

A. E. JONES.

STARTING DEVICE FOR THE COMPRESSED AIR MOTORS OF SELF PROPELLED TORPEDOES.

APPLICATION FILED JULY 10, 1908.

929,954.

Patented Aug. 3, 1909.

2 SHEETS—SHEET 1.

Fig. 1

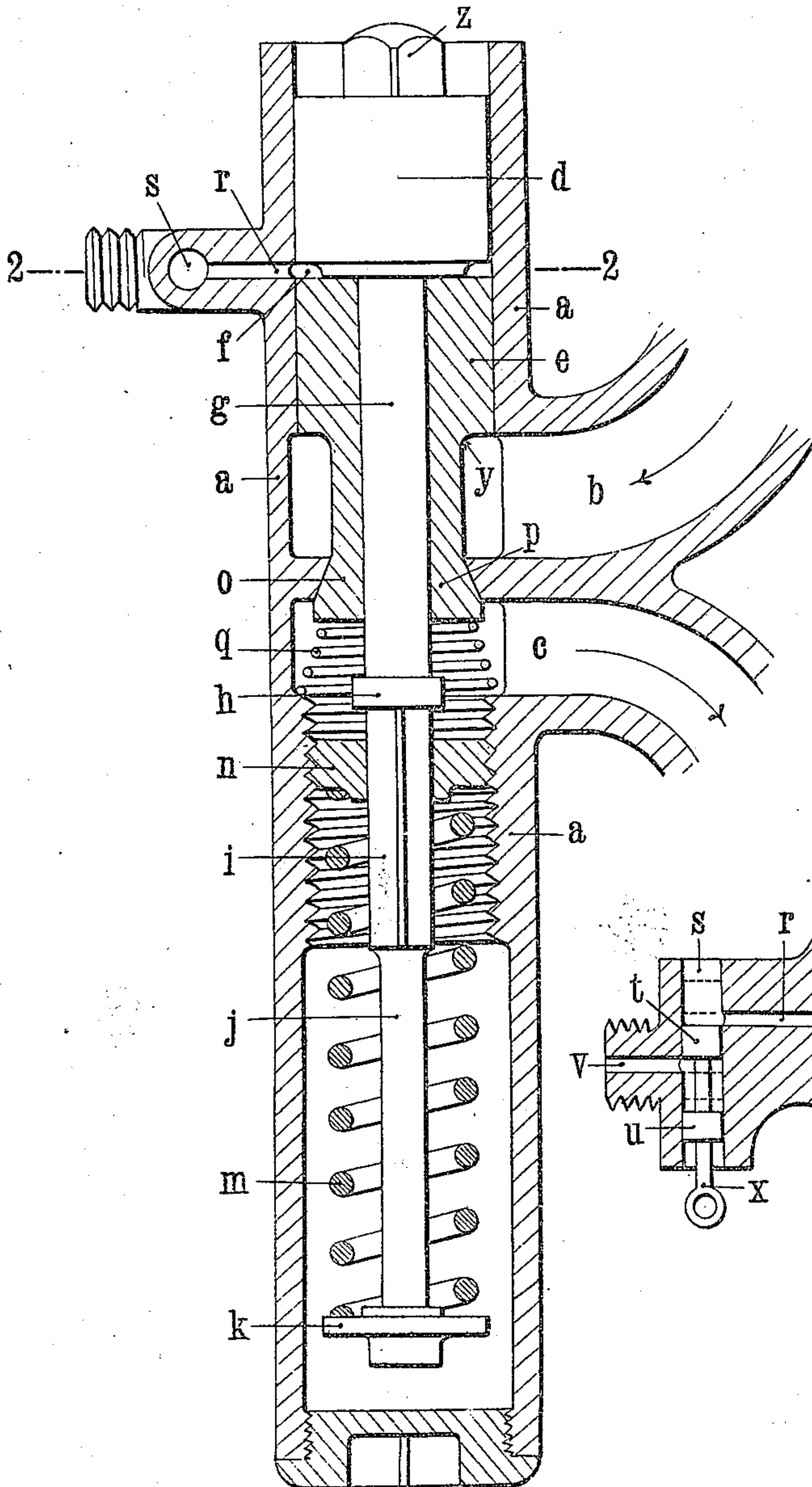
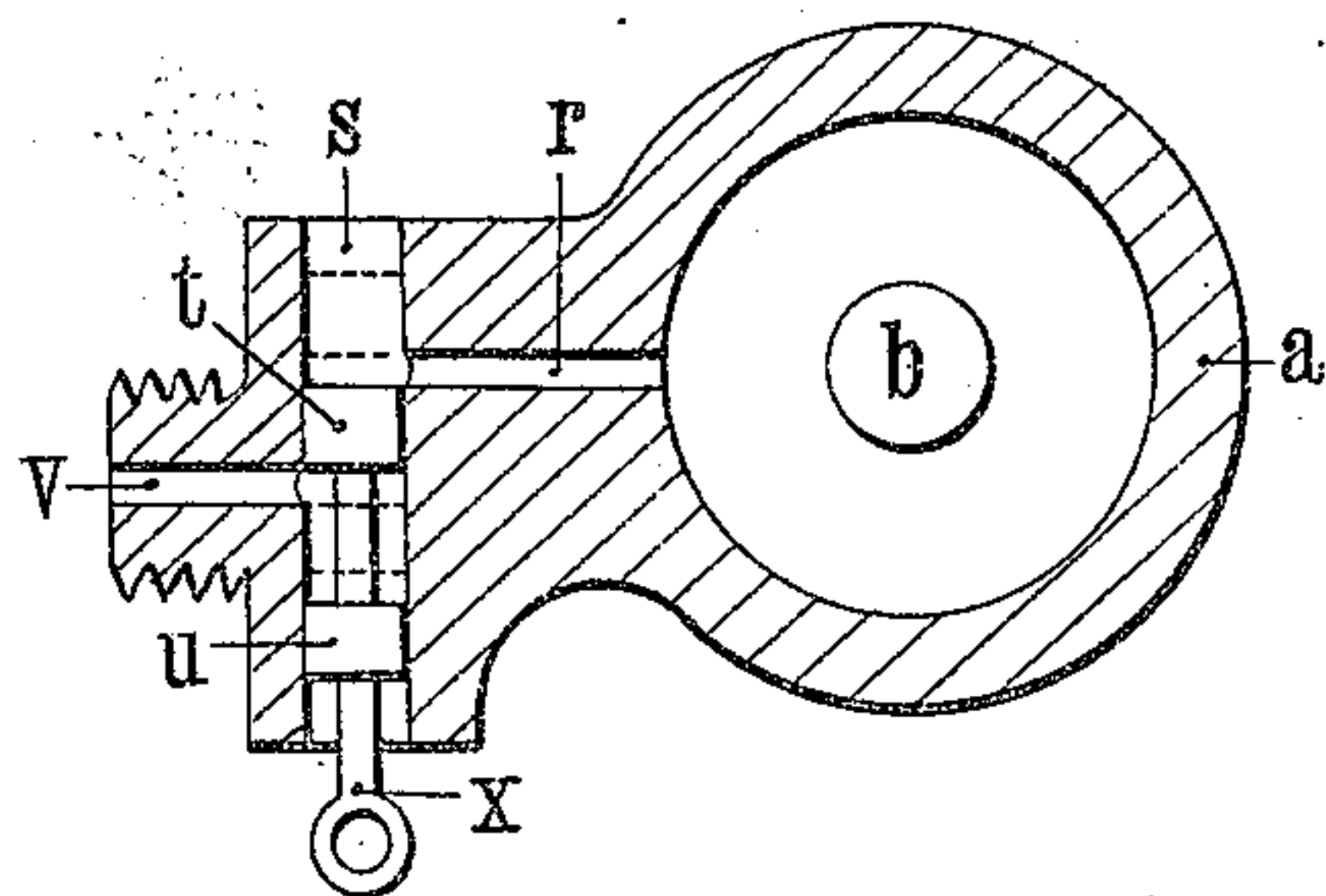


Fig. 2



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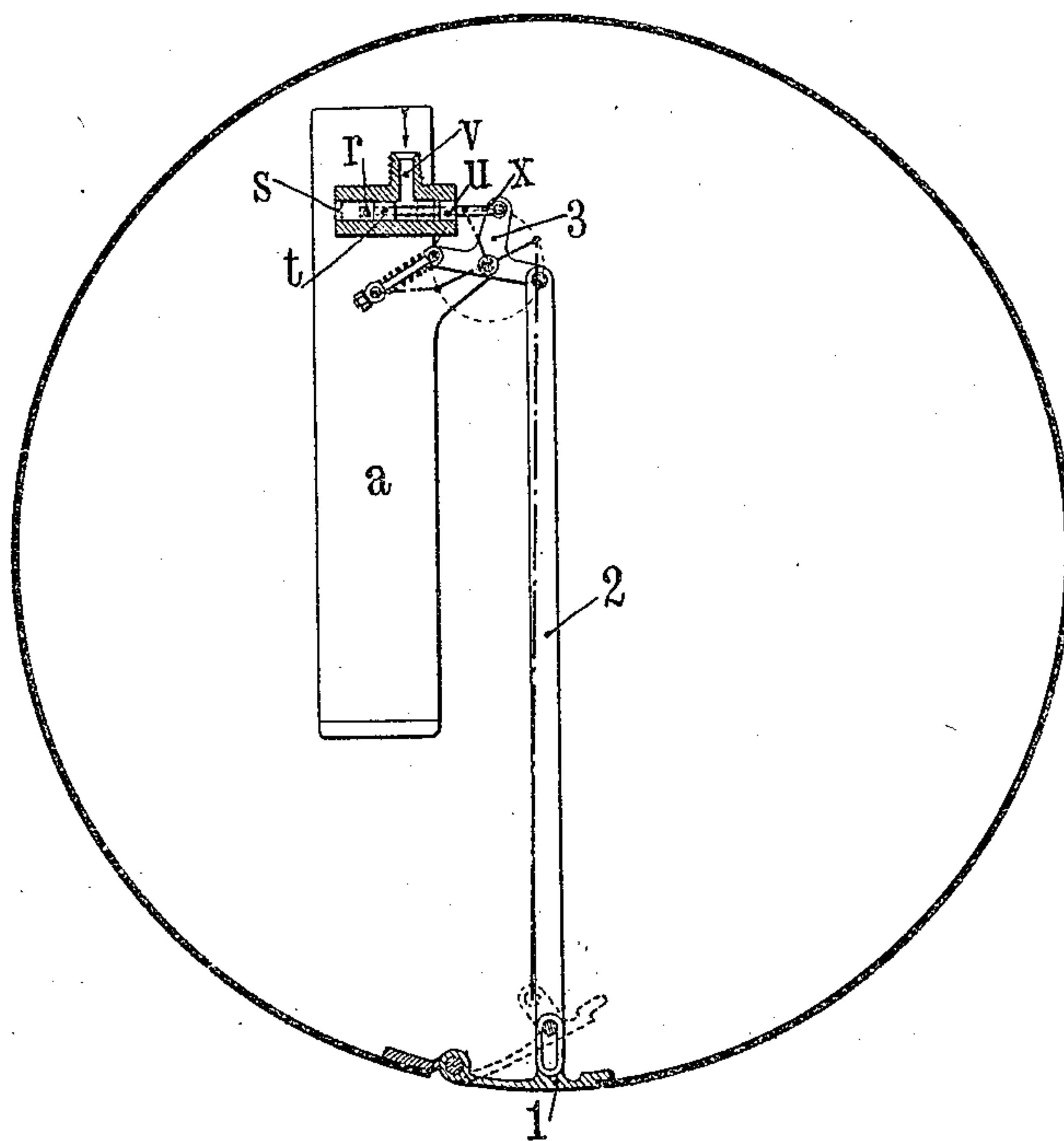
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Fig. 3



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UNITED STATES PATENT OFFICE.

ALBERT EDWARD JONES, OF FIUME, AUSTRIA-HUNGARY, ASSIGNOR TO WHITEHEAD & COMPANY, OF FIUME, AUSTRIA-HUNGARY, A CORPORATION.

STARTING DEVICE FOR THE COMPRESSED-AIR MOTORS OF SELF-PROPELLED TORPEDOES.

No. 929,954.

Specification of Letters Patent.

Patented Aug. 3, 1909.

Application filed July 10, 1908. Serial No. 443,005.

To all whom it may concern:

Be it known that I, ALBERT EDWARD JONES, a subject of the King of Great Britain, residing via Volosca, at Fiume, in the Empire of Austria-Hungary, have invented certain new and useful Improvements Relating to Starting Devices for the Compressed-Air Motors of Self-Propelled Torpedoes, of which the following is a specification.

10 This invention has for its object a combined retarding and starting device for compressed air motors of self-propelled torpedoes, and is intended more particularly for torpedoes launched above the surface of the
15 water.

The invention consists particularly in directly connecting the delay action flap of ordinary construction with the reducing valve of the air pressure reducer arranged
20 between the compressed air reservoir and the motor, for the purpose of dispensing with the moderating part of the air admission valve ordinarily arranged between this reducer and the reservoir, and the auxiliary air supply
25 valve for disengaging or operating the gyroscope, thereby simplifying the mechanism of the torpedo while rendering it more certain in its operation.

The invention also comprises a corresponding constructional form of the air pressure
30 reducer forming a regulator and retarder, controlled by the delay action flap.

A constructional form of the object of the invention is illustrated by way of example in
35 the accompanying drawing in which:—

Figure 1 represents a longitudinal vertical section through the pressure regulator. Fig. 2 is a cross section on the line 2—2 of Fig. 1. Fig. 3 shows the device in place in an auto-
40 mobile torpedo.

The cylindrical box *a* of the regulator comprises two tubular sockets of which *b* comes from the compressed air reservoir and *c* passes to the motor. In this box there are
45 arranged two pistons *d*, *e*, resting one upon the other, but with a small annular space *f* between them. The upper piston *d* is provided with a cylindrical rod *g* having a collar *h* prolonged by a square portion *i* followed
50 by another cylindrical portion *j* at the lower extremity of which a plate *k* is fixed. The regulating spring *m* bears on the one hand on

this plate *k* and on the other hand on a nut *n* mounted upon the square rod *i* of the piston
d and screwed into an appropriate screw 55 thread in the box of the regulator. The piston *d* ends above in a square head *z* adapted for the reception of a spanner. The other piston *e* carries at its lower part a valve *o* held against its seat *p* by a weak spring *q*. 60

In the annular space *f* left between these two pistons *d* and *e* there opens a passage *r* ending in a transverse passage *s* communicating at its extremities with the atmosphere, and at its middle with a passage *v* (Fig. 2) 65 connected to a reservoir containing a fluid under pressure, such as oil for example.

In the passage *s* there is arranged a cylindrical slide valve *t u* adapted to place the
70 passages *r* and *v* in communication; this slide valve is continued outside the passage *s* by a rod *x* connected by a bell crank lever 3 and a rod 2 to the delay action flap 1 arranged on the torpedo in the known manner.

The operation is as follows:—In the first 75 place the compression of the spring is regulated by turning the square head *z* on the piston *d* in accordance with the fall of pressure that it is desired to obtain between the pipes *b* and *c*. The torpedo being at rest, and 80 the air valve of the reservoir being closed, the parts will occupy the position represented in the drawing; the passage *s* communicating with the atmosphere prevents the accumulation of pressure in the annular space *f*, and 85 the valve *o* is held against its seat by the spring *q*, and when at the moment of the expulsion of the torpedo from the tube, the air valve opens, the pressure of the compressed air acting upon the annular surface *y* of the 90 piston *e* presses the reducing valve *o* upon its seat. When the torpedo falls into the water, the delay action flap 1 causes the displacement of the slide valve *t u* causing it to assume the position represented in broken 95 lines in Fig. 2, in which the passages *r* and *v* are placed in communication, so that the oil or other liquid under pressure enters the annular space *f* and causes the pistons *d e* to separate. The piston *e* descends, separating 100 the valve *o* from its seat, the piston *d* rising at the same time and compressing the spring *m* until the valve *o* rests upon the collar *h* of the rod *g*. Passage of compressed air from

b to *c* is then established. The two pistons *d* *e* then form a compact whole which assumes a position of equilibrium under the influence of the pressure of the spring *m* which tends to cause the whole to descend and of the air pressure which tends to cause it to ascend.

The advantages of the arrangement are as follows:—As a result of the combination of the delay action flap with the pressure regulator, the latter at the same time becomes a retarding device on the starting of the motor, so that it is possible to dispense with the retarding mechanism of the admission valve, which in the devices heretofore constructed is interposed between this regulator and the air reservoir, and is controlled by the delay action flap.

Owing to the relative arrangements of the regulating spring and of the two pistons, the maximum compression of the spring corresponds to the maximum separation of the pistons *d* and *e*, this separation being only attained during the travel of the torpedo. In this manner permanent fatigue of the regulating spring which tends to diminish the certainty of its operation is avoided; this is what takes place in regulators as hitherto constructed where this spring is subjected to considerable compression during the periods of repose.

Lubrication may be insured in the usual manner by means of the oil under pressure supplied to the annular space *f*, and descending along the rod *g* and mixing with the air passing through *c* to the motor.

The small spring *q* may be dispensed with, the compressed air acting upon the annular surface *y* of the piston *e* insuring the closing of the valve *o* as soon as the air supply valve on the reservoir is open.

Instead of a cylindrical slide valve for the distribution of oil under pressure in the annular space *f*, any other equivalent parts might be employed; similarly, the device producing the maximum separation of the pistons *d* and *e* might be constituted otherwise than by the collar *h* here represented.

The device might also be applied to torpedoes other than those launched above the surface of the water.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is:—

1. In a starting device for torpedo motors, the combination of a reducing valve solid with a piston having an annular surface which is subjected to the pressure of the compressed air, a second piston influenced by a spring, and means for forcing a fluid under pressure into the space comprised between the two pistons by the influence of the delay action flap.

2. In a starting device for torpedo motors,

the combination of a reducing valve solid with a piston which is subjected on one side to the pressure of the compressed air, a second piston provided with a rod traversing the first piston, a spring bearing on a plate fixed to said rod, an annular space provided between the two pistons and means for forcing a fluid under pressure into the said annular space by the direct influence of the delay action flap.

3. In a starting device for torpedo motors, the combination of a reducing valve solid with a piston which is subjected on one side to the pressure of the compressed air, a second piston provided with a rod traversing the first piston, a spring bearing on a plate fixed to said rod, a nut on the rod engaging with a screw-thread of the box for regulating the tension of the spring, an annular space provided between the two pistons and means for forcing a fluid under pressure into the said annular space by the direct influence of the delay action flap.

4. In a starting device for torpedo motors, the combination of a reducing valve, a piston solid therewith and subjected to the pressure of the compressed air, a second piston influenced by a spring with an annular space between the two pistons, a passage communicating with said annular space and a valve operated by the delay action flap for controlling the admission of a fluid under pressure between the two pistons.

5. In a starting device for torpedo motors, the combination of a reducing valve, a piston solid therewith, having an annular surface subjected to the pressure of the compressed air, a spring acting on the valve, a second piston separated from the first by an annular space and provided with a rod which is influenced by a spring, a passage communicating with the space between the pistons, and a slide valve connected with the delay action flap for placing the annular space in communication with the atmosphere or forcing therein a fluid under pressure.

6. In a starting device for torpedo motors, the combination with a box or casing adapted to receive compressed air from the compressed air reservoir and deliver it to the motor, of a reducing valve in said casing adapted when seated to prevent the passage of the compressed air to the motor, a delay action flap, and means actuated by the delay action flap for admitting fluid under pressure to said casing to act on said valve to move the same from its seat.

7. In a starting device for torpedo motors, the combination with a cylindrical box or casing arranged to receive compressed air from the compressed air reservoir and deliver it to the motor, of a reducing valve in said casing adapted when seated to prevent the passage of the compressed air to the motor, the said valve having a piston portion

subjected on one side to the pressure of the compressed air to press the valve upon its seat, a delay action flap, and means actuated by the delay action flap for admitting fluid
5 under pressure to the other side of the piston portion of said valve to move the valve from its seat.

In witness whereof I have hereunto placed my hand, at Weymouth, England, this twenty-fourth day of June, 1908.

ALBERT EDWARD JONES.

In the presence of two witnesses:

B. R. LEGG,

PERCY WOODS.