Jan. 14, 1947. H. S. BACON 2,414,284

PARACHUTE DECELERATOR

Filed Dec. 30, 1943 2 Sheets-Sheet 1

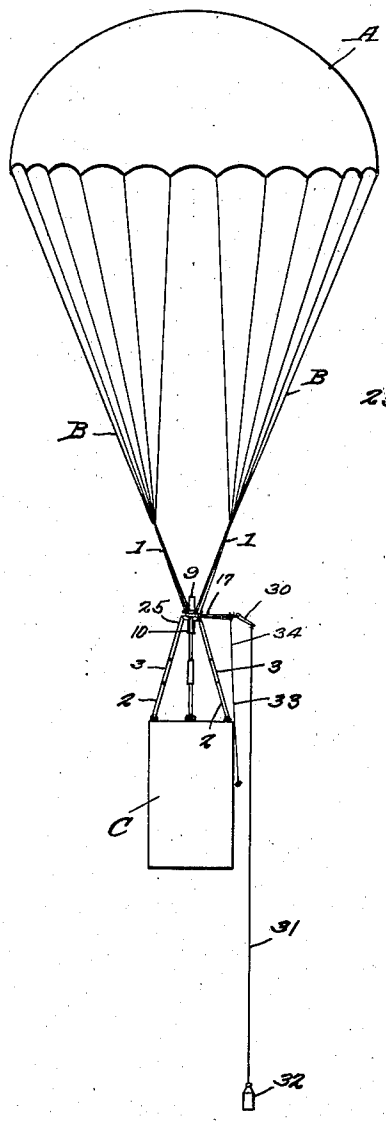


Fig. 1.

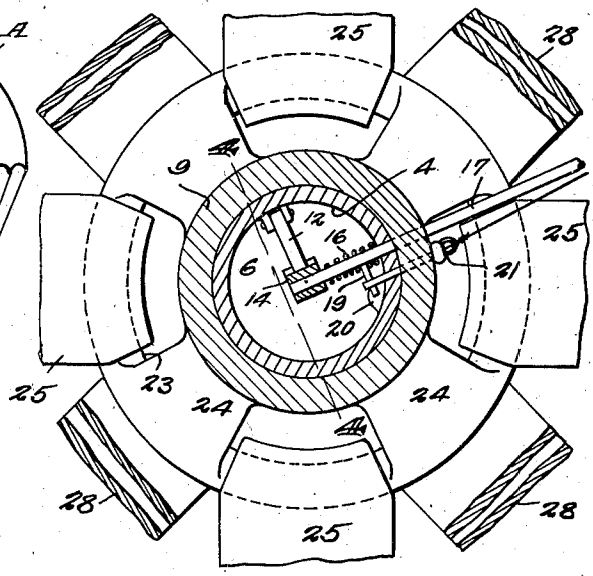


Fig. 3.

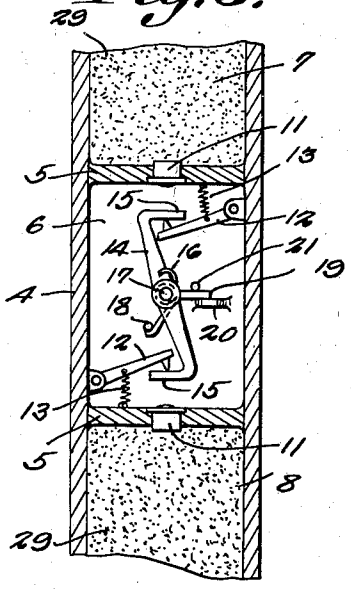


Fig. 4.

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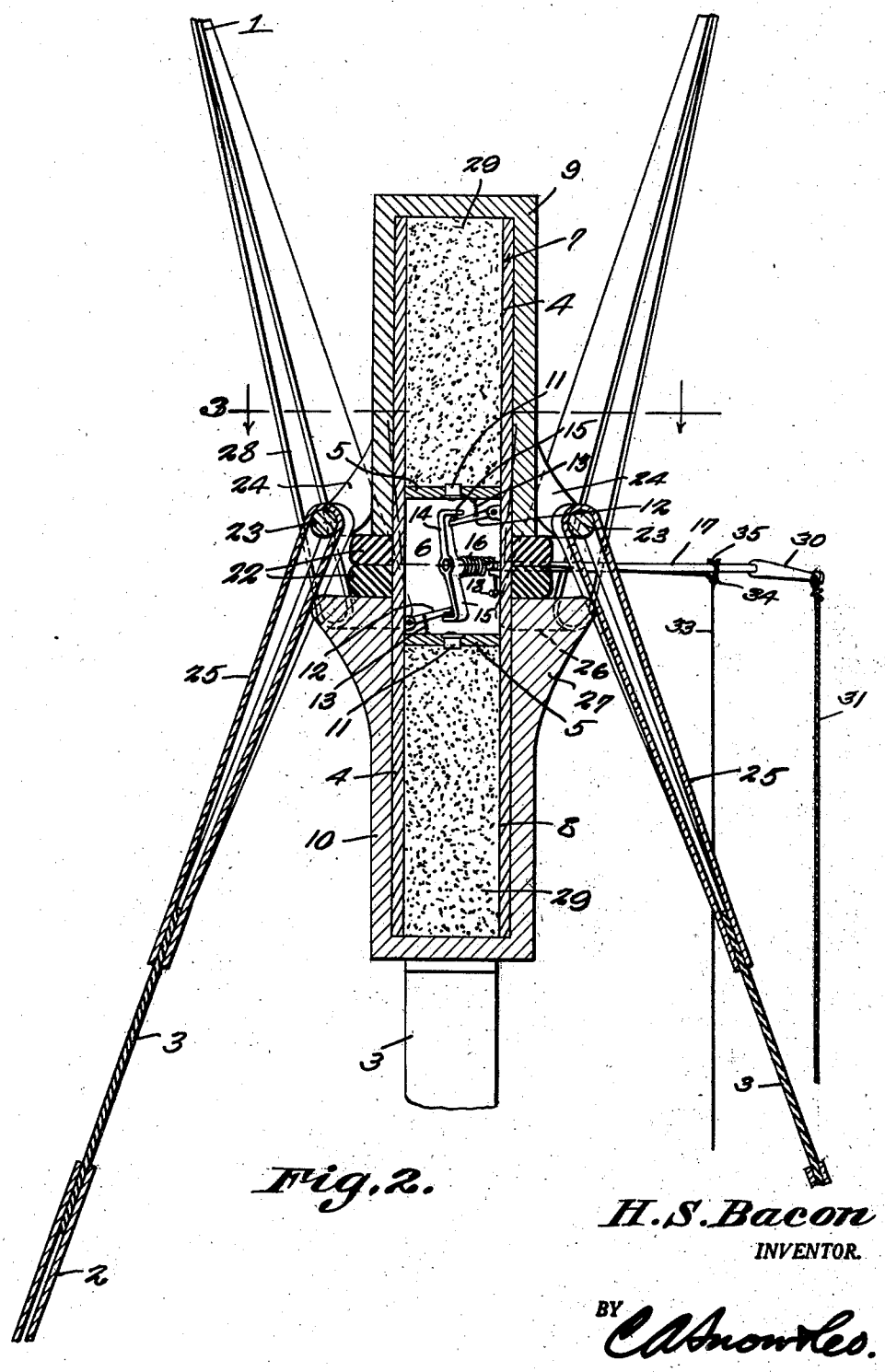


Fig. 2.

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UNITED STATES PATENT OFFICE

2,414,284

PARACHUTE DECELERATOR

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5 Claims. (Cl. 244—138)

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This invention relates to a deceleration device for use in connection with parachutes, one of the objects being to provide controlled means whereby, as the parachute reaches a point near the landing surface, the parachute canopy and the load will be abruptly shifted toward each other, thereby increasing the air resistance to the descent of the canopy and at the same time imparting a lift to the load so that the landing can be made at a slower speed than otherwise would be possible.

A further object is to provide a device of this character which can be combined readily with parachutes already in use and which can be used effectively not only for landing paratroops and others, but also for landing equipment and supplies.

A still further object is to utilize the expansion of gases resulting from the explosion of a confined charge for effecting the desired result.

With the foregoing and other objects in view which will appear as the description proceeds, the invention consists of certain novel details of construction and combinations of parts hereinafter more fully described and pointed out in the claims, it being understood that changes may be made in the construction and arrangement of parts without departing from the spirit of the invention as claimed.

In the accompanying drawings the preferred form of the invention has been shown.

In said drawings:

Figure 1 is an elevation of a canopy descending with a load of equipment supported by the harness.

Figure 2 is an enlarged vertical longitudinal section through the decelerating device showing portions of the canopy shrouds and harness connected thereto.

Figure 3 is a section on line 3—3, Fig. 2.

Figure 4 is a section through the middle portion of the decelerating device and showing one form of firing mechanism which can be used, said section being taken substantially on the line 4—4, Fig. 3, the outer shells being removed.

Referring to the figures by characters of reference, A designates the usual parachute canopy having depending shrouds or cords B. These shrouds or cords are arranged preferably though not necessarily in four groups, and extending from the lower end of each group is a strap 1. Obviously where the cords or shrouds are divided into four groups, four of these straps are used.

The load to be carried by the parachute has been indicated at C and can be in the form of a pack of equipment or supplies or can be the usual parachute harness. In any case straps 2 are extended upwardly therefrom, these straps, in the present instance being four in number although obviously this number can be varied. Each strap, however, is provided with an intermediate portion 3 formed of elastic so that a certain amount of stretch is permitted.

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The decelerating device constituting the present invention includes an inner tubular shell 4 open at its upper and lower ends and provided between its ends with partitions 5 so that this inner shell thus is divided into a central firing chamber 6 and end explosive chambers 7 and 8. Telescopically mounted on the upper portion of the shell 4 is an inverted outer shell 9 closed at its upper end and serving to close the explosion chamber 7. Another outer shell 10 closed at its lower end, is slidably mounted on the lower portion of the inner shell 4 and is closed at its lower end so as thus to close the lower explosion chamber 8. Percussion caps 11 are mounted in the partitions 5 and are located where they can be hit simultaneously by hammers 12 forming portions of the firing mechanism. This mechanism can be of any suitable construction and that which has been illustrated in the drawings is only one of many forms which might be used. In this illustrated form, the hammers 12 are subjected constantly to the pulling action of springs 13 but they are held against movement normally under the influence of these springs by a lever 14 having oppositely extended fingers 15 which extend between the hammers and the percussion caps so as thus to maintain said hammers normally spaced from the caps with the springs 13 under tension. This lever is held normally in holding position by a spring 16 which is coiled about a shaft 17 to which the lever is secured. This shaft is extended outwardly through the wall of the firing chamber 6 and the spring 16, which is secured at one end to the shaft, has its other end held to the wall of the firing chamber 6 in any suitable manner, as by means of a pin 18.

A finger 19 is extended radially from the shaft and within the firing chamber 6 and is normally pressed against a stop lug 20 because of the action of spring 16. This finger can be held against movement away from the stop 20 by a locking pin 21 overlying the finger 19 as shown particularly in Figs. 3 and 4.

The inner ends of the outer shells 9 and 10 having cushioning rings 22 interposed between them, these rings being formed of rubber. Shaft

17 is extended outwardly between these cushioning rings.

The upper shell 7 has a heavy ring 23 concentric therewith but connected to the shell by integral webs 24. In the spaces between these webs are located the looped upper ends 25 of the strap 2. A similar ring 26 is extended around the upper end of the shell 10 and is connected thereto by webs 27. The spaces between these webs receive the looped lower ends 28 of the straps 1.

Normally the parts of the decelerating device are located as shown in Fig. 2, it being understood, of course, that the chambers 7 and 8 are filled with an explosive material such as powder, indicated at 29. An arm 30 is extended radially from the outer portion of shaft 17 and has a cord 31 secured thereto, this cord being provided with a weight 32 sufficient to overcome the action of spring 16 when shaft 17 is unlocked. Normally, however, this shaft is held against movement by the locking pin 21 as before explained.

When it is desired to effect a landing, the load to be deposited on the ground is connected in the usual or any preferred manner to the straps 2 while the parachute canopy and its shrouds are packed in the usual way. If equipment is to be landed the weight 32 is paid out so that the load thereon will be transmitted to arm 30 and shaft 17. Pin 21 is withdrawn but, because of the weight, the trigger lever 14 will not move out of holding position. The parachute is released with its load and when it approaches the landing surface, the weight 32 will first contact with said surface. Thus shaft 17 will be relieved of the restraining influence of this weight and spring 16 will operate to shift the trigger 14 away from restraining position. Instantly the two hammers 12 will be released and they will strike the percussion caps 11, thereby exploding the charges 29. These explosions will result in shell 10 being driven downwardly and shell 9 being driven upwardly relative to the inner tube. The descent of tube 10 will impart an abrupt pull through the straps 1 upon the parachute canopy, thereby increasing the air resistance and retarding the descent of the canopy. The upward movement of the shell 9 will result in an upward pull through the straps 2 upon the load, this pull being cushioned by the elastic portion 13. These two actions, the abrupt downward pull on the parachute canopy and the abrupt upward pull upon the load, will effect an easy contact of the load with the landing surface.

It is to be understood, of course, that any suitable means can be employed for withdrawing the locking pin so that the parachutist, while descending in a harness, not shown, could withdraw the pin 21 from holding position. For example, and as shown in Figs. 1, 2 and 3, a handline 33 can be extended outwardly from the locking pin through an eye 34 carried by a ring 35 on shaft 17 and extending to a point within convenient reach by the parachutist. Of course means other than that described and shown could be used for this purpose.

The decelerating device and the amount of explosive used can be varied according to the weight of the load to be landed.

The length of cord 31 of course determines the distance from the landing surface at which the explosion of the charges is to be effected.

What is claimed is:

1. The combination with the canopy and load-engaging element of a parachute, of deceleration means interposed therebetween, said means including upwardly and downwardly relatively movable members connected to said element and canopy respectively, and means under the control of an operator for shifting said members from each other and shortening the distance between said element and the canopy.

2. The combination with the canopy and load-engaging element of a parachute, of deceleration means interposed therebetween, said means including upper and lower members connected to said element and canopy respectively, explosive-containing means associated with said members, and means under the control of the operator for igniting an explosive to propel the members in opposite directions respectively, thereby to shorten the distance abruptly between the canopy and element.

3. In a parachute the combination with a canopy and a load-engaging element, of a connection between said canopy and element including a structure having upper and lower chambers, an explosive material in each chamber, upper and lower members slidably mounted on the structure and connected to said element and canopy respectively, and means under the control of an operator for firing the explosive and abruptly shifting said members away from each other, thereby to abruptly decrease the distance between the canopy and element.

4. The combination with the canopy and load-engaging element of a parachute, of a connection between the canopy and element including upper and lower relatively movable members connected to the element and canopy respectively, an explosive charge interposed between the members, and means controlled by contact with a landing surface for exploding the charge, shifting the members away from each other, and abruptly decreasing the distance between the canopy and element.

5. The combination with the canopy and load-engaging element of a parachute, of a connection between the canopy and element including upper and lower relatively movable members connected to the element and canopy respectively, an explosive charge interposed between the members, and means controlled by contact with a landing surface for exploding the charge, shifting the members away from each other, and abruptly decreasing the distance between the canopy and element, said means including a weight, a trigger, hammers normally restrained by the trigger, a trigger-operating device movably mounted, and a flexible connection between the weight and said device for maintaining the trigger normally inactive.

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