Oct. 19, 1954 R. B. COTTON ET AL 2,692,120

AIR PICKUP SYSTEM

Filed Nov. 19, 1952 3 Sheets-Sheet 1

Fig. 3.

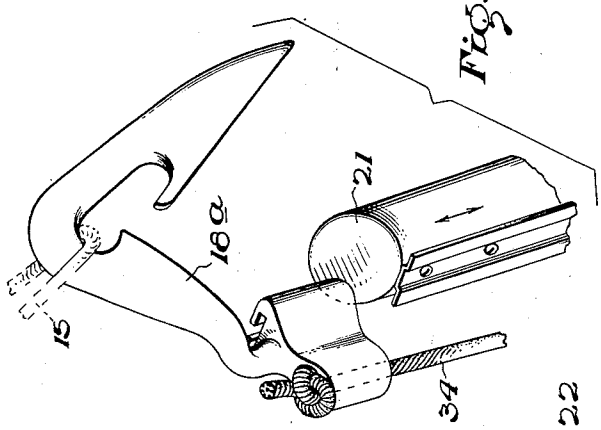
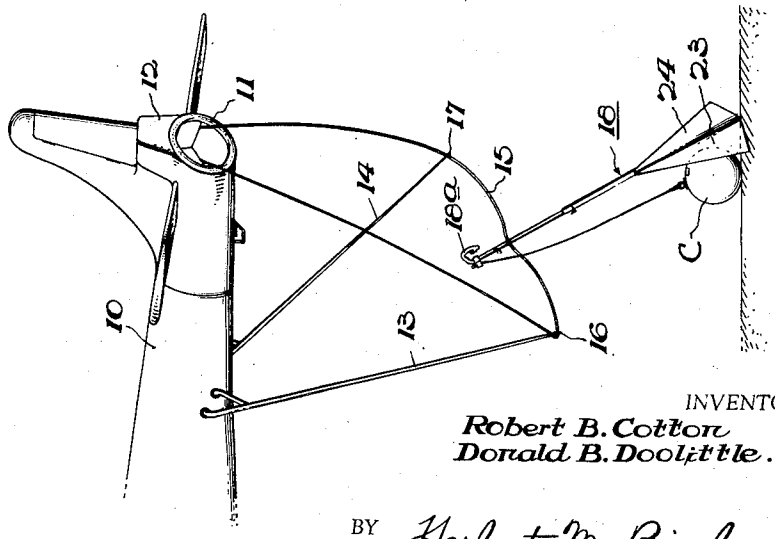


Fig. 2.

Fig. 1.



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AIR PICKUP SYSTEM

Filed Nov. 19, 1952 3 Sheets-Sheet 2

Fig. 4.

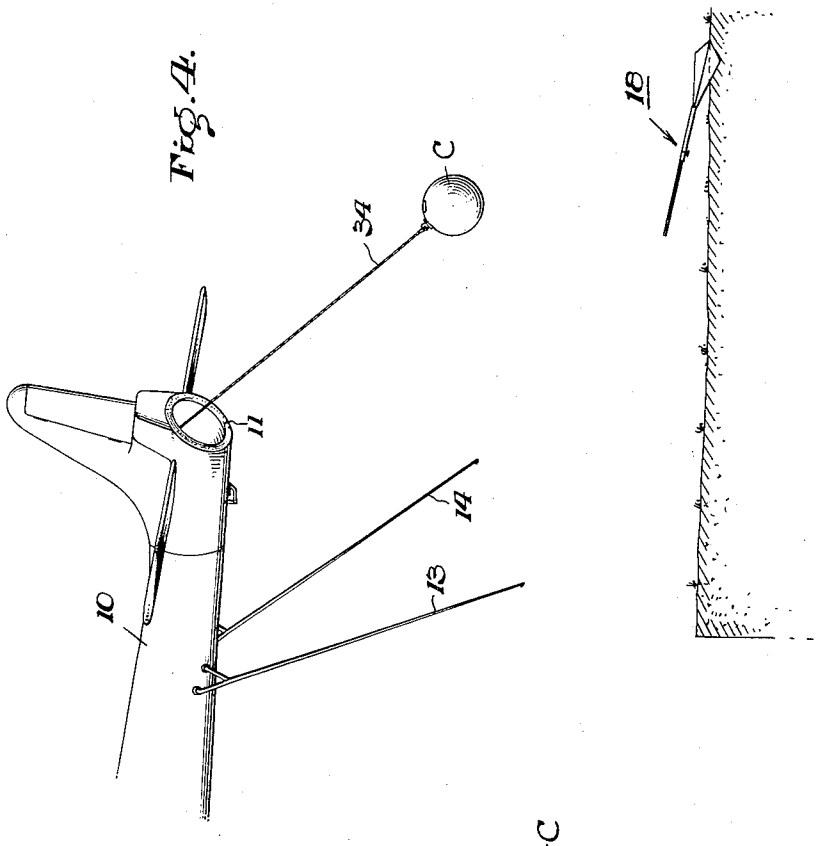
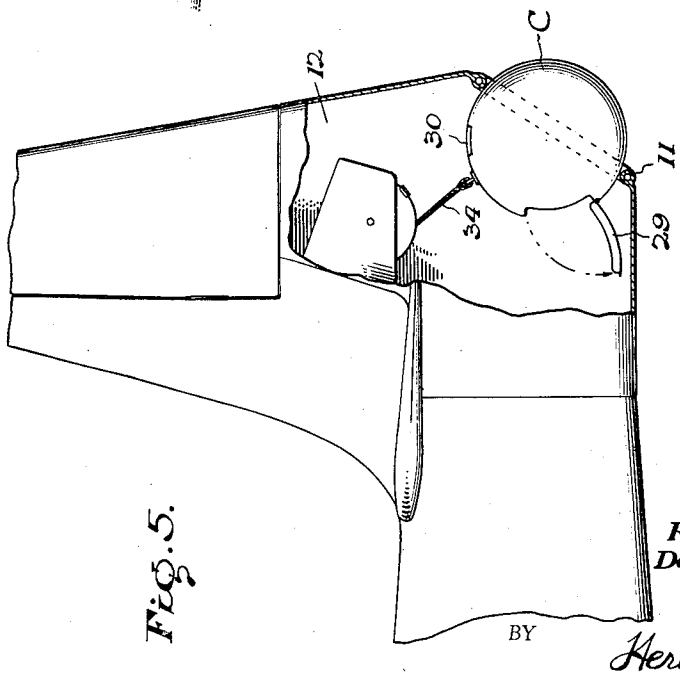


Fig. 5.



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Filed Nov. 19, 1952 3 Sheets-Sheet 3

Fig. 7.

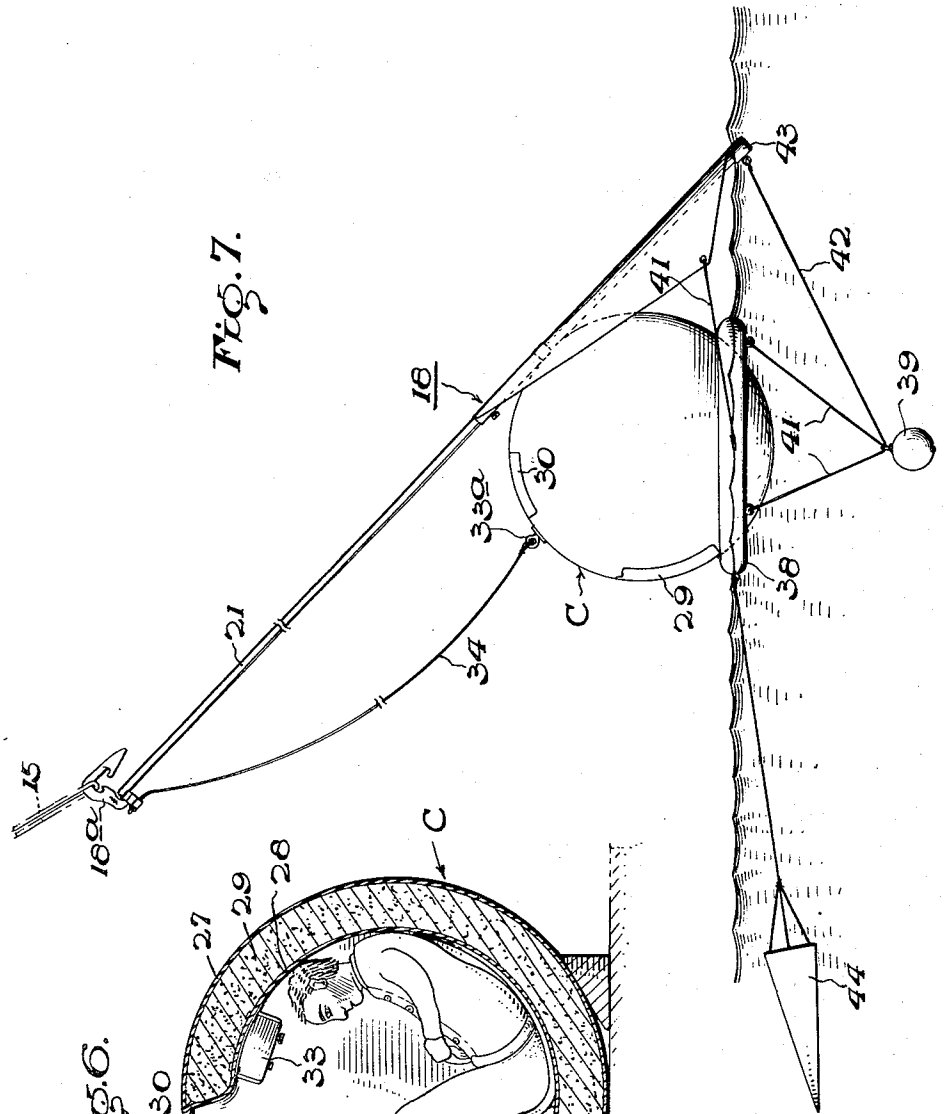
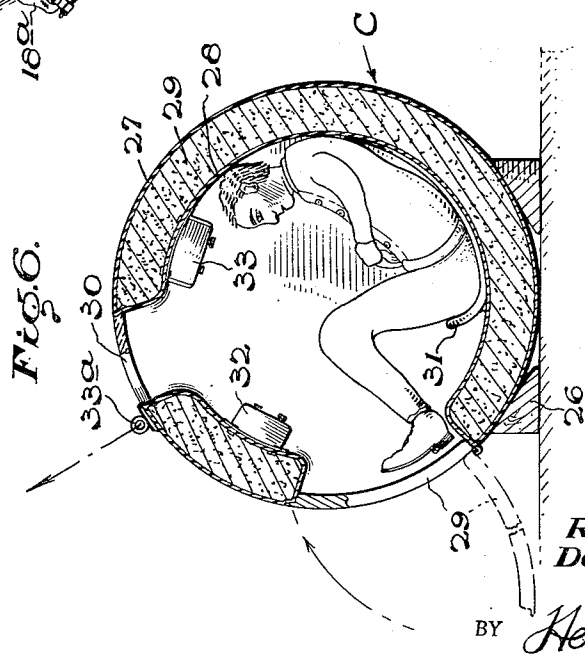


Fig. 6.



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AIR PICKUP SYSTEM

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11 Claims. (Cl. 258—1.2)

1

The present invention relates generally to an air pick-up system.

An object of the present invention is to provide a portable pick-up kit for human cargo comprising a novel container or capsule with a novel pick-up station having substantially maximum simplicity so as to be usable efficiently by inexperienced persons.

Another object is to provide the combination of a spherical manually mobile container and a pick-up station with a novel base adapted to tee up the container prior to each pick-up operation.

A further object is to provide a water-tight container in the form of a manually mobile body with shock proof walls and equipped with the necessary exterior bridle and interior equipment such as, for example, a heater, radio and the like.

Still another object is to provide a novel single pole ground station having a container tee or base and a directional signal panel, to thereby positively properly correlate the position of the pick-up container with the ground station.

Yet another object is to provide a novel aircraft pick-up arm arrangement for a single pole pick-up station.

With the above and other objects in view the present invention comprises certain new and useful constructions, combinations and arrangements of parts, clearly described in the following description, and illustrated in the accompanying drawings, in which:

Figure 1 is a perspective view of the tail of an aircraft illustrating the novel double pick-up arms with the pick-up loop connected therebetween and leading off from the pick-up winch through the rear opening in the craft's fuselage, said loop being about to engage the ground station for pick-up;

Figure 2 is a side view in elevation of a novel single pole pick-up station for use with a double arm pick-up and showing the winch connected loop engaged with the bridle hook just prior to release for pick-up;

Figure 3 is an enlarged perspective showing the bridle hook in the act of release from the single pole station;

Figure 4 is a panoramic view of the pick-up craft in the act of picking up the container after release from the ground station and just prior to retracting the pick-up arms;

Figure 5 is a view partly in elevation and partly in cross section of an aircraft equipped with a pick-up winch and special rear opening for one of the present invention novel cargo bodies showing it pulled into the craft after pick-up;

2

Figure 6 is a cross section view of the novel pick-up container with an illustration of a human cargo therein; and

Figure 7 is a side view in elevation of the novel single pole pick-up with the addition of flotation gear for water surface pick-up.

Referring in detail to the drawings and first with particular reference to Figure 1, there are illustrated four particular novel features of the present pick-up system, as follows:

1. The novel tail end structure of an aircraft fuselage 10 formed with a rear annular opening having a pneumatic cushion or bumper 11 and a special pick-up unit mounting 12 for reeling in the pick-up.

2. The novel double pick-up arms 13 and 14, preferably made of light metal tubing, such as aluminum and the pick-up unit loop 15 held by the diverging free ends 16 and 17 of the arms. The loop is held open by suitable frangible connections, not shown, until the load of the pick-up is applied.

3. The novel pick-up station 18 shown in detail in Figure 2; and

4. The novel pick-up container or capsule C shown in detail in Figure 6.

The pick-up unit

The pick-up unit housed in mounting 12 in the aircraft is the subject of another application and hence is not described or illustrated in this specification other than to explain that the unit is made to pick-up a computed accelerating load at predetermined pick-up acceleration based on the weight in pounds of the pick-up container or capsule C.

The pick-up arms

The pick-up arms 13 and 14 are extensible and foldable during flight and are formed at the outer or free ends of aluminum tubing as light as possible so that if an arm should engage the capsule C the arm which holds the loop will fail rather than impose any damage to the capsule. Also, the free ends 16 and 17 are equipped with some form of loop release clip or frangible connectcion releasable by the pick-up load. Such clips are generally known to the art.

With the double arm arrangement the pick-up loop is carried by the airplane and permits the use of the present novel single pole pick-up station now to be described.

The pick-up station

The present invention is intended particularly for a man pick-up operation and because the man

to be picked up may be unfamiliar with the operation, the ground station is made as simple as possible.

With this reason in view, a single pole station is used and also with the single pole station, the possibility of damage from the usual aircraft pick-up arm and hook formerly carried by the aircraft is eliminated. The pick-up hook 18a is now stationary and supported on the station pole.

More specifically the station 18 comprises a base formed of a flexible loop 19, see Figure 2, coiled at one point into a pole socket 20. The pole is formed of an upper section 21 and lower section 22. The lower section of the pole fits in socket 20, which section slants forward over the flexible base loop, so as to form an acute angle with respect thereto. Attached to lower pole section 22 are ground secured signal panels 23 and 24 respectively, preferably triangular. These panels are clipped together by a yoke 25 for cooperating with the socket 20 to hold the pole section 22, so their apices form an arrow shaped head with the apex thereof adjacent the capsule C when mounted under the pole on the base loop 19. Means are transported within the capsule or container C, such as wedges 26 to tee the capsule into pick-up position on the flexible base loop 19.

The upper pole section 21 telescopes within the lower section 22 and is held to adjusted positions by any suitable means, such as a set screw 22a. On the upper section is the usual release track for the pick-up hook 18a, which is pulled off the pole by the pick-up loop 15 as shown in Figure 5.

The pick-up capsule or container

The details of the pick-up capsule or container C are illustrated in Figure 6 and it is shown in various positions in Figures 1, 2, 4, 5 and 7.

The present novel pick-up capsule is constructed to provide mobility by one man on the ground, structural protection and suitable weight, proper position of the man therein to take maximum "g" load, bridle simplicity, possible adaptation to pick-up from water, see Figure 7, ability of the capsule to be reeled directly into the airplane, stability in the air and protection in event of possible bounce and inadvertent engagement by a pick-up arm. To attain the above desirable features the capsule C comprises a spherical body to give a maximum mobility on the ground. The weight, for example, may be approximately one-hundred seventy-five pounds. The body comprises a spaced jacket having an outer shell 27 and an inner shell 28. Each shell is spaced apart and filled with a shock absorbing material, such as blown or foam plastic filler 29a or the like.

The space between shells may be sealed off to provide at least two openings if desired. For example, one opening is for a door 29, suitably hinged and flanged to make a water tight closure, while the other opening is for a window 30 also suitably sealed.

On the interior wall of the inner shell is shown an occupant seat 31, a suitable heater 32, such as a chemical heater for cold weather rescue and a voice radio 33 for sound transmission to the pick-up airplane.

The exterior wall of the outer shell is generally smooth except for a bridle connection 33a. To this is connected a single strand bridle 34 of nylon rope capable of the usual necessary elongation for pick-up of approximately 20%.

The man to be picked up is shown in the drawing and his position is preferably basically a supine position with the legs folded up and the back lifted approximately 15 degrees. As stated a single static line to the capsule C is desirable for high speed pick-up, as a multiple bridle to the capsule, which would probably utilize a capsule with the man in full prone or supine position might cause entanglement and side loads if not set up properly and by an experienced operator. Since this operation may usually be conducted by personnel not familiar with the equipment, the single static line to the station's single pole is more practical.

The capsule as thus designed and constructed may be reeled directly into the airplane as shown in Figure 5.

Modification

Figure 7 illustrates how the station may be modified for operation on water. In this arrangement the base with its flexible loop 19 is replaced by a flotation gear, such as an annular ring float 38, a stabilizing weight 39 and a plurality of equalizing cables 40 interconnecting the float 38 to the weight, cables 41 connecting the float to the signal panels and a cable 42 connecting the float to the pole socket 43. Also, connected to the float is a suitable form of sea anchor 44.

The pole sections, signal panels and bridle hook are all the same as in the land operation and need no further description.

Operation

In operation the container or capsule C may be delivered for a man rescue by parachute. The capsule will contain the knocked down pick-up station poles signal panels, wedges, bridle and pick-up hook. The spherical capsule C is after landing on the ground rolled to a suitable station set up location and the same is rigged up for pick-up as shown in Figure 2.

If the capsule is water tight and dropped in the water, then the pick-up station is removed from the interior along with the necessary flotation gear and set up for operation as shown in Figure 7.

Thus there is provided a rapid emergency man pick-up for areas where no landing is feasible and where it is necessary to be more rapid and farther reaching than possible by helicopter and autogyros.

While preferred specific embodiments of the present invention are hereinbefore set forth, it is to be expressly understood that the invention is not to be limited to the exact constructions illustrated and described because various modifications of these details may be provided in putting the invention into practice within the purview of the appended claims.

We claim:

1. In an air pick-up, a spherical container adapted to house a man during the pick-up operation, said container comprising inner and outer spaced apart shells having the space between them filled with shock absorbing material, and a pick-up bridle and hook connected to the exterior wall of the outer shell.

2. In an air pick-up, a spherical container adapted to house a man during the pick-up operation, said container comprising inner and outer spaced apart shells having the space between them filled with shock absorbing material, a pick-up bridle and hook connected to the exterior wall of the outer shell, and a pick-up station pole extending over the container holding said bridle and hook in pick-up position.

3. In an air pick-up, a spherical container

adapted to house a man during the pick-up operation, said container comprising inner and outer spaced apart shells having the space between them filled with shock absorbing material, a pick-up bridle and hook connected to the exterior wall of the outer shell, and a pick-up station pole extending over the container holding said bridle and hook in pick-up position, said pole being clipped to an arrow shaped signal pointing toward the container.

4. In an air pick-up system, a spherical capsule of shock proof and water tight construction, a flotation ring adapted to receive and thereby tee the said capsule in air pick-up position, said capsule having a bridle and pick-up hook, a pick-up pole slanting over the top of the capsule for suspending the pick-up hook for pick-up operation.

5. In an air pick-up system, a manually movable spherical capsule of shock proof construction, a flexible base and mounting thereon for supporting said capsule, said capsule having a shock absorbing bridle and pick-up hook, a single pick-up pole slanting forward over the top of the capsule and supporting said pick-up hook, and triangular signal means with the apex pointing toward the container to indicate a proper pick-up direction.

6. In an air pick-up, an aircraft having a pair of diverging pick-up arms each pivoted to a side of the said aircraft, a pick-up loop carried by the arms, and a single pole ground station releasably supporting a pick-up hook and bridle to means to be picked up by the said pick-up loop.

7. In an air pick-up system wherein the aircraft carries the pick-up loop and a pair of loop supporting poles each pivotally mounted to a side of the aircraft and extending divergently from the aircraft body in a downward direction, a ground station with a single pole and a base, said pole having a bridle hook releasing track, and said base having means to support a spherical manually mobile cargo pick-up in proper position for pick-up.

8. In an air pick-up system wherein the aircraft carries the pick-up loop and a pair of loop supporting poles each pivotally mounted on a side of the aircraft and extending divergently from the aircraft body in a downward direction, a ground station with a single pole and a base, said pole having a bridle hook releasing track, said base comprising a flexible ground engaging base attached to the ground adjacent end of said pole, and a container support carried by the base positioned between the ends of the pole, said pole being at an acute angle with respect to the said base and said pole being rendered yieldably movable by said flexible base.

9. In an air pick-up system wherein the aircraft carries the pick-up loop and a pair of loop supporting poles each pivotally mounted to a side of the aircraft and extending divergently from the aircraft body in a downward direction, a ground station with a single pole and a base, a container and a bridle hook tethered to said container, said pole having a bridle hook releasing track, said base comprising a flexible ground engaging bore attached to the ground adjacent end of said pole, a container support carried by the base positioned between the ends of the pole, said pole being at an acute angle with respect to the said base and said pole being rendered yieldably movable by said flexible base and a triangular signal panel secured to the said pole so that the apex thereof points toward the pick-up container.

10. In an air pick-up system wherein the aircraft carries the pick-up loop and a pair of loop supporting poles each pivotally mounted to a side of the aircraft and extending divergently from the aircraft body in a downward direction, a ground station with a single pole and a base, a container and a bridle hook connected thereto, said pole having a bridle hook releasing track on which said hook is mounted, said base comprising a flexible ground engaging base attached to the ground adjacent ends of said pole, container supporting wedges carried by the base positioned on a vertical axis between the ends of the pole, said pole being at an acute angle with respect to the said base of said pole being rendered yieldably movable by said flexible bore and a triangular signal panel secured to the said pole so that the apex thereof points toward the pick-up container supported on said wedges, said container being spherical and wedged between the top of said flexible base and an intermediate point between the end of said pole adjacent the apex of the signal panel when resting on said wedges.

11. In an air-pick-up system wherein the aircraft carries the pick-up loop and a pair of loop supporting poles each pivotally mounted to a side of the aircraft and extending divergently from the aircraft body in a downward direction, a ground station with a single pole and a base, said pole having a bridle hook releasing track, and said base having means to support a spherical manually mobile cargo pick-up body in proper position for pick-up, said pole being formed of telescoping sections.

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