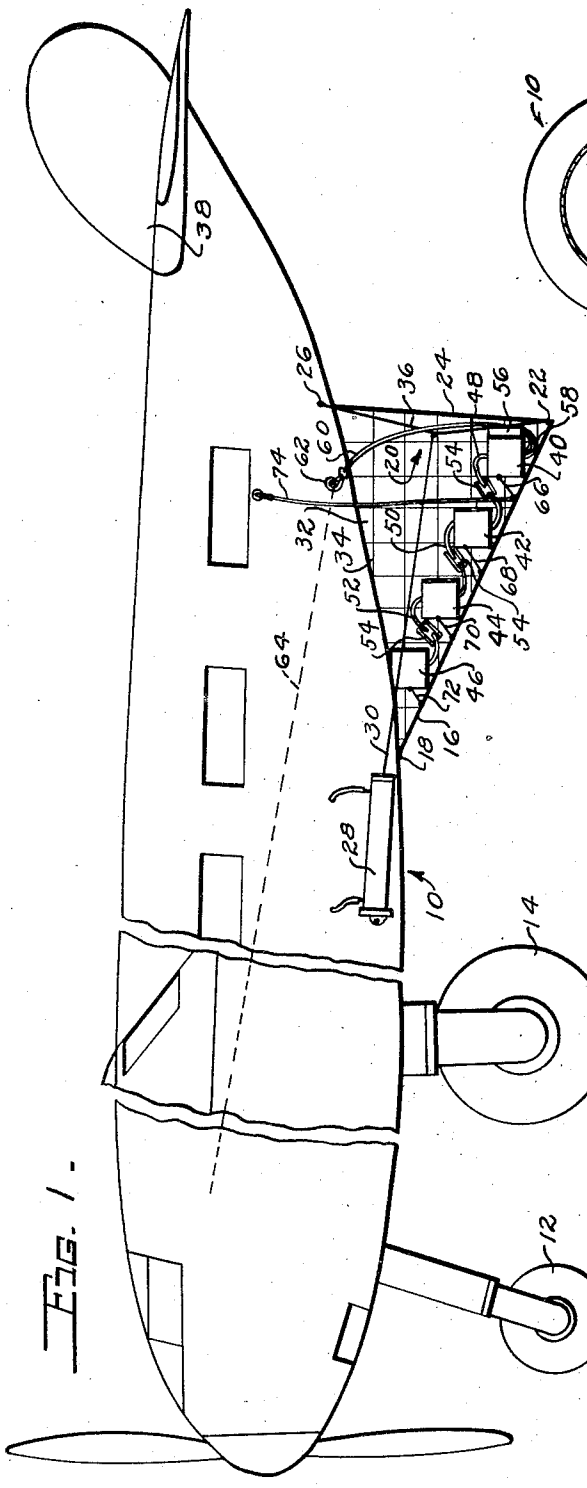


FIG. 1.

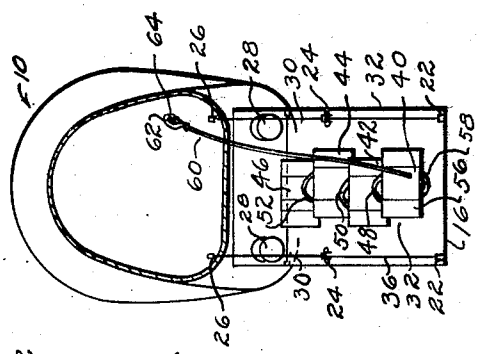


FIG. 2.

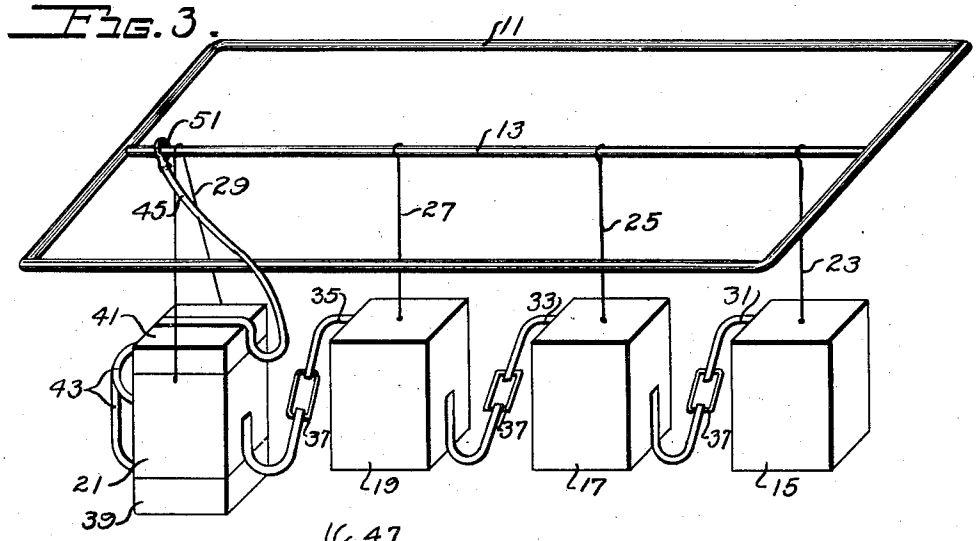
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FIG. 3.



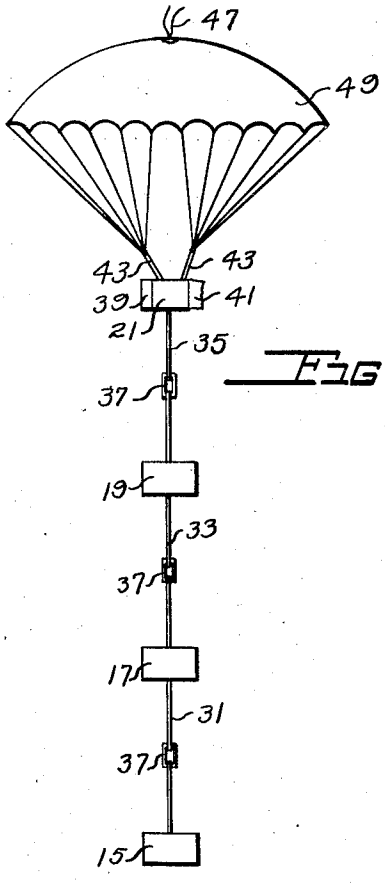


FIG. 4.

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MULTIPLE WEIGHT AERIAL DELIVERY CONTAINER LAUNCHING RIG

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Application April 25, 1942, Serial No. 440,483

7 Claims. (Cl. 244—137)

(Granted under the act of March 3, 1883, as amended April 30, 1928; 370 O. G. 757)

The invention described herein may be manufactured and used by or for Government for governmental purposes, without the payment to us of any royalty thereon.

This invention relates to paratroop equipment containers for aerial delivery by parachute and is particularly concerned with a system for delivering a plurality of containers simultaneously by means of a single parachute.

Much of the equipment used by paratroops is necessarily landed almost simultaneously with the landing of the troops and in close proximity to their points of landing, since they may require the equipment to go into immediate action.

Since a considerable distance is traveled by an aircraft during the launching of a single container, it follows that unless a number of launching chutes or other launching devices are provided, all of which take valuable space, successive containers of a required group may be delivered at considerably spaced apart locations.

Then, too, the equipment is somewhat diversified and may preferably be pre-packed and stored, each kind in a separate container, although that makes it necessary to deliver a series of separate containers to cover the range of the required equipment.

It is therefore an object of this invention to provide apparatus and a system of operation whereby a series of separate containers may be arranged on an appropriate launching device and launched substantially simultaneously.

Another object is to provide launching means which may be used with equal effectiveness for discharging the cargo and for the departure of the paratroopers.

Another object is to so construct and arrange the launching device as to serve also as a loading means whereby no other doors or openings are required for this purpose.

Another object is to so make the device that a single parachute will suffice for lowering the entire series of containers.

Another object is to group the articles of equipment for the several containers of the series in the order of their fragility to the end that the containers alighting first and hardest will contain the articles capable of withstanding the greatest shock.

Other objects and advantages will become evident as the following description is read with reference to the drawings, wherein:

Fig. 1 is a side view of an airplane which is of more or less special construction, particularly as to the novel launching apparatus which is provided to facilitate the application of our system.

Figure 2 is a fragmentary rear view of the launching apparatus of Fig. 1 showing the cargo placed for launching.

Figure 3 shows a modified launching arrangement adapted for use where standard planes are available which already have trap doors in the underside of the fuselage for dropping bombs, etc.

Figure 4 shows the cargo of Fig. 3 in descent.

Like reference characters indicate like parts throughout the drawings.

In the drawings, an airplane 10 has a tricycle landing gear 12—14, and a retractable ramp 16 which is hinged at 18 to the fuselage so that it may be swung to its down position as shown in Fig. 1 or it may be swung upward to cover an opening in the underside of the fuselage of the plane.

Since the ramp 16 must be lowered to its down position against considerable slip stream resistance, toggle joints 20, hinged at 22, 24 and 26, are provided. Hydraulic cylinders 28 act through rods 30 to operate the toggle.

Triangular canvas side walls 32, reinforced by rope 34 are secured at their lower edges to the edges of the ramp and at their upper edges to the edges of the opening in the bottom of the fuselage which the ramp covers when it is drawn to its closed position. No side doors are provided, loading and landing of both troops and equipment being effected through the doorway 36 which is formed by the lowering of the ramp.

The airplane 10 is of the high tail type, the empennage 38 being well above the doorway 36 thus providing a large clearance space above the doorway, which minimizes the danger of fouling.

The cargo assembly, selected for illustration, comprises four containers 40, 42, 44 and 46, the most fragile articles in the cargo being grouped in container 40, the next in order of fragility in container 42, etc. Successive containers are joined together by suitable lengths 48, 50, and 52 of strong webbing, each with a rubber "bungee" ring 54 interposed somewhere in the length between its points of connection to the containers.

A parachute pack 56 is secured to the top of the container 40, the parachute risers 58 being connected to the pack and its static line 60 being connected by break cord to the top of the canopy within the pack and at the other end by a spring snap 62 to the anchor cable 64. All of the containers are connected by light break cords 66, 68, 70 and 72 to the ramp 16.

The break cord 66 which connects the container 40 to the ramp 16 may preferably be secured in some manner which will permit it to be released by untying or breaking it from a distance. This may be accomplished by securing a length of stout webbing 74 to the cord 66 where it is tied to the ramp, the other end of the webbing being taken to a convenient position in the fuselage, so that a tug on this end will untie, cut or break the cord.

The cargo assembly is preferably arranged on and secured to the ramp in the manner above described while the ramp is in its upper closed position, and, if possible, before take-off. The procedure for launching the equipment from the ramp shown in Figs. 1 and 2 may be conducted substantially as follows:

When the landing area is approached, the hydraulic cylinders 28 are operated to force the ramp 16 to its down position as shown in Fig. 1, proper compensation being made for the increase in air resistance by means of the controls.

At the desired location, the line 74 is pulled to break the cord 66 which holds the container 40 to the ramp, whereupon the following sequence of events takes place:

The container 40 falls, the static line 60 tautens, the parachute in the pack 56 is drawn out and opened, the line 46 is tautened by the pull of the parachute, the break cork 68 is severed, the container 42 is pulled off the ramp, the line 50 is tautened, the break cord 70 is severed, the container 44 is pulled off the ramp, the line 52 tautens, the break cord 72 is severed and the container 46 is pulled off the ramp.

In landing, the container 46, having the sturdier articles, will alight first. Before it alights, the parachute is supporting four containers but after it alights it supports only three. Progressively, therefore, as each container alights, the load on the parachute is less and its speed therefore reduced until finally when only the container 46, having the more fragile articles remains suspended, the speed of the parachute is relatively slow. This is considered one of the salient features of the invention.

Immediately following the release of the equipment as above described, the troopers themselves may march toward the rear and down the ramp hooking the spring snaps of the static lines over the anchor cable 64 on the way back and jumping off the rear end of the ramp 16 in much the same way as they jump from the more conventional side door sometimes provided for this purpose.

In the modification of the invention, shown in Figs. 3 and 4, a frame 11 having a center bar 13 is mounted in an aircraft over a suitable opening in the bottom such, for instance as a trap door. A series of delivery containers, four in the instant case, numbered 15, 17, 19 and 21 are individually suspended from the bar 13 by cords 23, 25, 27 and 29 respectively. Interfacing sides of the containers are connected by lengths of webbing 31, 33 and 35 each having a rubber "bungee" ring 37 interposed somewhere between its points of connection to the containers.

The last container of the series, namely number 21, has a cork block 39, or other suitable flotation means, attached to the underside as a location marker in case the cargo is landed on water. It also has a parachute pack 41 secured to the upper side, the parachute risers 43 being connected to the container, and the static line 45 being secured by break cord 47 to the top of the canopy 49 (see Fig. 4), the other end being anchored by a spring snap 51 to the bar 13. The steps taken in the launching of the containers of the modification Figs. 3 and 4 are substantially as follows:

The cord 23 is cut; container 15 falls; the line 31 tautens breaking the cord 25; the container 17 falls; the line 33 tautens breaking the cord 27; the container 19 falls; the line 35 tautens breaking the cord 29; the container 21 falls tautening the static line 45 which pulls the canopy 49 from the pack and severs the break cord 47 between the static line and the canopy, whereupon the canopy opens, as shown in Fig. 4, with the several containers suspended in tandem. The rubber rings 37 cushion the shock when the several lines 31, 33, 35 become taut.

As in the first example shown in Figs. 1 and 2, the sturdiest articles of equipment are packed in the container which lands first, while the most fragile articles are packed in that container which lands last, whereby the landing speed of the fragile articles may be kept at a minimum.

Having described several embodiments of the invention wherein the objects set forth are attained, we claim:

1. Apparatus for the landing of paratroops and their equipment from moving aircraft, which comprises an airplane having a body with an opening in the bottom, a cover hinged at the forward end to said opening, the rear end being swingable on said hinge upwardly to close said opening and downwardly to form a passageway, remote controlled means to swing said cover on said hinges, triangular side walls of flexible material joined along one edge to the sides of the opening and at the other edge to the sides of the cover, thereby forming a protected landing ramp with a doorway facing rearward, an anchor line running lengthwise within the airplane, a series of equipment containers spaced one behind the other on said ramp each secured thereto by a break cord, heavy lines joining the interfacing sides of the containers, resilient shock absorbing rings interspaced between portions of said heavy lines, a parachute pack secured to the rearmost container of the series, a static line connected one end by break cord to the top of the canopy of the parachute and the other end to the said anchor line, and remotely controlled means for severing the break cord on the rearmost container.

2. Apparatus for the landing of paratroops and their equipment from moving aircraft, which comprises an airplane having a body with an opening in the bottom, a cover hinged at the forward edge to said opening, the rear end being swingable on said hinge upwardly to close said opening and downwardly to form a passageway, means to swing said cover on said hinges, side walls of flexible material joined along one edge to the sides of the opening and at the other edge to the sides of the cover, thereby forming a landing ramp with a doorway facing rearward, a series of equipment containers grouped on the ramp, each secured thereto by a break cord, a parachute pack secured to the first container of the series, a static line connected one end by break cord to the top of the canopy of the parachute and the other end anchored to a point on the airplane, means for severing the break cord connecting the said first container of the series

to the ramp, and heavy lines connecting the several containers of the group one to the other.

3. Apparatus for landing paratroops and their equipment from moving aircraft, which comprises an airplane having a body with an opening in the bottom, a ramp sloping downward and rearward from the edge of said opening, side walls connecting the sides of the ramp and the sides of the opening thereby forming a passageway down the ramp to a doorway facing rearward, a number of equipment containers grouped on the ramp each secured thereto by a break cord, a parachute pack secured to one container of the group, a static line having one end connected by a break cord to the top of the parachute canopy and the other end to a point on the airplane, means for severing the break cord connecting the said one container of the group, and heavy lines connecting the several containers of the group one to the other.

4. Apparatus for landing paratroop equipment from a moving aircraft, which comprises an aircraft having a body with an opening in the bottom, a number of equipment containers grouped in proximity to said opening, each secured by break cord to a member carried by the craft, a parachute pack secured to one container of the group, a static line having one end connected by a break cord to the top of the parachute canopy and the other end to a point on the craft, and heavy lines, each having a resilient shock absorbing means within its length, connecting the several containers of the group.

5. The apparatus defined in claim 4 including a flotation means attached to the container of the group having the parachute pack.

6. The apparatus defined in claim 4 including a remote controlled means for severing one of the break cords which connects one of the containers to the member carried by the craft.

7. Steps in the method of launching a parachute and its load of paratroop equipment from a moving aircraft having a static line connected at one end to the aircraft, which consists of assorting the pieces of equipment with regard to their fragility and forming them into packages, securing the packages by break cords to the aircraft in a position from which they will fall by gravity when the break cords are severed, connecting the packages one to the next by heavy lines, the packages being arranged so that an end package in the series contains the most fragile articles, attaching said end package to the parachute pack, tying the free end of the static line by break cord to the top of the canopy of the parachute, and severing the break cord which holds the said end package to the aircraft.

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