Feb. 21, 1950 H. J. STAMBAUGH 2,497,916

LAUNCHING OR TOWING DEVICE

Filed April 24, 1945 2 Sheets-Sheet 1

Fig. 1

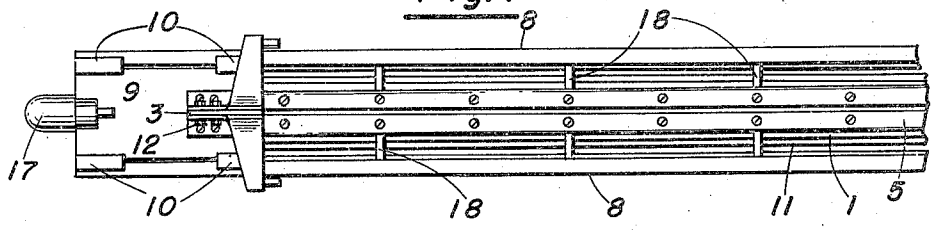


Fig. 2

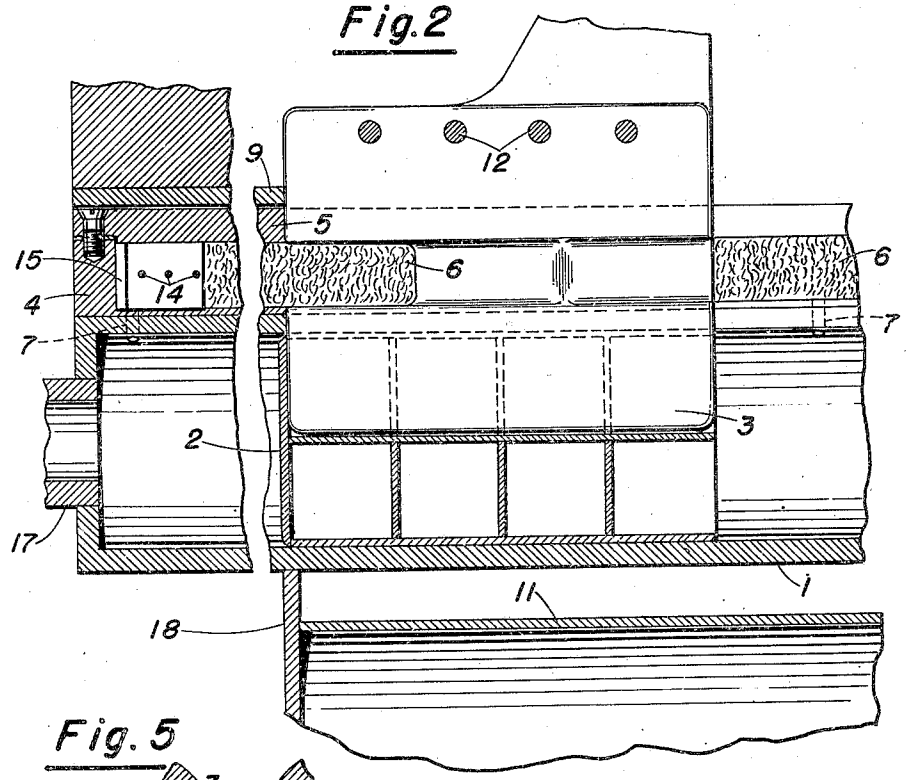
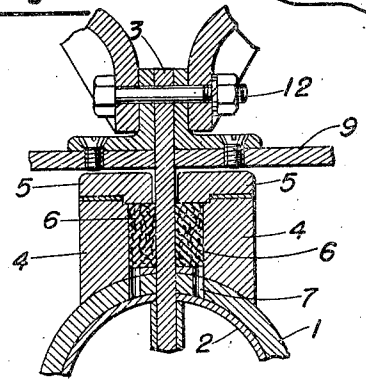


Fig. 5



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Fig. 3

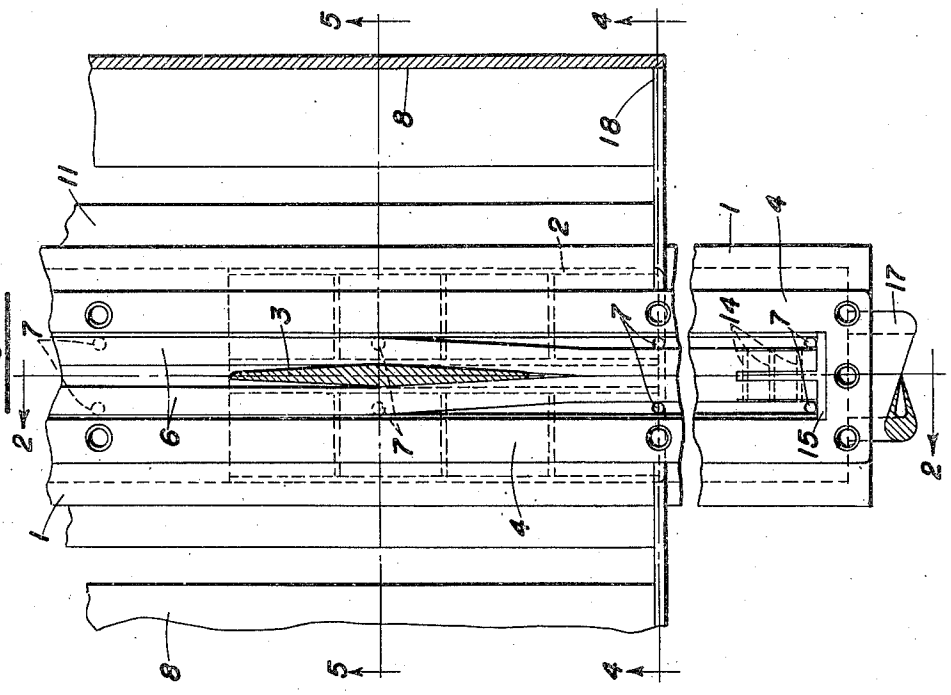
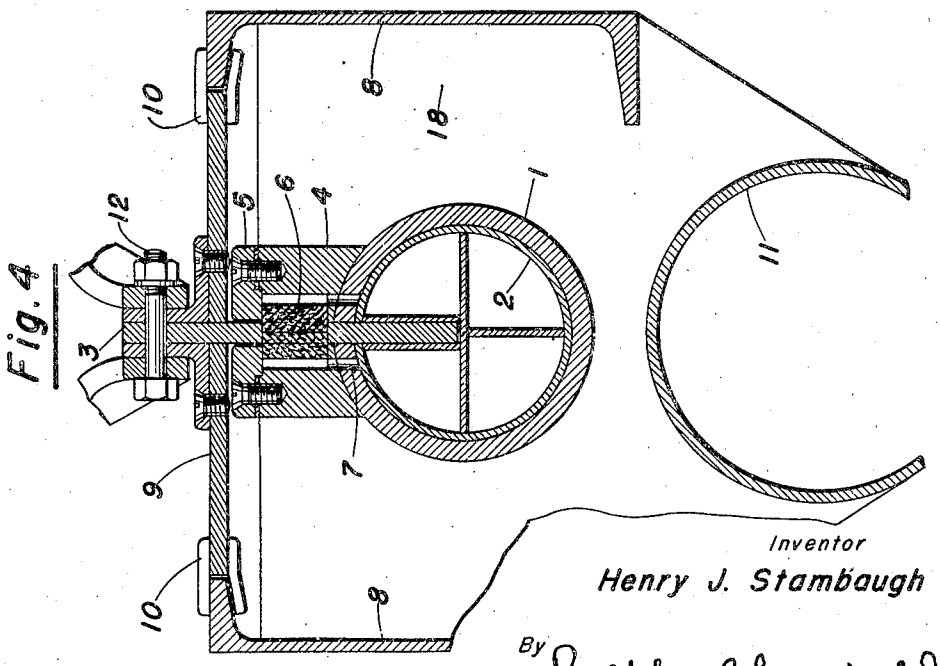


Fig. 4



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LAUNCHING OR TOWING DEVICE

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Application April 24, 1945, Serial No. 590,099

6 Claims. (Cl. 244—63)

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

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This invention relates to a launching device adapted to build up sufficient velocity to catapult a plane or an object into space.

A slotted tube is utilized with a piston operating therein by means of fluid pressure. The energy of the piston is transferred directly to either the plane or launching car by means of a connecting lug or tow fitting which operates in the slot.

It will be apparent that in order for energy to be built up and maintained behind the piston an effective closure seal must be provided for that portion of the slot behind the piston to form a closed chamber.

The purpose of this invention is to provide an effective closure which will seal the slot behind the piston as the piston is driven towards the end of the tube. This is accomplished by utilizing the fluid pressure in the closed portion of the tube or chamber to progressively move sealing strips into sealing contact.

Details of the invention are illustrated in the accompanying drawings in which:

Fig. 1 is a plan view of a portion of the launching or towing device showing the launching car in position,

Fig. 2 is a sectional view substantially on line 2—2 of Fig. 3,

Fig. 3 is an enlarged plan view of a portion of the launching or towing device showing the tow fitting in section,

Fig. 4 is a section on line 4—4 of Fig. 3 with parts broken away,

Fig. 5 is a section on line 5—5 of Fig. 3 with parts broken away.

The launching or towing device consists of a slotted tube 1 closed at one end and provided with piston 2 operating therein. The slot commences a predetermined distance from the closed end of the tube to provide an initial closed chamber and may extend the entire remaining length of the tube. If the opposite end of the tube is closed, a suitable braking device must be provided to stop the piston. However, it has been found to be more convenient to allow the piston to be discharged from the end of the tube together with the launching car. These may go over the side of the ship and can be easily replaced for the next launching.

Piston 2 is shown as a built up cellular cylinder with rear end cap but may also be solid. A longitudinal slot is provided in the piston which is aligned with the slot in the tube to receive a lug or tow fitting 3. This tow fitting extends through the slot in the tube and can be bolted at its upper end to a launching car as later described, or can

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be otherwise connected to the plane or vehicle. The tow fitting 3 may be an ordinary plate or may have converging ends, as shown for a purpose which will appear later.

The sealing means will now be described. L-shaped members or blocks 4 are secured to the tube on opposite sides of the slot with the lower leg of each L facing inwardly as shown and together with cap members 5 form inwardly facing continuous channel sockets on each side of the slot. Within each channel is a sealing strip 6 of any desired material but preferably of reinforced fibrous material which is adapted to move laterally. When the sealing strips are in retracted position the space above the slot is clear so that movement of the lug or tow fitting is unobstructed as shown in Fig. 5. Built up rather than integral channels are used so that the strips can be conveniently inserted.

Spaced apertures 7 are provided along each side of the slot extending from the tube into the outer edge of the sealing strip channel.

It will be apparent that as the piston and tow fitting are moved down the tube by fluid pressure, some of the fluid will be forced through certain of the apertures into contact with the outer face of each sealing strip thereby forcing the sealing strips inwardly into contacting relationship. This has the effect of sealing the slot in the tube against the escape of fluid, as shown in Fig. 4, and also forming a closed chamber for the fluid acting on the rear face of the piston.

The sealing strip channels are shown on the outside of the tube. It is conceivable, however, that the channels and sealing strips may be secured inside of the tube without departing from the spirit of the invention. In that case a suitable groove would necessarily be formed in the piston to correspond.

A fluid container or accumulator 11 supplies fluid under pressure to the closed end of the tube by means of a valve controlled supply line 17. Any suitable supply of fluid can be used and entry into the tube can be made either at the closed end as shown or by spaced inlets along the length of the tube. The fluid may be steam, compressed air, oxygen, explosive gases, or the like.

Launching car 9 is shown with guides 10 to engage the upper flanges of channel tracks 8 on each side of the slotted tube. Bolts 12 are used to secure the car to the tow fitting. The plane can be supported on the car by means of a cradle such as shown in Figs. 1 and 5.

Instead of using a launching car the tow fitting may be detachably connected to the plane

direct in any suitable manner. In such case it is preferable to locate the slotted tube below the flight deck so that the plane can take off directly therefrom on its own landing wheels.

It will be apparent that if fluid such as steam is to be used under high pressure as the energy force that some form of lateral bracing must be provided for the slot weakened tube. Figs. 1 and 4 show gussets or plates 18 to provide the necessary lateral bracing.

Sealing strips 6 preferably extend beyond the slot at the closed end of the tube and may be secured together as shown by suitable rivets or bolts 14 extending through T-iron 15.

The tow fitting is preferably tapered rearwardly as shown resulting in minimum wear on the sealing strips and also in a better seal as these strips are forced inwardly into contacting relationship by the fluid pressure behind the piston.

This invention is primarily intended to be used as a catapult for planes. However, it will be apparent that the speed of the piston and tow fitting can be controlled by the choice of fluids and pressures. It is therefore within the scope of this invention to use the device as a conveyor or towing device where it is desired to impart motion to an object or series of objects.

The invention described herein may be manufactured and used by or for the Government of the United States of America for governmental purposes without the payment of any royalties thereon or therefor.

Having described my invention I claim:

1. An aeroplane launching device including a slotted tube closed at one end, a piston in said tube provided with a slot and aligned with the slot in the tube, a tow fitting in the piston slot extending through the tube slot to engage a launching car or plane, means for supplying fluid to the tube behind the piston and under pressure, and means for sealing the slot behind the piston to form a closed chamber, said means including inwardly facing continuous channel sockets secured to said tube on each side of the slot, an elongated sealing means laterally movable in each channel socket, normally positioned to leave a space substantially the width of the tow fitting and spaced communicating apertures between the sides of each channel socket behind the sealing means and the slotted tube whereby fluid between the rear end of the tube and the piston will enter the channel sockets behind said sealing means and force the sealing means into contacting relationship.

2. In an aeroplane launching device a slotted tube closed at one end, a piston in said tube and a tow connection operated thereby through said slot, means for supplying fluid under pressure to said tube behind said piston, and means for sealing the slot in said portion of the tube to form a closed chamber, said means comprising inwardly facing continuous channel members secured to the tube on each side of the slot, an elongated sealing means laterally movable in each channel member normally positioned to leave a space substantially the width of the tow connection, and spaced communicating apertures between the fluid chamber and the sides of each channel member behind the sealing means whereby fluid will enter behind said sealing means to force them into contacting relationship to bridge the slot.

3. In a fluid operated towing device, a tow fitting, a tube closed at one end and provided with a slot extending longitudinally thereof, a piston in said tube, said tow fitting extending through said slot and operated by said piston, means for supplying fluid to said tube behind said piston, and means for sealing said portion of the tube comprising inwardly facing continuous channel sockets secured to said tube on opposite sides of said slot, an elongated sealing means laterally movable in each socket normally positioned to leave a space the width of said tow fitting and means for supplying fluid to said channel socket behind each sealing means to force them inwardly into contacting relationship following the passage of the piston, said means comprising spaced apertures connecting the sides of each channel socket behind the sealing means with said tube.

4. In a fluid operated towing device, a tube closed at one end and provided with a slot extending longitudinally thereof, a piston operating in said tube, means for supplying fluid to said tube behind said piston, a towing connection operated by said piston extending through said slot, and means for sealing the slot behind the piston to form a closed chamber, said means comprising inwardly directed continuous channel socket members secured to the tube on opposite sides of the slot, a laterally movable sealing means in each channel member normally positioned to leave a space substantially the width of said towing connection, and spaced apertures communicating with the sides of each channel socket member behind the sealing means to exert pressure on the rear face of each sealing means to force them into contacting relationship when fluid is supplied to these apertures from a suitable source said fluid first supplied to the apertures adjacent the closed end of the tube and progressively to other apertures as the towing connection moves in said slot, said towing connection coacting with said sealing means to progressively seal said channel socket members against leakage ahead of said towing connection.

5. In a fluid operated launching device, a tube closed at one end and provided with a slot extending longitudinally thereof, a piston operating in said tube, means for supplying fluid to said tube behind said piston, a towing connector extending from said piston through said slot, and means for progressively sealing the slot behind the piston to form a closed chamber, said means comprising inwardly facing continuous channel-like members secured to the tube on opposite sides of the slot to form inwardly facing sockets, an elongated sealing means laterally movable in each socket and normally positioned therein to leave a space substantially the width of said towing connector, and means for exerting pressure between the back wall of each socket and its sealing strip to force the strips inwardly into contacting relationship to bridge the gap between the opposing sockets, said means comprising spaced orifices between each socket and the fluid chamber said towing connector and sealing means further characterized as substantially filling said sockets and the space therebetween whereby leakage along said sockets behind said sealing means is prevented.

6. In an aeroplane launching device, a tube closed at one end and provided with a slot extending longitudinally thereof, a piston operated in said tube, means for supplying fluid to said tube behind said piston, a towing connection operated by said piston and extending through said slot, and means for sealing the slot behind the piston to form a closed chamber, said means comprising an inwardly facing continuous socket

on opposite sides of the slot, an elongated sealing means laterally movable in each socket said sealing means normally positioned in each socket to leave a space substantially the width of the towing connection, and spaced apertures between the sides of each socket behind the sealing means and the chamber whereby fluid will enter behind said sealing means to force them into contacting relationship said towing connection and sealing means dimensioned to substantially fill said sockets and the space therebetween and upon reverse movement of said towing connection in said slot to force said sealing means into said sockets to form a seal in said sockets opposite said towing connection.

HENRY J. STAMBAUGH.

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Certificate of Correction

Patent No. 2,497,916 February 21, 1950

HENRY J. STAMBAUGH

It is hereby certified that errors appear in the printed specification of the above numbered patent requiring correction as follows:

Column 4, line 58, for the word "strip" read *means*; same line, strike out "strips" and insert instead *sealing means*; line 61, strike out "each socket" and insert instead *the sides of each channel-like members behind the sealing means*;

and that the said Letters Patent should be read with these corrections therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 8th day of August, A. D. 1950.

[SEAL]

THOMAS F. MURPHY,
Assistant Commissioner of Patents.