

(No Model.)

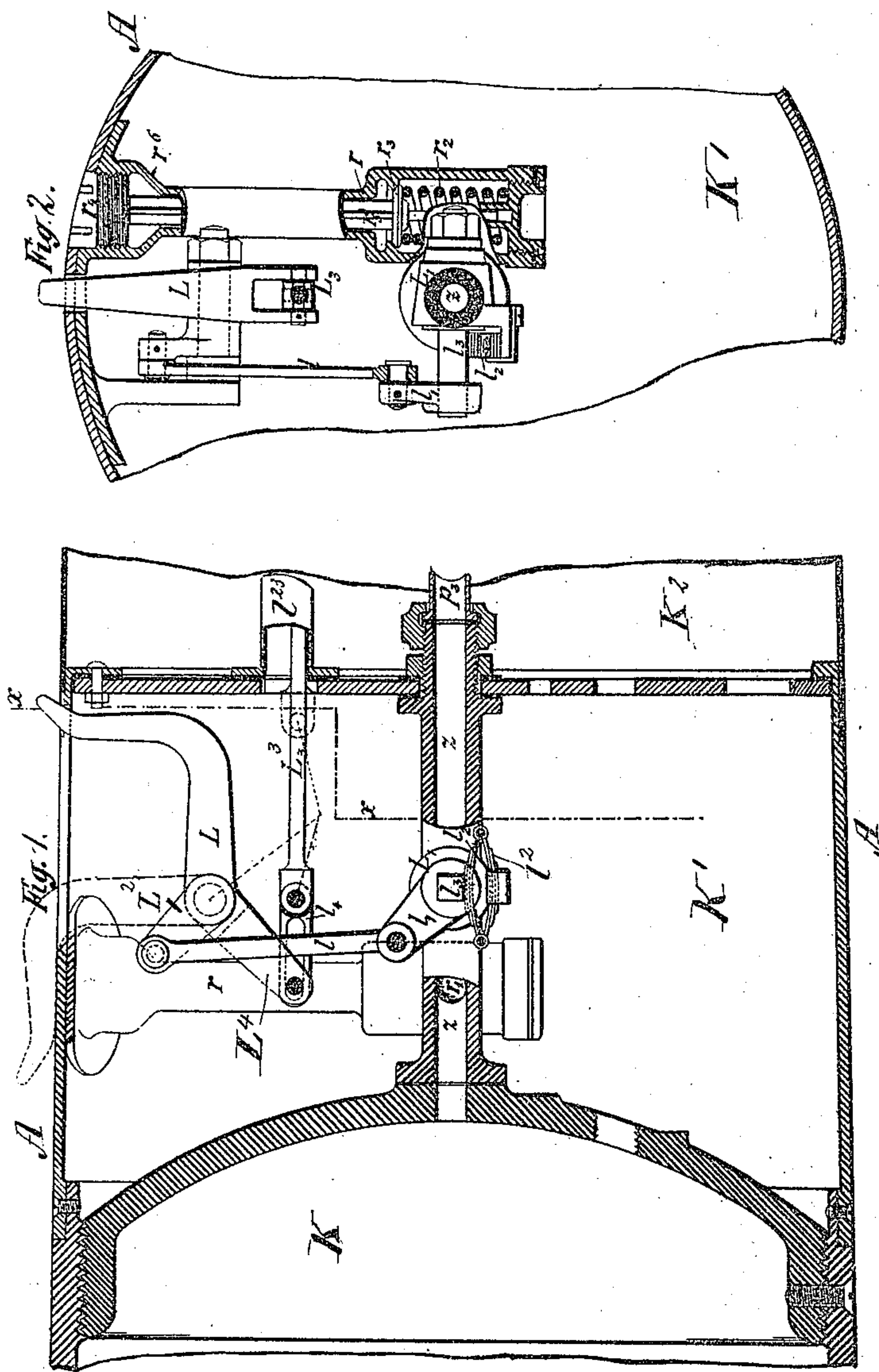
2 Sheets—Sheet 1.

ADOLF GRAF VON BUONACCORSI DI PISTOJA.

SELF PROPELLING TORPEDO.

No. 413,114.

Patented Oct. 15, 1889.



Witnesses:
Thomson Cross
Mill. E. Bouzel

Inventor
Adolf Graf von Buonaccorsi di Pistoja

Henry Orth
att'y

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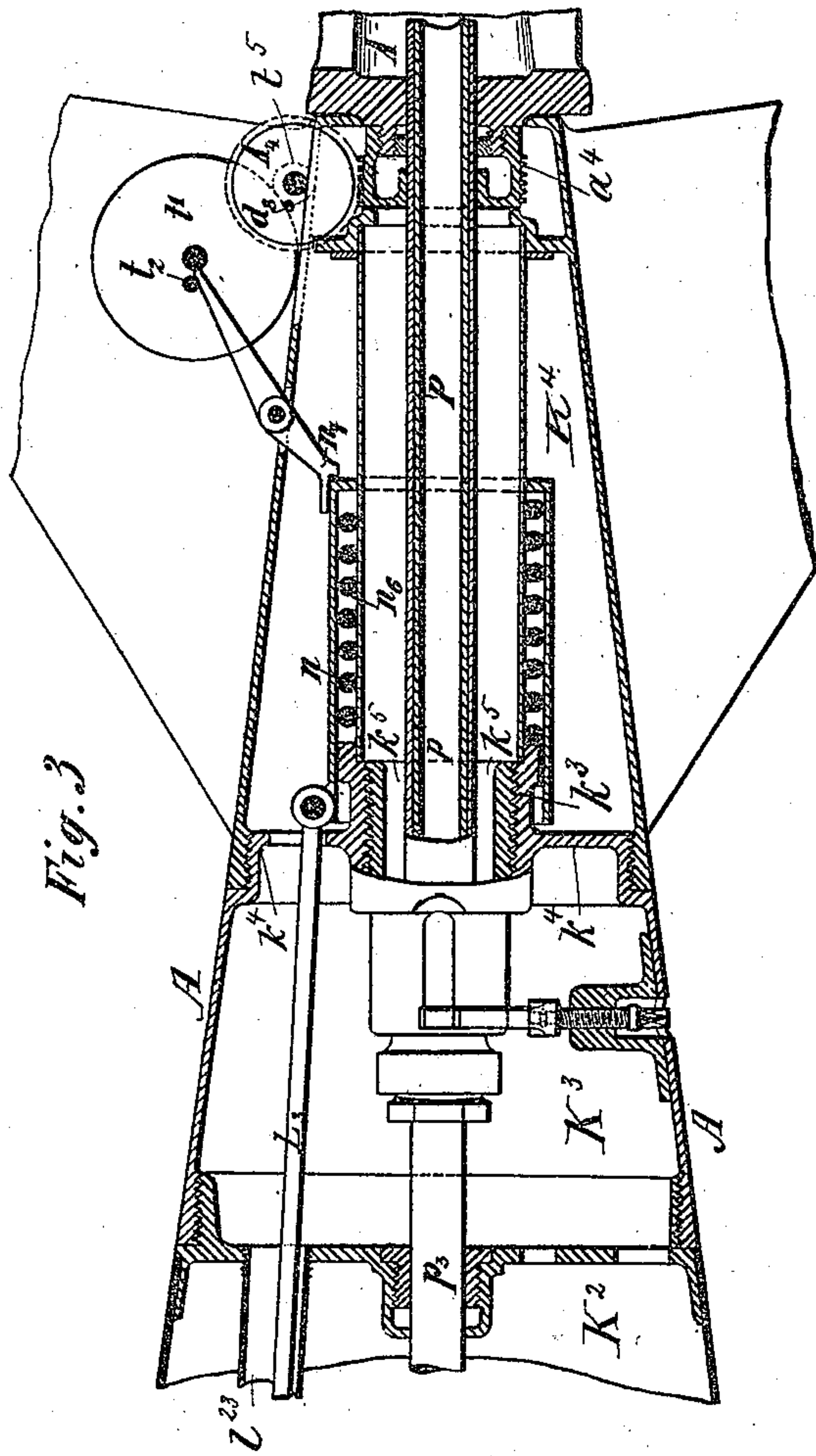


Fig. 3

Witnesses:

Thompson Cross
Mill. & Rouze

Inventor.

Adolf Graf von Buonaccorsi di Pistoja.

Henry M. Coe

UNITED STATES PATENT OFFICE.

ADOLF GRAF VON BUONACCORSI DI PISTOJA, OF VIENNA, AUSTRIA-HUNGARY.

SELF-PROPELLING TORPEDO.

SPECIFICATION forming part of Letters Patent No. 413,114, dated October 15, 1889.

Application filed November 15, 1888. Serial No. 290,968. (No model.) Patented in Germany June 19, 1887, No. 42,619; in Austria-Hungary November 18, 1887, No. 24,042 and No. 49,221; in France February 24, 1888, No. 188,945; in Belgium March 12, 1888, No. 81,003; in England March 20, 1888, No. 4,297; in Italy March 31, 1888, XXII, 23,135, XLV, 431; in Portugal May 17, 1888, No. 1,244; in Norway May 28, 1888, No. 934, and in Spain June 30, 1888, No. 8,035.

To all whom it may concern:

Be it known that I, ADOLF GRAF VON BUONACCORSI DI PISTOJA, a subject of the Emperor of Austria-Hungary, residing at Vienna, in the Province of Lower Austria, in the Empire of Austria-Hungary, have invented certain new and useful Improvements in Self-Propelling Torpedoes, (for which I have obtained Letters Patent in Austria-Hungary, No. 24,042 and No. 49,221, dated November 18, 1887; in Germany, No. 42,619, dated June 19, 1887; in France, No. 188,945, dated February 24, 1888; in Belgium, No. 81,003, dated March 12, 1888; in Italy, Vol. XXII, No. 23,135, and Vol. XLV, No. 431, dated March 31, 1888; in Spain, No. 8,035, dated June 30, 1888; in Portugal, No. 1,244, dated May 17, 1888; in England, No. 4,297, dated March 20, 1888, and in Norway, No. 934, dated May 28, 1888;) and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to letters or figures of reference marked thereon, which form a part of this specification.

This invention relates to self-propelling, offensive or fish torpedoes, and has for its object to provide means whereby the motive fluid may be automatically admitted to the distributing pipe or pipes when the torpedo is being launched, and to automatically cut off the supply of motive fluid after the torpedo has been launched, and to time the cut-off to the distance to be traveled by the torpedo.

The further object of the invention is to provide means for charging the storage-chamber or reservoir with the motive fluid and in connecting the duct or passage for the fluid with the main supply-pipe, whereby the construction of the chamber or reservoir may be materially simplified and cheapened, and whereby the danger of leakage is greatly reduced.

To these ends the invention consists in the combination, with the main supply-pipe, of a stop cock or valve and mechanism for oper-

ating the same automatically to establish communication between the main and distributing pipes when the torpedo is being launched, in means for automatically reversing the position of the stop cock or valve after the torpedo has been launched, to cut off the said communication, and in mechanism for timing the operation of the cut-off devices to the distance to be traveled by the torpedo, substantially as hereinafter fully described, and pointed out in the claims.

The invention further consists in the combination, with the supply-main and the distributing or admission cock or valve, of mechanism for charging the reservoir with the motive fluid, and a charging duct or pipe interposed in the said main between the reservoir and distributing cock or valve, substantially as hereinafter fully described, and pointed out in the claims.

The invention further consists in details of construction and combinations of parts, substantially as hereinafter fully described and claimed.

Referring to the drawings, Figure 1 is a longitudinal axial section of the chamber in rear of the chamber or reservoir for the motive fluid and in front of the sinking or ballast chamber. Fig. 2 is a section on line xx of Fig. 1, the shell of the torpedo being broken away; and Fig. 3 is a section of the chambers in rear of the sinking or ballast chamber of the torpedo, illustrating the mechanism for timing the operation of the distributing-valve to automatically cut off the communication between the reservoir and the distributing-pipes.

Referring to Fig. 1, K indicates the chamber or reservoir for the motive fluid, which in this case is compressed air; K', the valve-chamber in which are arranged the feed and distributing valves; K², the ballast or immersing or sinking chamber; K³, the chamber containing the sinking-valves and their operating mechanism, which I have deemed unnecessary to show, as these devices do not form a part of this application, but are fully described, shown, and claimed in an applica-

tion for patent filed November 15, Serial No. 290,969; and K^4 , the stern chamber, in and about which is located the mechanism for timing the operation of the distributing cock or valve to cut off the supply of compressed air to the distributing-pipes and to the operating mechanism.

The communication between the reservoir K and the distributing-pipes $p^3 p$ is, as usual, effected during the launching—that is to say, as the torpedo leaves the launching-tube, through the medium of a valve-lever L, whose outer end projects through shell or hull A of the torpedo.

To facilitate the operation of the admission and cut off of the compressed air to the distributing-pipes, I employ a stop-cock L' , to the plug l^3 of which a lever L is connected, the outer end of said plug being square in cross-section, for purposes presently explained.

As the torpedo leaves the launching-tube, the outer end of the lever strikes a stop in said tube that shifts the lever from its position shown in dotted lines in Fig. 1 to the position shown in full lines in said figure, to establish the communication between the reservoir K and the distributing-pipes $p^3 p$, through the main z , the plug l^3 being turned ninety degrees at each movement of the lever L. The arm L^2 of lever L is connected by a link l to a radial arm l' on the plug l^3 of the stop-cock L' , against one of the faces of the squared end of which bears an elliptic spring l^2 , that maintains the plug in the position to which it is shifted.

In launching exercises it is desirable that the supply of air be cut off as soon as the torpedo has reached the target or arrived at the end of its course, and this is automatically effected by the following instrumentalities. The lever has a second arm L^4 , to which is connected a chain or a slotted link l^4 , and to said chain or link is connected a rod L^3 , that serves to automatically shift the valve to cut off the communication between the air-chamber K and the distributing-pipes $p^3 p$. The rod L^3 extends through a tube l^{23} and is pivotally connected with a cylinder or sleeve n , held against the stress of its actuating-spring n^6 by a detent n^7 , one of the arms of which detent extends into the path of a pin t^2 , projecting from the face of a registering and timing disk t' , that is driven from a pinion t^5 on the arbor of the worm-wheel A^4 , that meshes with a worm-thread on the hub a^4 of one of the reaction propellers or wheels. The spring-actuated sleeve n slides on a tubular boss k^3 , formed on the partition k^4 , that separates the chamber K^4 from the chamber K^3 , into which boss is screwed a tubular bearing k^5 for the propeller-shaft q and air-distributing pipe p .

It will be observed that when the pin t^2 on the timing and registering disk or wheel t' strikes the detent-arm the detent releases the sleeve n , the latter is moved rearwardly un-

der the stress of the spring n^6 , and the lever L is shifted from its position shown in full lines in Fig. 1 back into its position shown in dotted lines in said figure, thereby shifting the valve-plug l^3 and cutting off the communication between the reservoir K and the distributing-pipes.

The detent n^7 is a gravital one—that is to say, the arm thereof that engages the sleeve n is heavier than the arm that extends into the path of the pin t^2 , so that said heavier arm will lie on the sleeve when the latter is in its rearmost position, and as the sleeve is drawn forward when the lever L is shifted the detent-arm rides over it until said sleeve has reached the limit of its forward motion, when the offset or shoulder on the engaging arm will drop behind the sleeve and lock it in that position.

By means of the described mechanism the distance traveled by the torpedo may be regulated and the torpedo then automatically brought to the surface through the agency of the horizontal rudder and the auxiliary mechanism that controls the same, which rudder-operating mechanism has been fully described in my application for patent filed April 18, 1888, Serial No. 271,047.

The devices for charging the compressed-air reservoir are constructed and arranged as follows: To the shell of the torpedo is secured a tubular valve-casing r , in communication with the main z , by a pipe r' , Fig. 1. In the lower part of the casing is arranged a check-valve r^3 , held to its seat by the pressure of the air and by the spring r^2 . The rod r^5 of valve r^3 extends into the upper enlarged portion or mouth r^6 of the casing r , which is normally closed by a screw-plug r^4 . When it is desired to force air into reservoir K and compress the same therein, the plug r^4 is removed and the end of the forcing-pipe screwed into the mouth of the casing sufficiently to move the valve r^3 from its seat. Air may now be forced through the casing r and connecting-pipe r' , and through main z into reservoir K, the stop-cock L' being closed and said air compressed within the reservoir K to any desired degree.

When the reservoir K is charged, the end of the forcing-pipe is unscrewed from the mouth r^6 , and as said pipe is unscrewed the check-valve r^3 will, under the stress of its spring and the pressure of the air in the reservoir, move back to its seat, thus preventing the escape of the compressed air from the reservoir K. After the pipe has been removed the screw-plug r^4 is screwed into the enlarged end of casing r^6 , thereby preventing all possibility of leakage of air through said casing.

Having described my invention, what I claim is—

1. In a torpedo of the class described, the combination, with the reservoir for the motive power, the propelling mechanism, and the pipe connecting said mechanism with the res-

ervoir, of a stop-cock interposed in said pipe, and a lever connected with said stop-cock, the end of which lever projects through the shell of the torpedo, substantially as and for the purposes specified.

2. In a torpedo of the class described, the combination, with the reservoir for the motive power, the propeller, and the supply-pipe for supplying such motive power to the propeller, of a cut-off valve interposed in said supply-pipe, an automatically-movable device connected therewith to close said cut-off valve, and a trip mechanism connected to said device and operated by the propeller to release said device, substantially as described.

3. In a torpedo of the class described, the combination, with the reservoir for the motive power, the propeller, and the supply-pipe for supplying such motive power to the propeller, of a cut-off valve in said supply-pipe, an automatically-movable device connected therewith to close said cut-off valve, a detent for engaging said device and keeping it set, and a trip for engaging said detent, operated by the revolutions of the propeller, substantially as described.

4. In a torpedo of the class described, the combination, with the reservoir for the motive power, the propeller, and the supply-pipe for supplying such motive power to the propeller, of a cut-off valve in said supply-pipe, a spring-actuated shifting device connected to close said valve, a detent for holding said device against the stress of its spring, and a disk revolved by the propeller and having a pin engaging said detent, substantially as described.

5. In a torpedo of the class described, the combination, with the reservoir for the motive power, the propeller, and the supply-pipe for supplying such motive power to the propeller, of a cut-off valve, a spring-actuated shifting device connected to close said valve, a detent for holding said device against the stress of its spring, and a timed tripping mechanism connected to the detent, operated by the propeller to trip the detent, substantially as described.

6. The combination, in a torpedo, with the supply-pipe z , the stop-cock L' , its plug l^3 , and radial arm l' on said plug, of the angular valve-lever L , projecting through the shell of the torpedo, the arm L^2 thereof, and the link l , connecting said arm with the arm l' , substantially as and for the purposes specified.

7. The combination, in a torpedo, with the supply-pipe for the motive power, of a stop-cock having a plug formed with a square end, means for turning said plug one-fourth of a revolution, and an elliptical spring bearing with its side against one face of the square end of said plug to hold said plug in an open or closed position, substantially as described.

8. The combination, in a torpedo, with the propeller, the supply-pipe for the motive power, a stop-cock and its plug in said pipe,

of shifting mechanism consisting of a lever connected with the stop-cock, a spring-actuated shifting-rod connected with the lever, a locking device to lock the rod against movement, and intermediate mechanism operated by the propeller and operating the locking device to release the shifting-rod, substantially as and for the purposes specified.

9. The combination, in a torpedo, with the propeller, the supply-pipe for the motive power, and a stop-cock and its plug in said pipe, of shifting mechanism consisting of a lever connected with the stop-cock, a shifting-rod connected with the lever, a spring-actuated cylinder connected with the shifting-rod, a locking device for locking the cylinder against motion, and a disk revolved from the propeller and provided with a pin for tripping said locking device, substantially as described.

10. The combination, in a torpedo, with the propeller, the supply-pipe for the motive power, a stop-cock and its plug in said pipe, of shifting mechanism consisting of a lever connected with the stop-cock, a shifting-rod connected with the lever, a spring-actuated cylinder connected with the shifting-rod, a detent for locking the cylinder against motion, a revoluble disk provided with a pin projecting from the face thereof and traveling in the path of the detent, and gearing connected with the propeller to revolve the disk, substantially as and for the purposes specified.

11. In a torpedo of the class described, the combination, with the reservoir for the compressed motive fluid, the distributing-pipe, and the distributing-valve, of feeding devices comprising a valve-casing interposed in the distributing-pipe between the distributing-valve and fluid-reservoir, said valve-casing having its open outer end secured to the shell of the torpedo, and a check-valve arranged in said casing, substantially as and for the purposes specified.

12. In a torpedo of the class described, the combination, with the reservoir for the compressed motive fluid, the distributing-pipe, and the distributing-valve, of feeding devices comprising a valve-casing interposed in the distributing-pipe between the distributing-valve and fluid-reservoir, said valve-casing having its outer end enlarged and interiorly screw-threaded, said enlarged outer end being secured to the shell of the torpedo, a screw-plug l^4 , for said enlarged outer end of the casing, and a spring-actuated check-valve l^3 arranged therein, substantially as and for the purposes specified.

In testimony whereof I affix my signature in presence of two witnesses.

ADOLF GRAF VON BUONACCORSI DI PISTOJA.

Witnesses:

OTTO SCHIFFER,
OTTO MAASS.