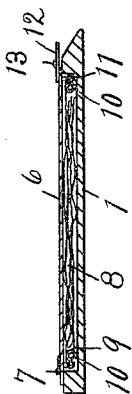


1,030,312.

Patented June 25, 1912.
3 SHEETS-SHEET 1.

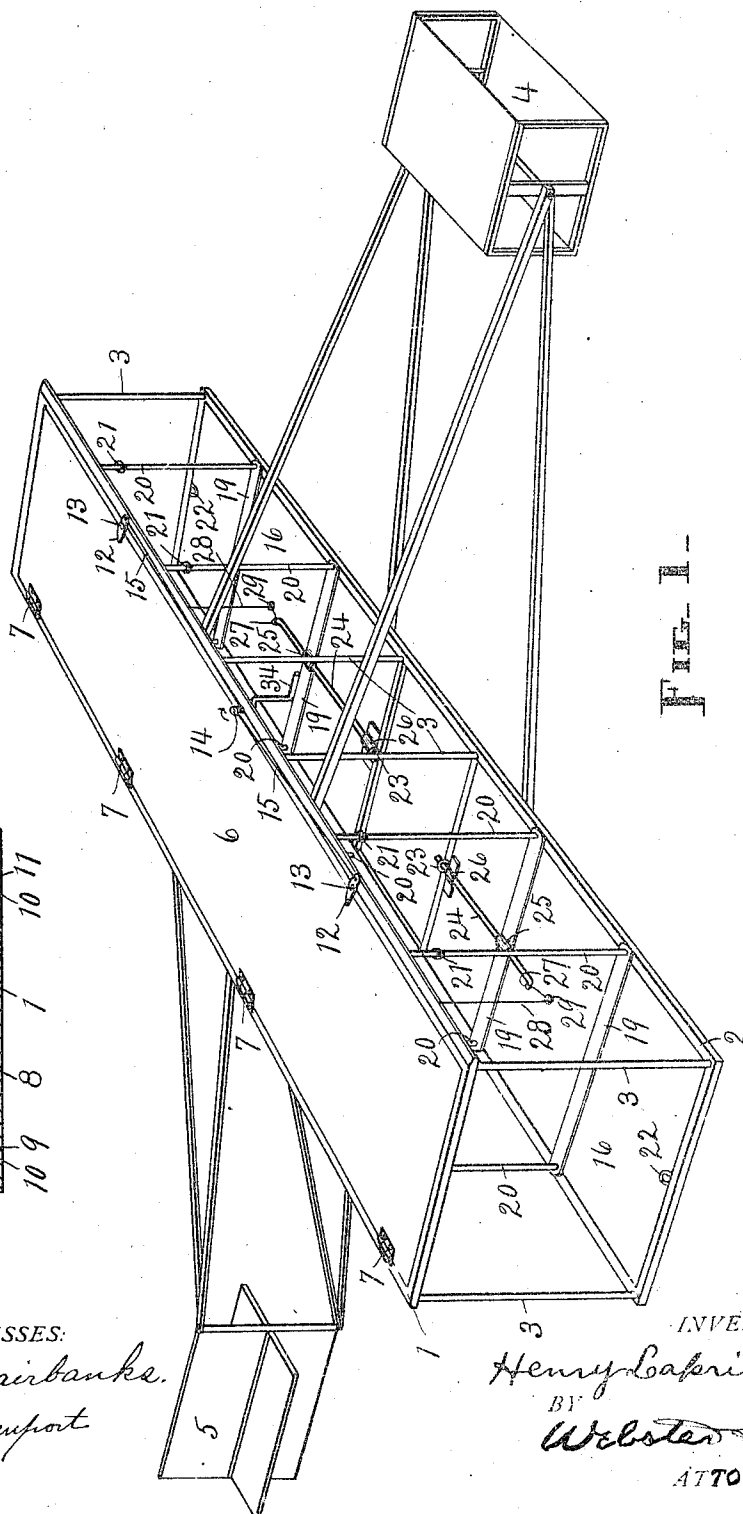
FIG. 2-



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FIG. 1-



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APPLICATION FILED AUG. 21, 1911.

3 SHEETS—SHEET 2.



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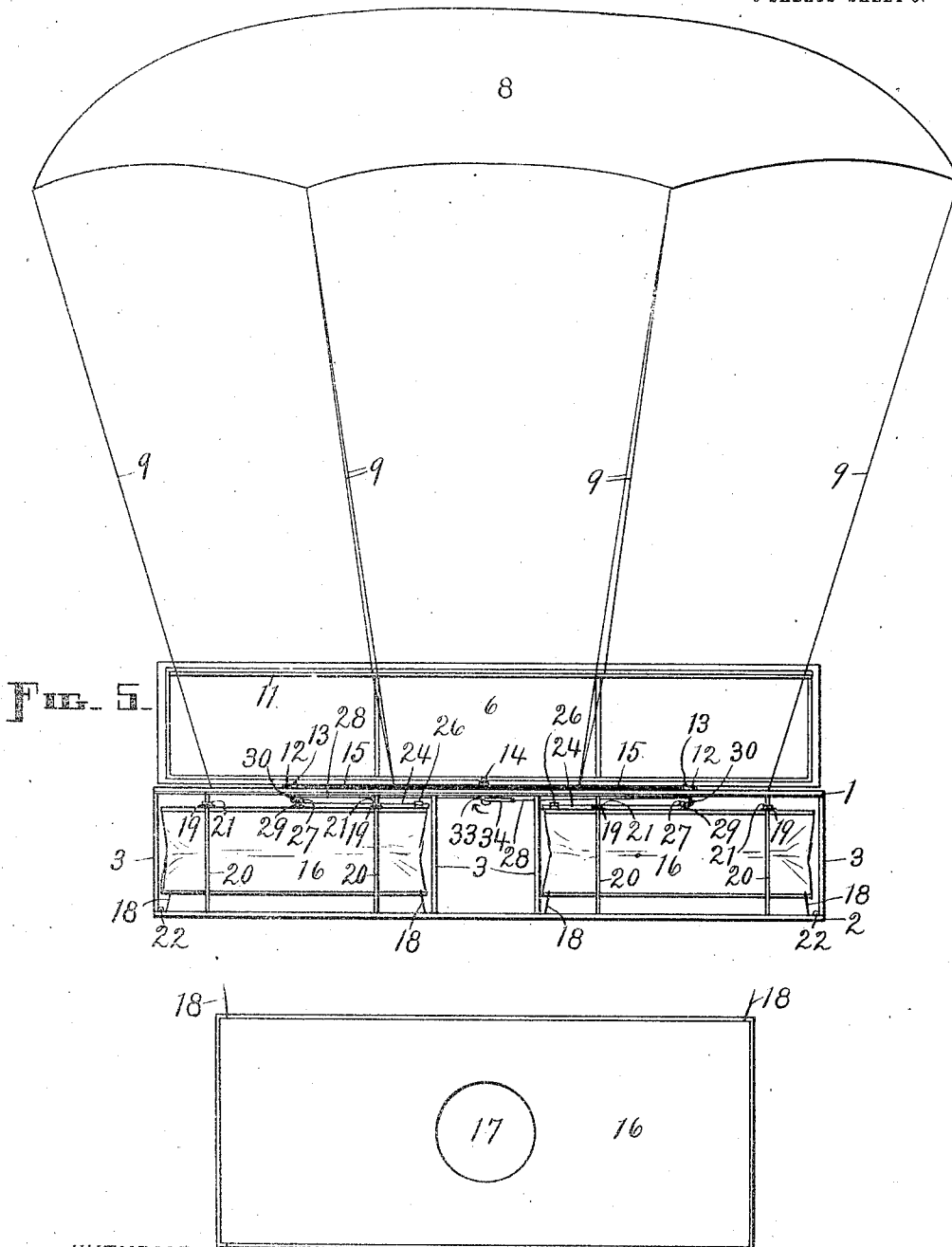
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1,030,312.

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3 SHEETS—SHEET 3.



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FIG. 6.

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UNITED STATES PATENT OFFICE.

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AEROPLANE.

1,030,312.

Specification of Letters Patent.

Patented June 25, 1912.

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To all whom it may concern:

Be it known that I, HENRY LAPRISE, a citizen of the United States of America, residing at Holyoke, in the county of Hampden and State of Massachusetts, have invented certain new and useful Improvements in Aeroplanes, of which the following is a specification.

My invention relates to improvements in that class of air craft or air-navigating machines known as aeroplanes, and resides in certain peculiar safety appliances for such machines, which appliances are in the nature of a parachute with confining and releasing means therefor, and of collapsible air chambers with confining, releasing and elevating means therefor, all as hereinafter set forth.

The object of my invention is to safeguard an aeroplane in the event it becomes unmanageable and drops, and such object is twofold in its nature: first, to cause the machine to descend slowly so that it will not strike with undue force, and, second, to prevent the machine from sinking if it comes down in the water.

A further object is to provide appliances, capable of safeguarding an aeroplane in the manner above pointed out, which can be compactly and securely carried so as not to interfere with the progress of the machine under favorable or ordinary conditions, yet are available and can be brought into service or action almost instantly and with little effort, even when both of the appliances are needed.

Other objects will appear in the course of the following description.

A preferred form of embodiment of the invention, whereby I attain these objects, is illustrated in the accompanying drawings, and I will proceed to describe the invention with reference to said drawings, although it is to be understood that the form, construction, arrangement, etc., of the parts in various aspects are not material and may be modified without departure from the spirit of the invention.

In the drawings, in which like numerals designate like parts throughout the several views, Figure 1 is a perspective of an aeroplane equipped with the new appliances, the driving and other mechanism ordinarily

employed with an aeroplane being omitted since it forms no part of the present invention; Fig. 2, a cross-section through the top of said aeroplane; Fig. 3, an underside plan of said top, a portion of the same at one end being omitted; Fig. 4, a top plan of the aeroplane bottom, a portion of this at one end also being omitted; Fig. 5, a front elevation of the aeroplane with both appliances released and in operation or operative positions, and, Fig. 6, a bottom plan of one of the air chambers. Fig. 5 is necessarily on a small scale, while Figs. 3, 4 and 6 are all drawn to the same scale and are larger than corresponding parts in Fig. 1, and Fig. 2 is on a still larger scale.

The aeroplane herein shown comprises, with a top 1 and a bottom 2 connected by uprights 3, an elevating plane 4 and a rudder 5, all of which are represented in a more or less conventional manner but in practice may be of usual and well-known construction and arrangement.

The aeroplane top 1 is made hollow or recessed and provided with a lid or cover 6 which has one longitudinal edge hinged at 7 to said top adjacent to the rear edge of the same. The space within the top 1 beneath the cover 6 when closed is for a parachute 8 and guy ropes 9 therefor, each of the latter having one end fastened to said parachute and the other end fastened to an eye-bolt 10 set within the recessed part of said top. There may be any number of guy-ropes 9, more probably than are shown. A rod 11 is rigidly attached at the ends and at intermediate points to the inside of the cover 6 adjacent to the front or upper edge thereof, accordingly as the cover is closed or open, and some or all of the back ropes 9 pass from their eye-bolts 10 between said rod and said cover to the parachute 8. The latter is made of suitable material, is of proper size and possesses sufficient strength to fill with air and expand, when loose or free, and to prevent, after the manner of any parachute, the aeroplane from descending at a too rapid rate of speed.

The parachute 8 and the ropes 9 are of such a nature that they can be packed into the shallow space in the top 1, and confined therein by the cover 6 when closed. Two buttons 12 are pivotally mounted at 13—13.

on the top 1 adjacent to the front edge thereof, being so located that when turned cross-wise of said top they extend over the front edge of said cover when closed and secure the same. A rotatable post or swivel 14 is mounted on the top 1 between the pivots 13, and cords 15—15 connect said swivel with the front ends of the buttons 12 when said buttons are in locking position. The cords 15 are fastened to the swivel 14, and one passes from the front of said swivel to the right to have its opposite end fastened to the right-hand button 12, and the other passes from the back of said swivel to the left to have its opposite end fastened to the left-hand button 12. Thus it will be seen that, by rotating the swivel 14 in the direction of the associated arrow in Fig. 1, the cords 15 are wound on said swivel and the buttons 12 are swung on their pivots 13 out of engagement with the cover 6. Said cover is made of thin and light material and being of some considerable area flies open easily and quickly when released, the compressed parachute 8 starting the opening movement and the air which then gets under the cover completing the operation. As soon as the cover 6 opens the parachute 8 flies loose and is caught and filled by the air by the time it straightens the ropes 9, and then supports the aeroplane by means of said ropes, so that the machine makes an easy descent. The ropes 9 are, of course, held taut by the parachute 8 and with the aeroplane straining at them below, at this time, and the cover 6 is retained in an approximately upright position, although with a backward slant, and prevented from vibrating appreciably because of the fact that the rear ropes or some of them at least are engaged by the rod 11. These engaging ropes may also assist in opening the cover to its full extent, and in any event afford an automatic control for the same, so that it cannot assume any position or make any movement that might interfere with the proper working of the parachute and its ropes.

In the bottom 2, between the ends thereof and the central space reserved for the driving and other mechanism and for the operator, are two recesses provided to receive a corresponding number of collapsible chambers or floats 16 when collapsed and inactive. These floats are of bellows formation with flexible sides which fold very compactly and with holes in their bottoms, but without flaps over such holes. One of the aforesaid holes appears at 17 in Fig. 6. Short lengths of cords 18 are fastened to the bottom of each float 16 adjacent to the corners thereof, and also to the aeroplane bottom 2. The cords 18 check the upward movement of the float bottoms after they rise a sufficient distance above the aeroplane bottom to permit an ample amount of air

to enter beneath the floats to fill them, such air passing through or in reality being sucked in through the holes 17.

Each float 16 is provided with one or more transverse guide bars 19 which have perforated projecting terminals to receive and ride up and down on a corresponding number of vertical guide rods 20. The bars 19 are rigidly attached to the tops of the floats 16, being arranged transversely thereof, and the rods 20 are secured to the members 1 and 2. The bars 19 and rods 20 cause the floats to ascend and descend without either endwise or lateral movement. The upward rise of the tops of the floats 16 is limited by means of nuts 21, or equivalent members, which are attached to the guide rods 20 at the proper elevation to stop the guide bars 19 when they arrive with the tops of said floats at the right height.

The floats 16 are securely held in their collapsed condition and within the recesses provided for their reception in the bottom 2 by means of lugs 22—22, staples 23—23 and horizontal bolts 24—24. The lugs 22 extend inwardly over the outer ends of the floats 16 from the outer ends of the bottom 2, and the staples 23 are set in the bottom 2 adjacent to the inner ends of said floats. The bolts 24 extend longitudinally of the floats 16 on the top, and are arranged to slide in bearings 25—25, formed by the central portions of the inner bars 19, and in brackets 26—26 fastened to said floats adjacent to their inner ends. The outer end of each bolt 24 is provided with a head 27 to which a cord 28 is attached. In the center of the top of each float 16 is an eye-bolt 29 through which the cord 28 from the adjacent locking bolt 24 passes. The length of each bolt 24 is less than the distance between the associated eye-bolt 29 and the inner end of the float 16 which carries these parts, so that said bolt can be withdrawn from the staple 23 provided for it before the head 27 of said bolt strikes said eye-bolt.

The cords 28 pass directly upward to and through eye-bolts 30—30 which depend from the underside of the top 1, and from said eye-bolts said cords extend inwardly to a winding-drum 31 to which they are fastened at the ends opposite those that are fastened to the bolt heads 27. The winding-drum 31 is fast on a crank-shaft 32 which is journaled in two bearing brackets 33 secured to the underside of the top 1. The left-hand cord 28 passes to the top of the winding-drum 31 and the right-hand cord to the bottom of said drum, hence when the latter is rotated in the direction of the associated arrow in Fig. 5 said cords are wound on the drum. It is in this manner that the bolts 24 are drawn out of engagement with the staples 23 and into contact with the eye-bolts 29, and the floats 16 elevated, said floats be-

ing elevated by the upwardly-running cords held by the bolt heads 27 which are too large to pass through said eye-bolts. When the floats start to rise their top parts tilt upwardly at the inner ends to enable the floats to clear the lugs 22. After clearing the aforesaid lugs the floats resume and maintain their horizontal positions. The winding-drum 31 is shorter than the space between the brackets 33. The front terminal of the crank-shaft 32 is in such form that it serves as a handle 34. These parts and members are so operated that, when the crank-shaft is drawn forward until the front end of the winding-drum contacts with the front bracket 33, the handle 24 can be revolved freely, but, when said shaft is forced back until the rear end of said drum contacts with the rear bracket 33, said handle encounters the top 1 and is thus prevented from rotating, convenient locking means for the floats when elevated and expanded and for the elevating mechanism being thus afforded. As soon as the bottoms of the floats 16 clear the bottom 2, air enters through the openings 17 and fills said floats, so that they are made capable of sustaining the weight of the aeroplane in the water or on the same.

The complete operation of the safety appliances is as follows, assuming that the parachute 8 and the ropes 9 are packed in the top 1 with the cover 6 closed and fastened, and that the floats 16 are collapsed and locked down by means of the bolts 24 and associated fastening members. At the instant the operator loses control of the machine and the latter starts to drop, the operator turns the swivel 14 which is in easy reach of his position, in the proper direction and winds the cords 15 thereon until the buttons 12 are actuated out of engaging relation with the cover 6, when said cover flies open and the parachute soars aloft as far as the ropes 9 permit, fills with air, and becomes a supporting medium for the aeroplane, easing it to the ground or on to the water in case water instead of land be underneath. In the latter case, or, in other words, when the operator finds he is descending onto the water, he immediately draws out the crank-shaft 32 far enough for the handle 34 to clear the top 1 (see Fig. 3), and revolves said shaft to wind up the cords 28.

The cords thus being wound onto the winding-drum 31 first slide the bolts 24 toward the eye-bolts 29 and into contact therewith, thus unlocking the floats 16, and then elevate said floats until they are fully expanded.

The crank-shaft and the winding-drum, the cords 28, and the floats 16 are now secured by pushing said shaft rearwardly in the brackets 33 and permitting the handle 34 to come to rest against the top 1. The floats have meanwhile filled with air so that they

are ready to support the aeroplane on the water by the time the former strikes the latter. The safety appliances now have the appearance represented in Fig. 5. The floats 16 are able to sustain on the water the weight of the aeroplane either with or without the assistance of the expanded parachute 8.

To replace the parachute 8, draw it down, fold and pack it away with the ropes 9 in the space provided for the same, and close the cover 6. Turn the swivel 14 in the direction opposite to that indicated by the associated arrow, in Fig. 1, to loosen the cords 19, and turn the buttons 12, which are positioned approximately in line with each other and with their free ends pointing toward the ends of the top 1, so as to locate said free ends over the adjacent edge of the cover 6. Then rotate the swivel in the other direction sufficiently to take up whatever slack there may be in the cords 15. The parts thus disposed appear as shown in Figs. 1 and 2.

To replace the floats, free the crank-shaft 32 and unwind the cords 28. The floats 16 at once settle onto the bottom 2, and the air is expelled from them in any suitable manner, after which the outer ends of the now collapsed floats are inserted beneath the lugs 20, and the bolts 24 are actuated into engagement with the staples 23. Finally the slack if any in the cords 28 is taken up and the crank-shaft secured. In Figs. 1 and 4 the parts appear as just described.

The rods 20 not only guide the floats 16 in their upward and downward movements, but also assist in keeping them in place especially when elevated, all through the medium of the guide bars 19, however, said bars must not fit said rods so closely that the slight tilting movement necessary in drawing said floats out of engagement with the lugs 22 and returning them to such engagement will be prevented.

It is plainly to be seen that the actions of the safety appliances are largely automatic after said appliances have been released.

In place of the eye-bolts 29 and 30, there may be employed any usual and suitable type of antifriction guides for the cords 28.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. An aeroplane provided with storage places for collapsed floats, and collapsible floats having bottom openings, said floats being adapted to be packed in the spaces provided therefor and to be released from such spaces and expanded and filled with air from below.

2. An aeroplane provided with a storage place for a collapsible parachute and with storage places for collapsed floats, a parachute adapted to be packed in the space provided therefor and to be released therefrom

- for action, and collapsible floats having bottom openings, said floats being adapted to be packed in the spaces provided for them and to be released therefrom and expanded and filled with air from below.
3. The combination with a recessed aeroplane top, such top being provided over the recess therein with a cover which has one longitudinal edge articulated to said top adjacent to one longitudinal edge of the latter, and further provided adjacent to the other longitudinal edge with fastening means for the corresponding longitudinal edge of such cover, of a parachute attached to said top and adapted to be packed into the recess under said cover, and manually-operated means to unfasten said cover to release said parachute.
4. The combination with a recessed aeroplane top, such top being provided over the recess therein with a cover and further provided with pivotally mounted members capable of locking and releasing said cover, of a parachute and flexible means for attaching said parachute to said top, said parachute and said flexible means being adapted to be packed into the recess under said cover, a rotatable member mounted on said top, and flexible members connecting said pivotally mounted members with said rotatable member, the arrangement being such that said cover may be unfastened and released upon turning said rotatable member.
5. The combination with a recessed aeroplane top, such top being provided over the recess therein with a cover, of means to fasten and unfasten said cover, flexible members secured to said top and certain of such members being slidably connected with said cover, and a parachute secured to said flexible members, such flexible members and parachute being adapted to be packed into the recess under said cover.
6. The combination, in an aeroplane, with the bottom of the machine, of collapsible floats normally carried thereon, said floats having air-receiving openings in their undersides, and means to expand said floats in an upward direction.
7. The combination, in an aeroplane, with the bottom of the machine, of floats normally carried by said bottom, said floats having air-receiving openings in their undersides, means to elevate and expand said floats, and means to limit the upward rise of the bottoms of said floats.
8. The combination, in an aeroplane, with the bottom of the machine, and guide rods rising from said bottom, of collapsible floats normally carried by said bottom and provided with guide bars engaging said rods, said floats having air-receiving openings in their undersides, and means to elevate and expand said floats.
9. The combination, in an aeroplane, with the bottom of the machine, of collapsible floats normally carried by said bottom, means to fasten said floats to said bottom, and means to release said floats and to elevate them bodily and expand the same.
10. The combination, in an aeroplane, with the bottom of the machine, such bottom being provided with lugs and staples, of collapsible floats normally carried by said bottom and engaged by said lugs, sliding bolts arranged on said floats in operative relation to said staples, and means to withdraw said bolts from said staples and to elevate and expand said floats.
11. The combination, in an aeroplane, with the bottom of the machine, of floats normally carried by said bottom, means to elevate said floats clear of said bottom and expand them, and means to limit the upward rise of the tops of said floats.
12. The combination, in an aeroplane, with the top and bottom of the machine, and a winding-drum mounted under said top, of collapsible floats normally carried by said bottom but capable of being raised clear of the same, locking and releasing means for said floats, and flexible members attached to said winding-drum and to said locking and releasing means, whereby said floats are released and elevated and expanded when said drum is rotated in the proper direction.
13. The combination, in an aeroplane, with the top and bottom of the machine, guide members for flexible members depending from said top, a winding-drum mounted under said top, and staples set in said bottom, of collapsible floats normally carried by said bottom, said floats also being provided with guide members for flexible members, locking bolts slidably mounted on said floats between said last-mentioned guide members and said staples and in operative relation to the latter, said locking bolts having heads at their outer ends, which heads are too large to pass through the adjacent guide members, and flexible members extending from said locking bolts through both sets of guide members therefor to said winding-drum.
14. The combination, in an aeroplane, with the top and bottom of the machine, guide rods between said top and bottom, guide members for flexible members depending from said top, a longitudinally-movable crank-shaft journaled under said top and provided with a winding-drum, said crank-shaft being held against rotation when in its rearward position and released for rotation when in its forward position, and staples set in said bottom, of collapsible floats normally carried by said bottom, said floats being provided with guide bars in engagement with said guide rods, and further provided with guide members for flexible mem-

bers, locking bolts slidingly mounted on said floats between said last-mentioned guide members and said staples and in operative relation to the latter, said locking bolts having heads at their outer ends, which heads are too large to pass through the adjacent guide members, and flexible members extending from said locking bolts through both sets of guide members to said winding-drum.

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Witnesses:

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