

Nov. 12, 1929.

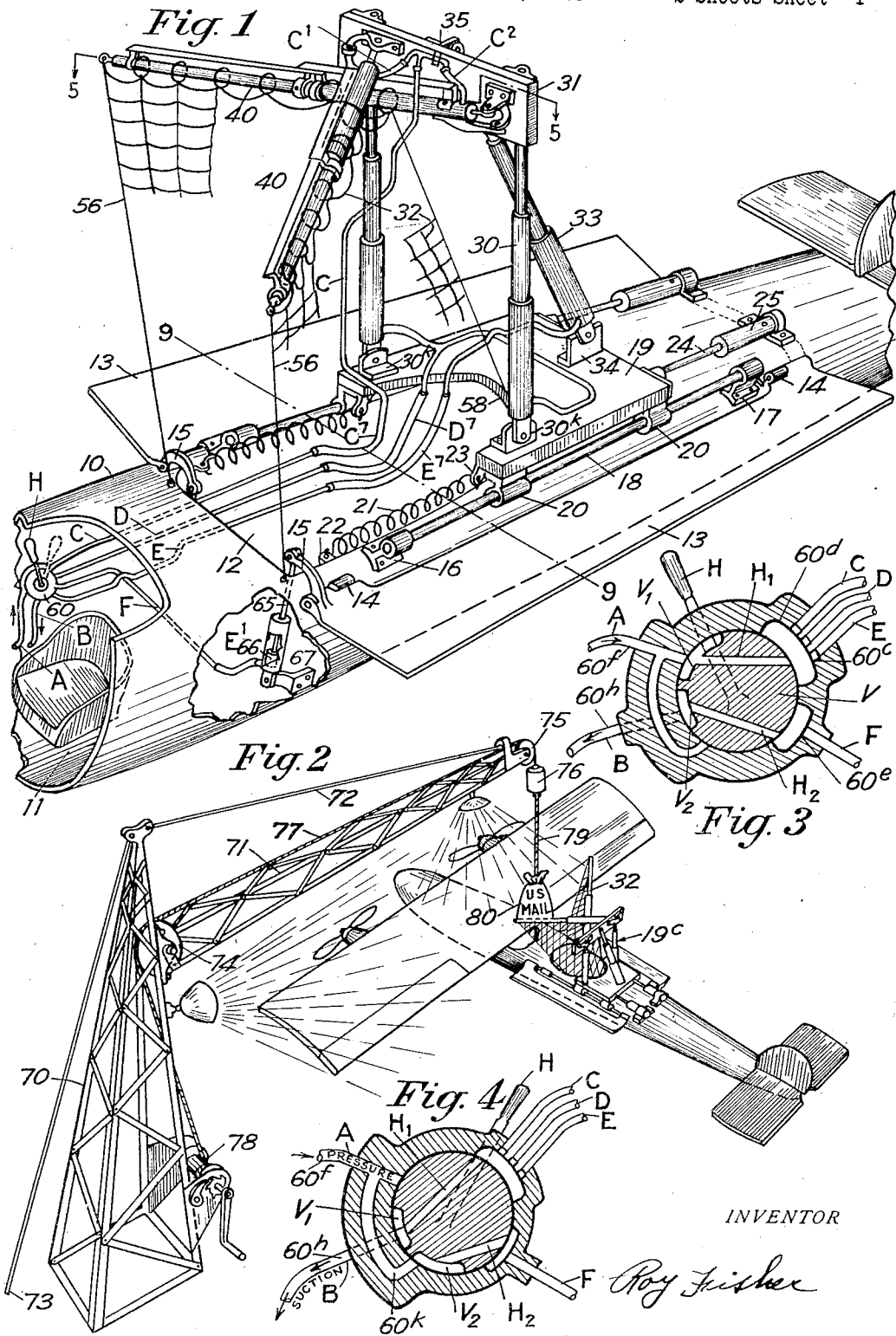
R. FISHER

1,735,385

AERIAL MAIL CATCHER

Filed June 13, 1928

2 Sheets-Sheet 1



INVENTOR

Roy Fisher

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2 Sheets-Sheet 2

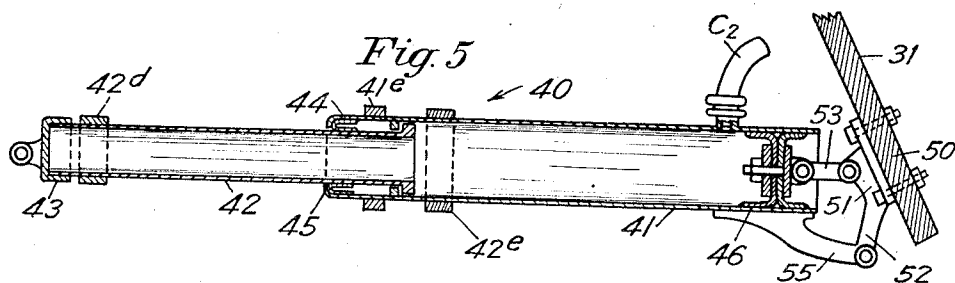


Fig. 8

Fig. 6

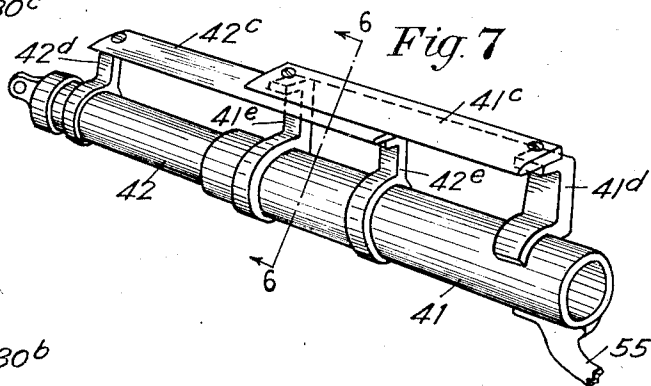
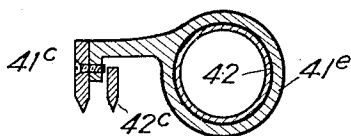
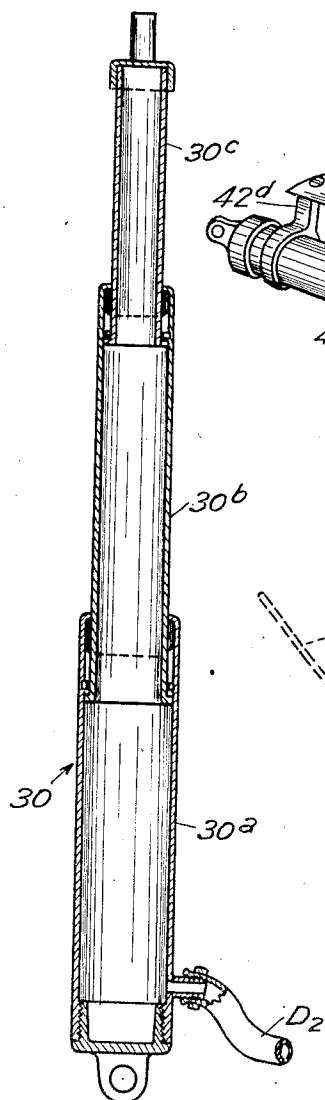
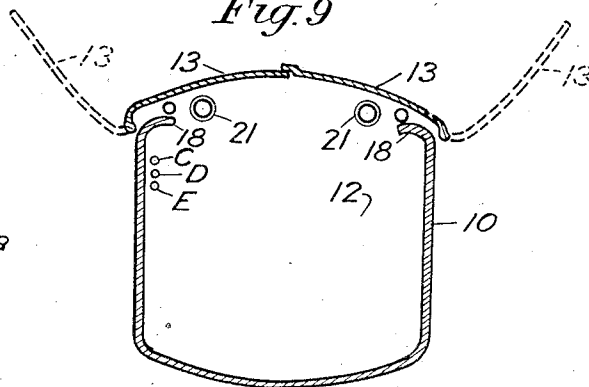


Fig. 9



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AERIAL-MAIL CATCHER

Application filed June 13, 1928. Serial No. 285,108.

In this specification, and the accompanying drawings, I shall describe and show a preferred form of my invention, and specifically mention certain of its more important objects. I do not limit myself to the forms disclosed, since various changes and adaptations may be made therein without departing from the essence of my invention as hereinafter claimed; and objects and advantages, other than those specifically mentioned, are included within its scope.

My invention relates to aircraft and in particular to means for collecting articles and mail while in flight. It is more especially adapted for cities where landing fields are not available. A tower is provided to support the mail delivery portion of the apparatus.

One object is to provide improved means for severing the mail supporting connection.

Still further objects are to provide means to automatically operate the mail receiving receptacle from open to closed position and vice versa; to provide the receiving receptacle with improved buffer means to absorb the shock when the mail bag or other article being received encounters the catching element of the apparatus, and to provide means for adjusting said receiving receptacle to various heights with respect to the fuselage of the aeroplane.

A further important object is to provide improved means for manually controlling and co-ordinating the movements of the various operating parts of the apparatus.

Other objects and advantages may hereinafter appear, but the objects and advantages which have already been enumerated represent broadly the novel features of the invention.

Referring to the accompanying drawings, which illustrate a preferred embodiment of the invention,

Figure 1 is a perspective view of an aeroplane showing the same provided with the receiving portion of the apparatus in open position.

Figure 2 is a perspective view of the complete apparatus.

Figure 3 is a sectional detail of the valve control showing also a portion of the pipe

lines through which pressure and suction are supplied to operate the receiving portion of the apparatus.

Figure 4 is a view similar to Figure 3 except that the parts are shown in the reverse position.

Figure 5 is a transverse section on line 5—5 of Figure 1.

Figure 6 is a cross section on line 6—6 of Figure 7.

Figure 7 is a perspective view of one of the net-carrying arms and of the knives carried thereby.

Figure 8 is a longitudinal mid-section of one of the supporting masts.

Figure 9 is a cross-section in line 9—9 of Figure 1 showing in different positions the doors for closing the mail and baggage pit.

Referring in detail to the drawings:

The fuselage 10 is provided with the usual cockpit 11. A little to the aft of said cockpit is provided a mail pit 12, there being at each side of said mail pit a door 13 having hinges 14 and operating arms 15 whereby said doors are moved from the position shown in dotted line in Figure 9 to the full line position of said view in order normally to close said mail pit 12 when the mail catcher is in recumbent position.

Near the mail pit 12 brackets 16 are attached to the upper portion of the fuselage, said brackets 16 cooperating with like brackets 17 located rearwardly thereof to support the carriage rails 18 whereon is slidably mounted the platform 19 by means of the four bearing members or feet 20 attached to the under side of said platform.

Forwardly of said platform are provided tension springs 21, the front edges of which are attached to fixed lugs 22 and the rear ends of which are attached to lugs 23 with which the front corners of platform 19 are provided. To the other end of said platform are secured a pair of piston rods 24 which are operatively connected with dash pot cylinders 25 secured to the fuselage as shown in Figures 1 and 2.

Said platform 19 forms part of a carriage designated in a general way as 19^a in Figure 2. Near each side of the platform 19 is pivoted thereto an extensible telescopic arm or

standard 30. The pair of standards or masts thus formed are connected together at their upper ends by means of a cross-piece 31, upon which is mounted a mail and baggage catching device 32. Rearwardly of cross-piece 31 is a third extensible member or mast 33 the lower end of which is pivotally connected to a bracket 34 attached to the rear end of platform 19.

This bracket 34 supports the base portion of mast 33 at a higher level than the pivotal points whereon masts 30 are supported, in order that when suction is supplied to the interior of mast 33, the hoisting function supplied to the device by the masts 30 may be rendered more positive.

Said mast 33 occupies an inclined position as shown in Figure 1 when the catching device is in the operative position. Its upper end is pivotally connected with a bracket 35 attached to the rear side of cross-piece 31.

Said three masts conjointly form a tripodal support for the mail catching device when they are in the upstanding position, and they, together with the carriage, are protected from the shock of the impact of the mail bag by the tension springs 21 and dash-pot cylinders 25.

Referring now in detail to the construction of the catching device, said device comprises a pair of extensible arms or telescopic members 40, each of said arms being like the other in construction. As shown in Figure 5, the inner telescopic section 41 of each arm has telescoped thereinto an outer section or arm 42. The outer end of arm 42 is closed fluid tight by means of a cap 43 and a fluid tight packing 44, retained in place by the in-turned flange 45 of the tubular member 41. cooperates with the piston head 46 to form a fluid-tight chamber within said members 41 and 42. C¹ and C² are flexible terminals of the conduits which supply pressure and suction to arms 40.

A cutting blade 41^a is supported above section 41 by brackets 41^d and 41^e, and a cutting blade 42^a is supported above section 42 by means of brackets 42^d and 42^e. Brackets 41^d and 41^e are rigidly fastened to arm section 41. Bracket 42^d is rigidly fastened to arm section 42, while its cooperating bracket 42^e is slidably mounted on tubular member 41. Knives 41^c and 42^c slidably overlap each other.

Within the inner portion of each of members 41 communicates a pressure and suction supply the function and operation of which will be described later. Near each end of cross-piece 31, there is secured to the front face of said cross-piece a base plate 50, (see Figure 5) which is provided with a lug 51 and an arm 52, said piston head 46 and lug 51 are linked together by means of a link 53, the ends of said link being pivotally connected with these two parts and adapted to give a slight swing to arms 40 when suction or pres-

sure is applied. The inner end of the tubular member 41 has secured thereto at one side an operating arm 55 which at its inner end is pivotally secured to the outer end of said arm 52 of base plate 50. These two pivotal supports cooperate in the oscillative movements of said arms.

Each of the telescopic members 40 (see Figure 1) has attached thereto the upper edge of a net 56, the lower edge of said net being, like its upper edge, continuous. The lower front corners of said net are attached to the top of the fuselage at each side of the mail pit 12 near a front corner of said pit. The rear portion of said net is attached to the curved edge portion 58 of a concavity provided in the front portion of the platform 19. This construction is clearly shown in Figure 2; only a portion of the net is shown in Figure 1 in order not to obscure the view.

It is to be understood that the sides of the net 56 will be provided with sufficient slack to permit the net to accommodate itself to forward and rearward movement of the platform 19 when the latter is actuated by the impact of a mail pouch or other article caught by the apparatus.

Referring now more particularly to construction of the extensible standards or masts 30 and 33, said masts are telescopic in construction, each mast 30 having a relatively large basal tube 30^a (see Figure 8), a smaller middle tube 30^b and a still smaller terminal tube 30^c. The tubes 30^a are at their lower ends pivoted to brackets or lugs 30^k on the front corner portions of the platform 19. Like the catching arms 40, the masts 30 are hollow, and are supplied with oil or other liquid which is alternately subjected to pressure and suction to control their movements. For this purpose a multiple control valve 60 (see Figures 3 and 4) is provided with a conduit A in constant communication with a source of fluid pressure (not shown), and a pipe B in like communication with a source of suction (not shown).

Means are also provided for operating by means of fluid suction and pressure the doors 13 at each side of the mail pit 12, as will presently be described in connection with the operation of the other pressure operated parts, each of said doors 13, as already stated, is provided with an operating arm 15. These operating arms 15 extend inwardly with respect to the door hinge 14 and are pivotally connected with piston rods 65 having piston heads 66 within the piston cylinders 67, in such a manner that fluid pressure supplied to the lower end of cylinder 67 will open door 13 and fluid suction at the same point will close said door.

The multiple valve 60, shown in detail in Figures 3 and 4, is provided with a valve V operated by a handle H. This valve V is provided with a cross passage H¹ to supply

pressure and a cross passage H^2 to supply suction when the valve is in the position shown in Figure 3, the pressure and suction functions being reversed when the valve is in the position shown in Figure 4. The valve casing 60^a is provided with the recesses 60^d and 60^e, the former recess being in communication with conduits C, D, E, and the latter recess being in communication with conduit F. The valve V is provided with recess V¹ in communication with pressure supply passage 60^f, and with a recess V², which is in communication with suction passage 60^h, when the valve is in the position shown in Figure 3. When the valve is in the position shown in Figure 4 the recess V¹ is in communication with the suction passage 60^h and, by means of a by-pass 60^k in the valve casing, the recess V² is at this time in communication with the pressure supply passage 60^f. The cross passage H¹ communicates with the recess V². With the pressure pipe A and suction pipe B arranged as shown to supply the fluid pressure and suction, and the conduits C, D, E, F, connected up as shown in Figures 3, 4 and 1, the apparatus is assembled for proper co-ordinate movement of the various elements as will be readily understood after a description of the operation.

Conduits C, D and E are respectively provided with flexible portions C', D' and E' to permit longitudinal movement of platform 19.

The delivery portion of the apparatus is mounted upon a tower 70, having a horizontal cantilever beam 71 supported from the upper end of the tower by cable 72, said cable being continued down to the ground at the other side of the tower to an anchorage 73. As the inner end of the cantilever beam 71 is pivotally connected with the tower, tightening cable 72 will raise the outer end of beam 71 and loosening cable 72 will lower the outer end of beam 71.

Beam 71 is provided at its inner end with a large sheave 74 and at its outer end with a smaller sheave 75. A spool 76 is supported by a cable or connection 77, said connection being led over sheaves 75 and 74 and thence down to a windlass 78 whereby said spool may be raised and lowered as desired. With said spool 76 is connected a rope 79 from which is suspended a mail bag 80 or other article or container of articles to be delivered to the catching apparatus, as best shown in Figure 2.

Operation: In Figures 1 and 2 the apparatus is shown with the mail catching device in the elevated position ready to receive a mail bag, but it is to be understood that baggage or other expressage may be handled with equal facility. As the aeroplane advances from the position shown in Figure 2, the mail bag will strike against the net 56 the

mail pouch will receive an additional downward impulse which will more positively direct said pouch into the mail pit 12. As soon as the force of the impact has subsided the tension springs 21 will move the platform forwardly to its original position.

When air pressure and suction are relied upon, as may be desirable in some instances, the air within the sternal mast 33 will also act as an auxiliary buffer to relieve the shock, on account of the upstanding masts 30 being pivotally mounted.

Owing to the backward slope of the central portion of the net 56 the mail pouch will receive an additional downward impulse which will more positively direct said pouch into the mail pit 12. As soon as the force of the impact has subsided the tension springs 21 will move the platform forwardly to its original position.

After the mail bag has been deposited within the mail pit 12, the pilot will move the handle H of the control valve from the position of Figure 3 to the position of Figure 4, thus supplying suction to the door operating cylinders 67, fluid pressure to the inclined telescopic member 33, and suction to the hollow catching arms 41. Simultaneously said valve will supply suction to the pair of telescopic masts 30. The result will be that the masts or members 30 will be retracted or shortened and the inclined mast or member 33 will at the same time be extended, thus swinging the cross-piece 31 forwardly and downwardly and at the same time swinging appreciably inward, the mail catching members 40 so that the mail catching device proper will lie in a recumbent position at a sufficiently low position to permit doors 13 to operate after the movement of parts as just described has been completed. While this movement is being completed, the pair of doors 13 will fold down upon the mail catching elements.

A reversal of the operations just described will take place when the handle of the control valve is placed at the other limit of its movement in order to restore the mail catching elements to their operative position.

I claim:

1. In apparatus of the character described, the combination with the fuselage of an aeroplane; of a plurality of extensible standards supported on said fuselage in spaced relation to each other for vertical extension thereabove, a cross-piece connecting the upper portions of said standards, and a catching device mounted on said cross-piece.

2. In apparatus of the character described, the combination with the fuselage of an aeroplane; of a plurality of extensible members supported on said fuselage in spaced relation to each other for vertical extension thereabove, a cross-piece connecting the upper portions of said members, a catching device

mounted on said cross-piece, and means mounted on said fuselage to simultaneously extend said members and move said catching device from a closed to an open position.

5 3. The substance of claim 2 and, said means including a valve controlled fluid pressure supply to simultaneously operate both of said members and said catching device.

4. In apparatus of the character described, 10 the combination with the fuselage of an aeroplane having a pit adapted to receive mail pouches and the like; of means stationed on said fuselage alongside said pit and adapted for extension thereover to direct a mail 15 pouch thereinto and then to be retracted to a recumbent position, and a pair of cooperating doors mounted on said fuselage alongside said pit and adapted to close to cover both said pit and said extensible means when 20 the latter is in the recumbent position.

5. The substance of claim 4 and, fluid pressure and suction means operatively connected with said source and adapted simultaneously to open said doors and extend said extensible 25 means and also simultaneously to retract said extensible means and close said doors.

6. In apparatus of the character described, the combination, with the fuselage of an aeroplane having a pit adapted to receive mail 30 pouches and the like; of a pair of hollow extensible masts pivotally mounted on said fuselage adjacent said pit on opposite sides thereof and assuming an upright position when extended, a cross-piece connecting the 35 free ends of said masts, mail-catching means carried by said cross-piece, a third hollow extensible mast pivotally mounted at its base on said fuselage rearwardly of said pit in spaced relation thereto, the free end of said 40 third mast being pivotally connected with said cross-piece, said masts being constructed and arranged to be extended by fluid pressure there within, and fluid pressure and suction means communicating with the interior of 45 all of said masts to move all the recited movable parts from an upright to a recumbent position.

7. The substance of claim 6 and, said fluid pressure and suction means including a multiple way valve operable from the fuselage 50 and adapted simultaneously to supply suction to said pair of masts and pressure to said third mast and vice versa.

8. In apparatus of the character described, 55 the combination, with the fuselage of an aeroplane; of means mounted on said fuselage; adapted to catch a mail bag and direct it downwardly into said fuselage, and a tripod construction mounted on said fuselage to support 60 said catching means, said tripod comprising a pair of extensible leg members and a third leg member to cooperate with said pair of leg members, and means mounted on said fuselage and coordinating with said 65 tripod construction to simultaneously ex-

tend said pair of leg members and retract said third leg member, and vice versa.

9. The substance of claim 8 and, said three leg members being hollow, and fluid pressure and suction means communicating with their 70 interiors to supply fluid pressure and suction to said extensible members to operate them as stated.

10. In apparatus of the class described, the combination with the fuselage of an aeroplane, of carriage rails mounted on said fuselage longitudinally with respect thereto, a carriage adapted for lengthwise movement on 75 said carriage rails, means mounted on said fuselage and connected to said carriage in front thereof for retarding its movement in one direction, means mounted on said fuselage and connected to said carriage rearwardly 80 thereof to aid in retarding its movement in the same direction, load engageable masts telescopically connected to said carriage, and means mounted on said aeroplane for effecting the movement of said masts to and from 85 an upstanding position.

11. In apparatus of the class described, the combination with a sliding carriage adapted for longitudinal adjustment and the fuselage 90 of an aeroplane; of a grappling device adapted for vertical extension on said carriage; said grappling device comprising a plurality of telescopic masts arranged in tripodal 95 formation, a cross-piece mounted on said telescopic masts, a pair of telescopic arms carried by said cross-piece, means mounted on said aeroplane operatively connected with 100 said telescopic masts for moving them collectively into load engaging position and means mounted on said aeroplane for effecting the extension of said telescopic arms to a catching 105 position.

12. In apparatus of the class described, the combination with the fuselage of an aeroplane of a sliding carriage mounted on said fuselage and adapted for longitudinal adjustment 110 thereon, a load grappling device connected thereto for relative horizontal movement and vertical adjustment, manually actuated means mounted on said fuselage for controlling the vertical adjustment of said grappling device, whereby to engage a load, 115 and means connected to said carriage to absorb the shock of the load.

13. In apparatus of the class described, the combination with the fuselage of an aeroplane and a supporting carriage mounted 120 thereon, of a plurality of extensible masts arranged in tripodal formation secured to said carriage, a mail catching device proper supported by said masts, and means operatively related to said catching device for 125 raising and lowering the same through the agency of said extensible masts, auxiliary means operatively related to said catching device for absorbing the shock of impact in the receiving of the mail load and manually oper- 130

able means operatively related to said masts for closing the device which engages the load.

14. In apparatus of the class described, the combination with the fuselage of an aeroplane; of a mail catching device connected thereto for opening and closing movements, said mail catching device comprising a net, hoisting devices mounted on said fuselage for automatically raising and lowering said net, a pair of crossed arms mounted on said hoisting devices for supporting said net when in extended position, means operable from the fuselage to extend and retract said arms, cutting means properly carried by said arms, pivotal means operatively related to the base portions of said arms tending to force them outwardly, means to releasably secure said crossed arms against outward swinging movements, and means to swing said cross arms inwardly during the descent of said hoisting devices.

15. In apparatus of the class described, the combination, with the fuselage of an aeroplane of a mail catching device mounted on said fuselage and having a pair of crossed arms arranged for relative opening and closing movement and means mounted on said fuselage for bodily elevating and lowering said crossed arms; of cooperating means mounted on said fuselage and which are automatically put into operation during the lowering of said arms to automatically effect their closing movements after they have engaged a load, and auxiliary shock absorbing means carried by said arms and rendered operative by the raising of said crossed arms to the elevated position.

16. In apparatus of the class described the combination with the fuselage of an aeroplane of a catching device mounted on said fuselage and arranged for vertical and fore and aft movements, hoisting means coordinating with the catching device to cause it to be swung outwardly with relation to the fuselage for engaging a load and lowering the same, means operatively relating to said catching device for absorbing the impact encountered by the load, a door and automatic means operatively connected to said door to close it down upon said fuselage after said device has been lowered.

17. In apparatus of the class described, the combination with the fuselage of an aeroplane, of a catching device supported by a plurality of extensible masts mounted on said fuselage and adapted to be raised and lowered, pressure and suction means mounted on said fuselage to raise and lower said catching device through the agency of said extensible masts, and manually actuated means mounted on said fuselage to raise said extrusive masts in unison, and means operatively related to said catching device whereby in the lowering of said masts two of said masts are caused to retract more slowly than the

third in order that said device may be closed by the third.

18. In apparatus of the class described, the combination with a fuselage of an aeroplane or the like of a mail catching device adapted for longitudinal movement thereupon; comprising a catching screen and a platform upon which said screen is supported, and shock absorbing means located on said fuselage fore and aft of said platform.

19. The combination with a fuselage of an aeroplane and a carriage thereon, of a plurality of extensible masts, means mounted on said fuselage for individually operating said masts, a breast plate carried by said masts, extensible arms carried by said breast plate and means mounted on said fuselage for simultaneously projecting said arms.

In testimony whereof I affix my signature hereunto.

ROY FISHER.