

(No Model.)

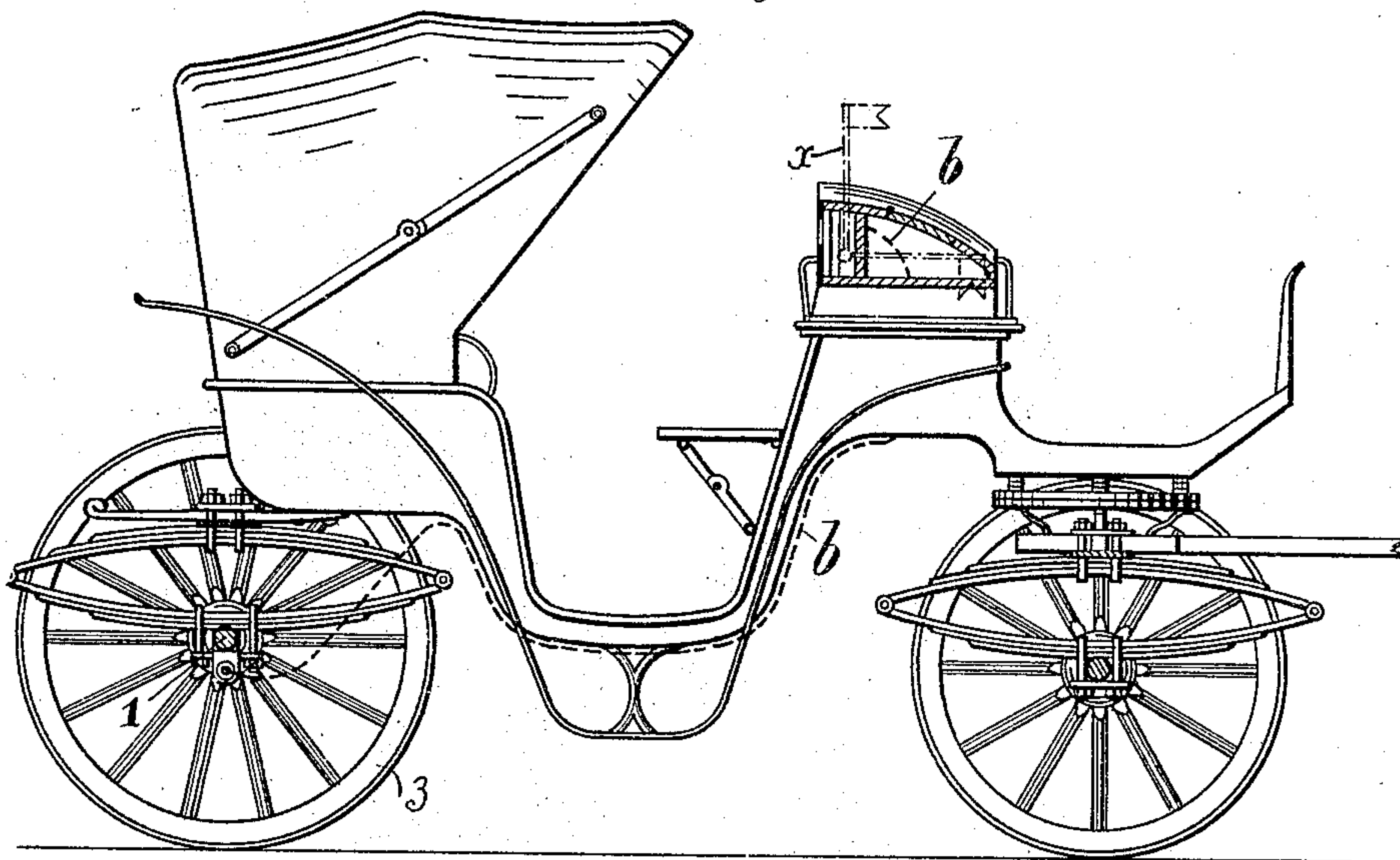
3 Sheets—Sheet 1.

F. ERHARDT.  
FARE INDICATOR AND REGISTER.

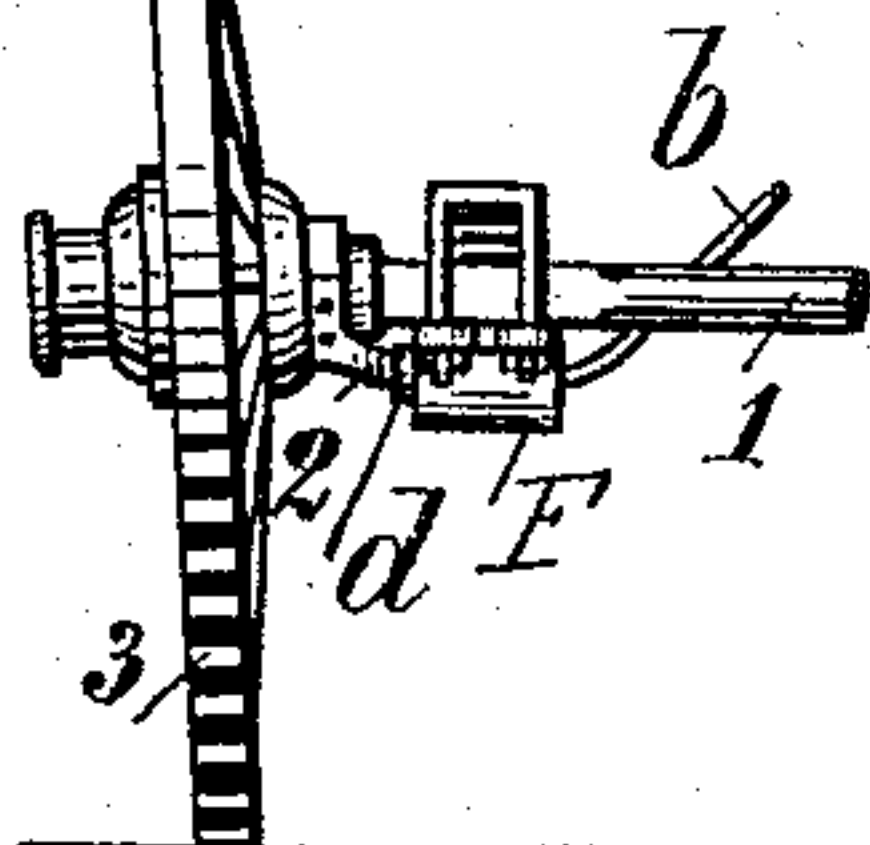
No. 509,799.

Patented Nov. 28, 1893.

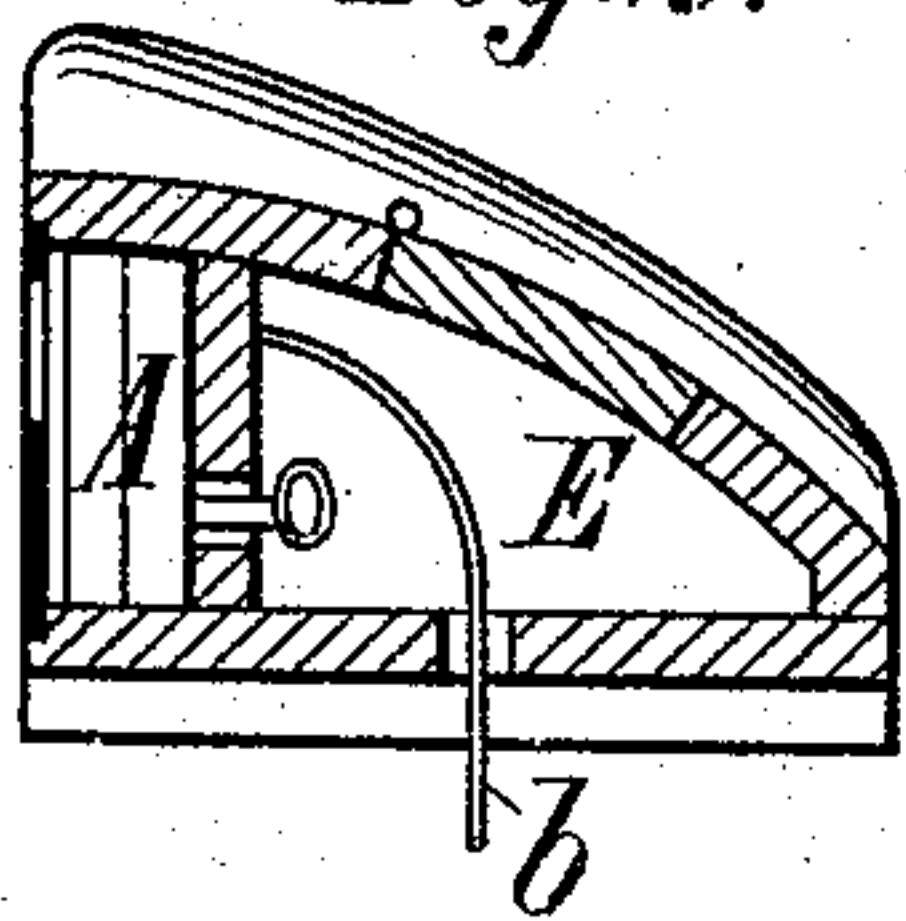
*Fig. 1.*



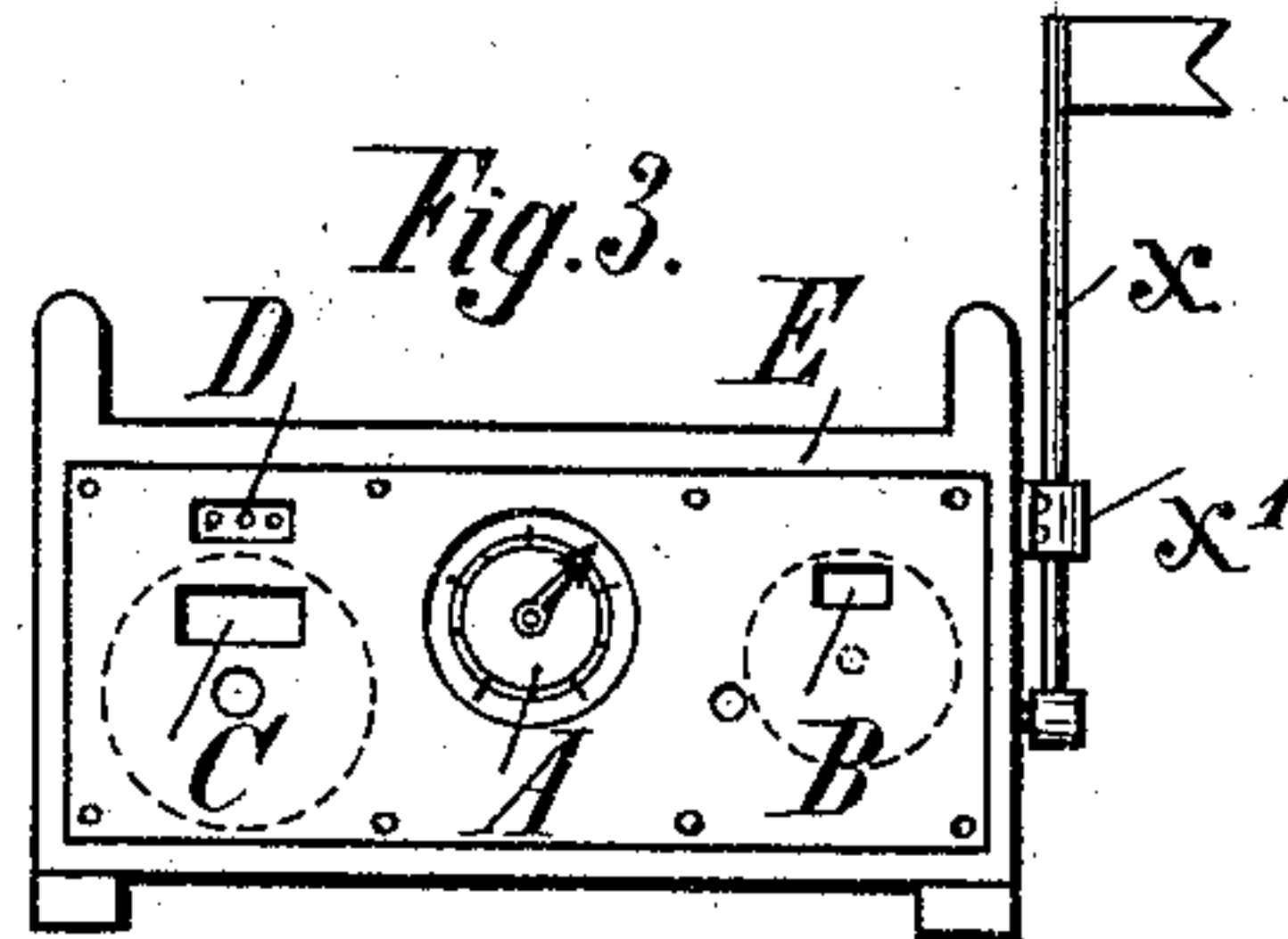
*Fig. 4.*



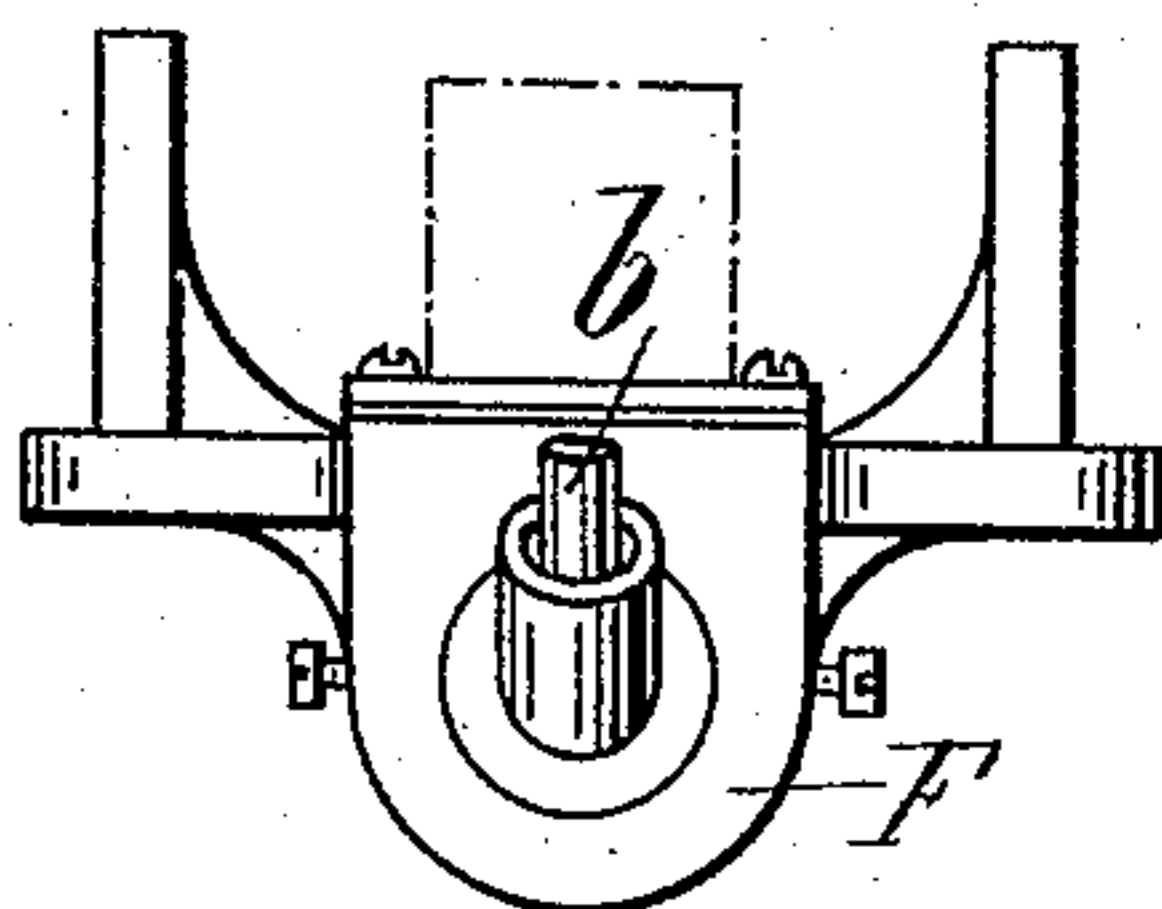
*Fig. 2.*



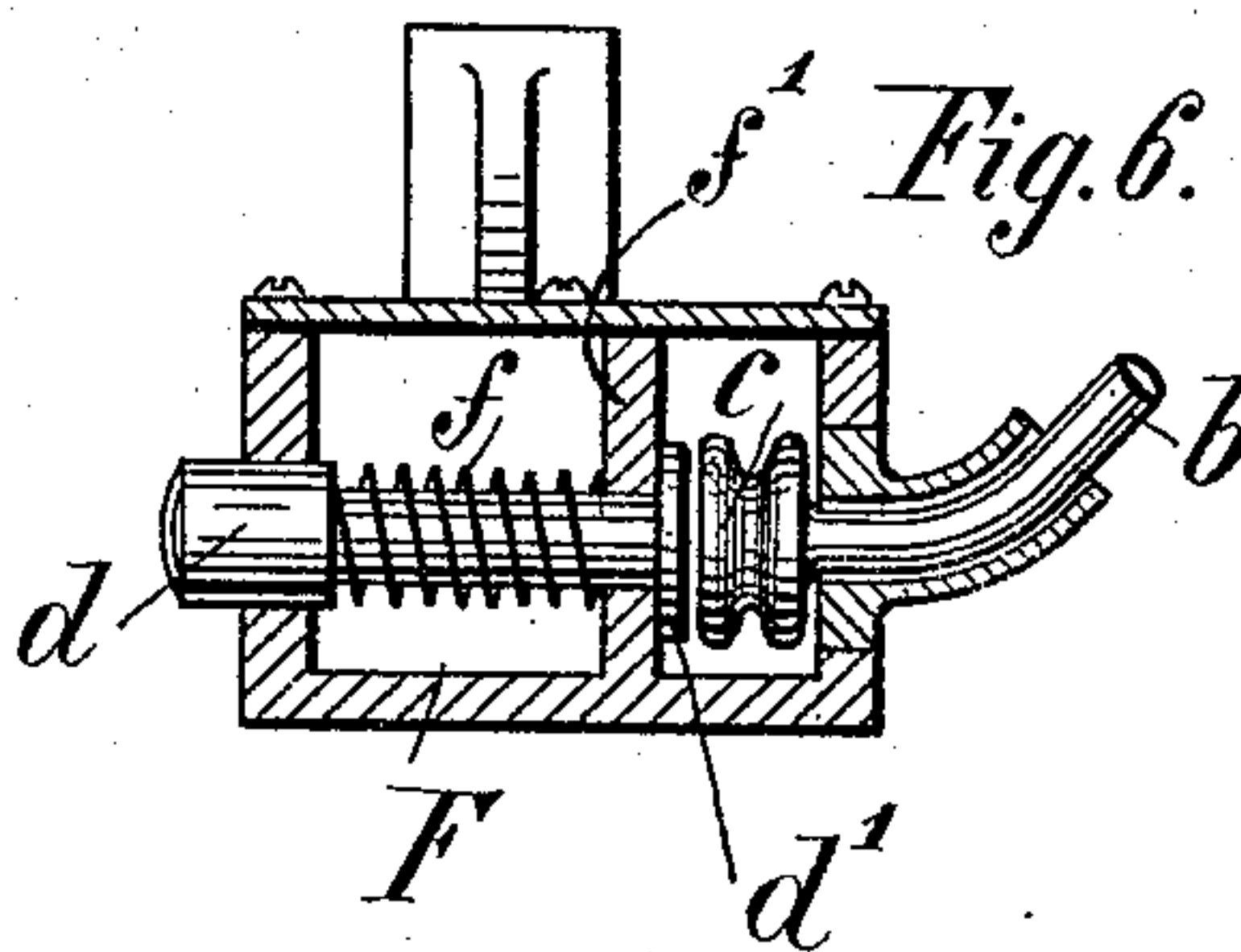
*Fig. 3.*



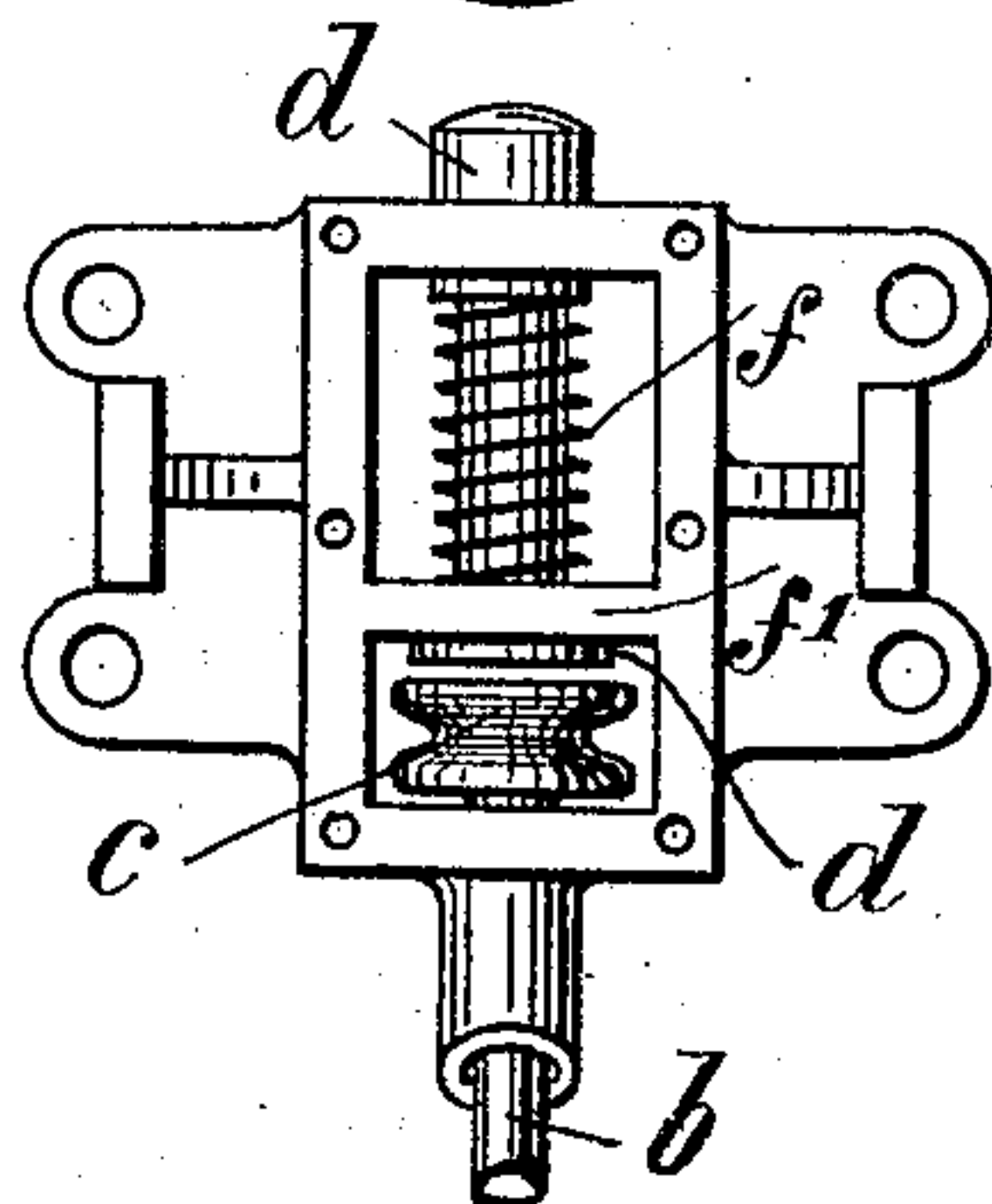
*Fig. 5.*



*Fig. 6.*



*Fig. 7.*



Witnesses  
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Inventor:  
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(No Model.)

3 Sheets—Sheet 2.

F. ERHARDT.  
FARE INDICATOR AND REGISTER.

No. 509,799.

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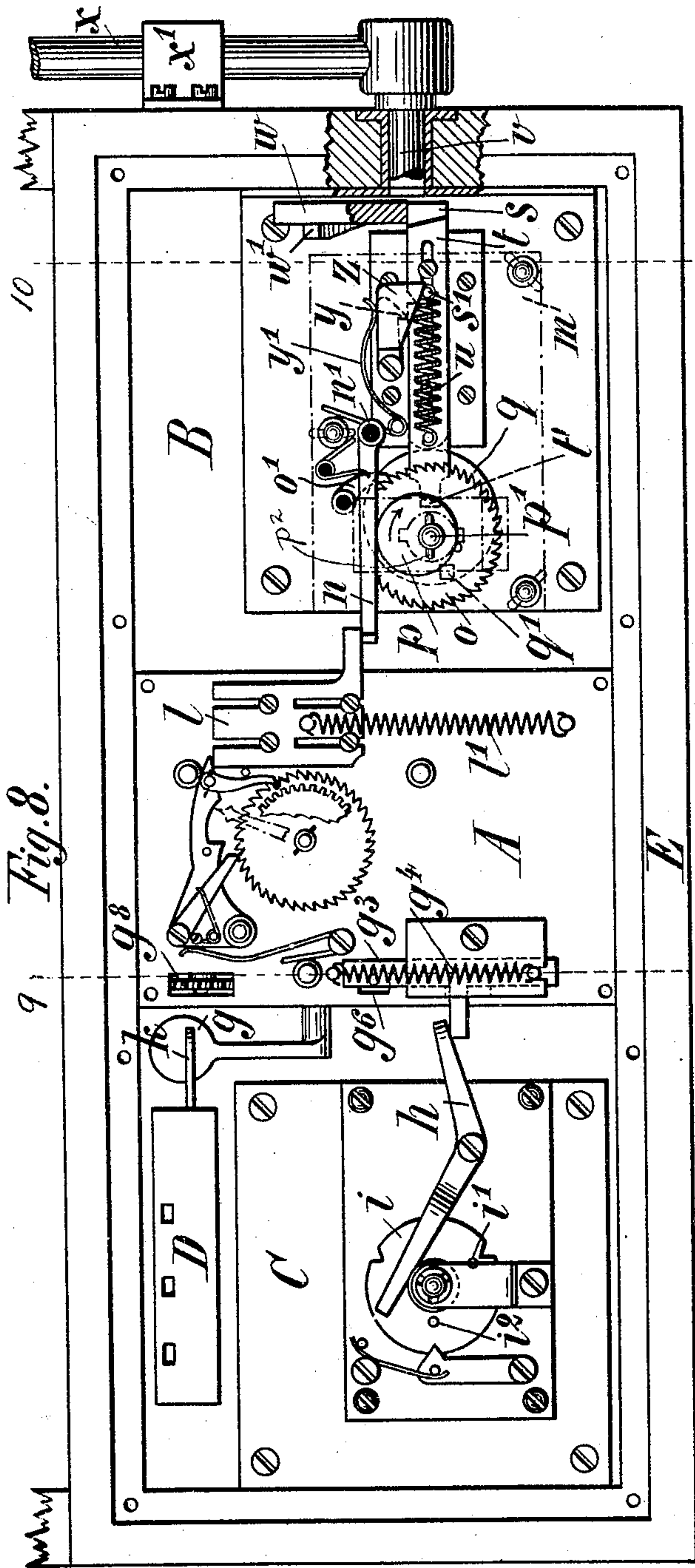


Fig. 8.

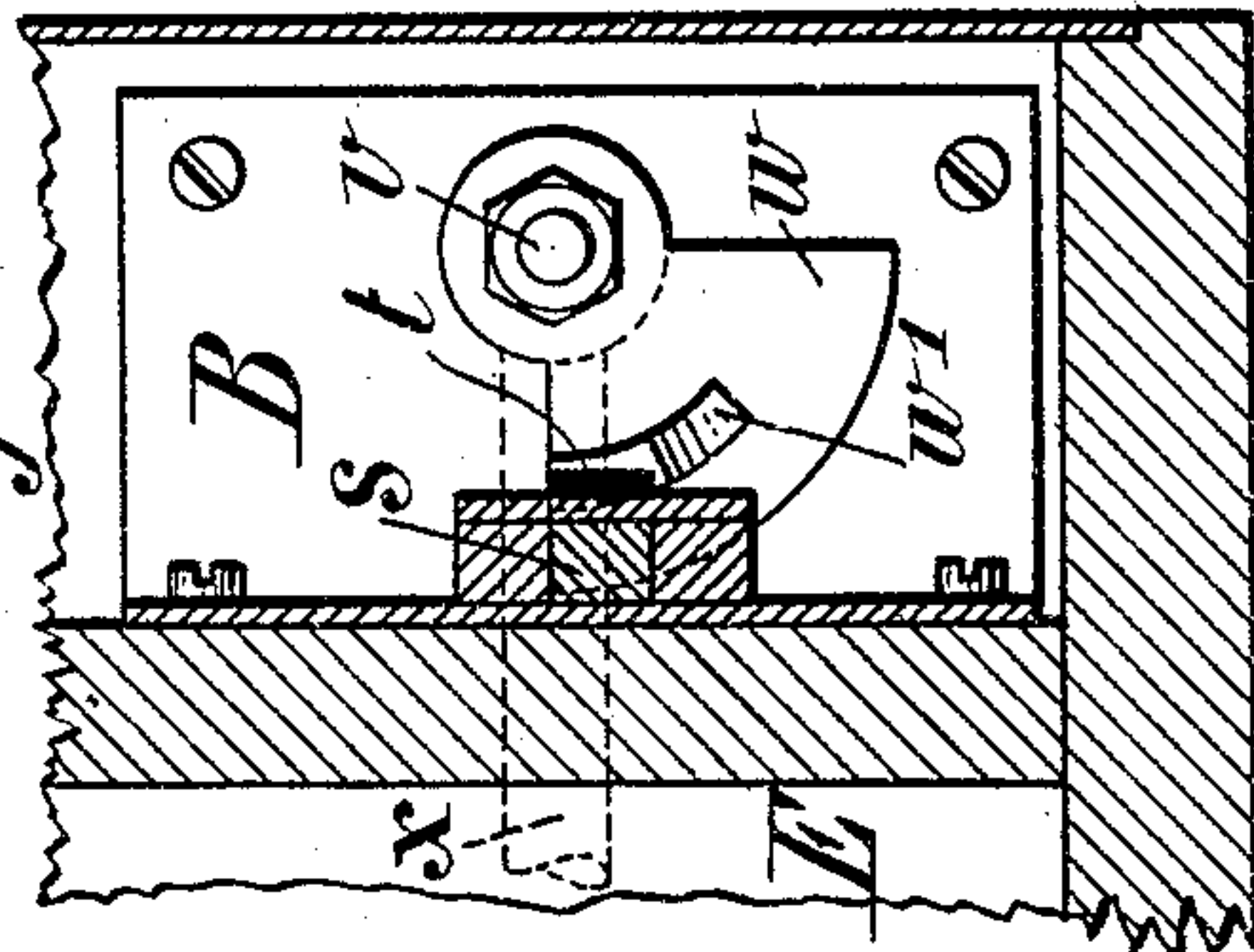


Fig. 10.

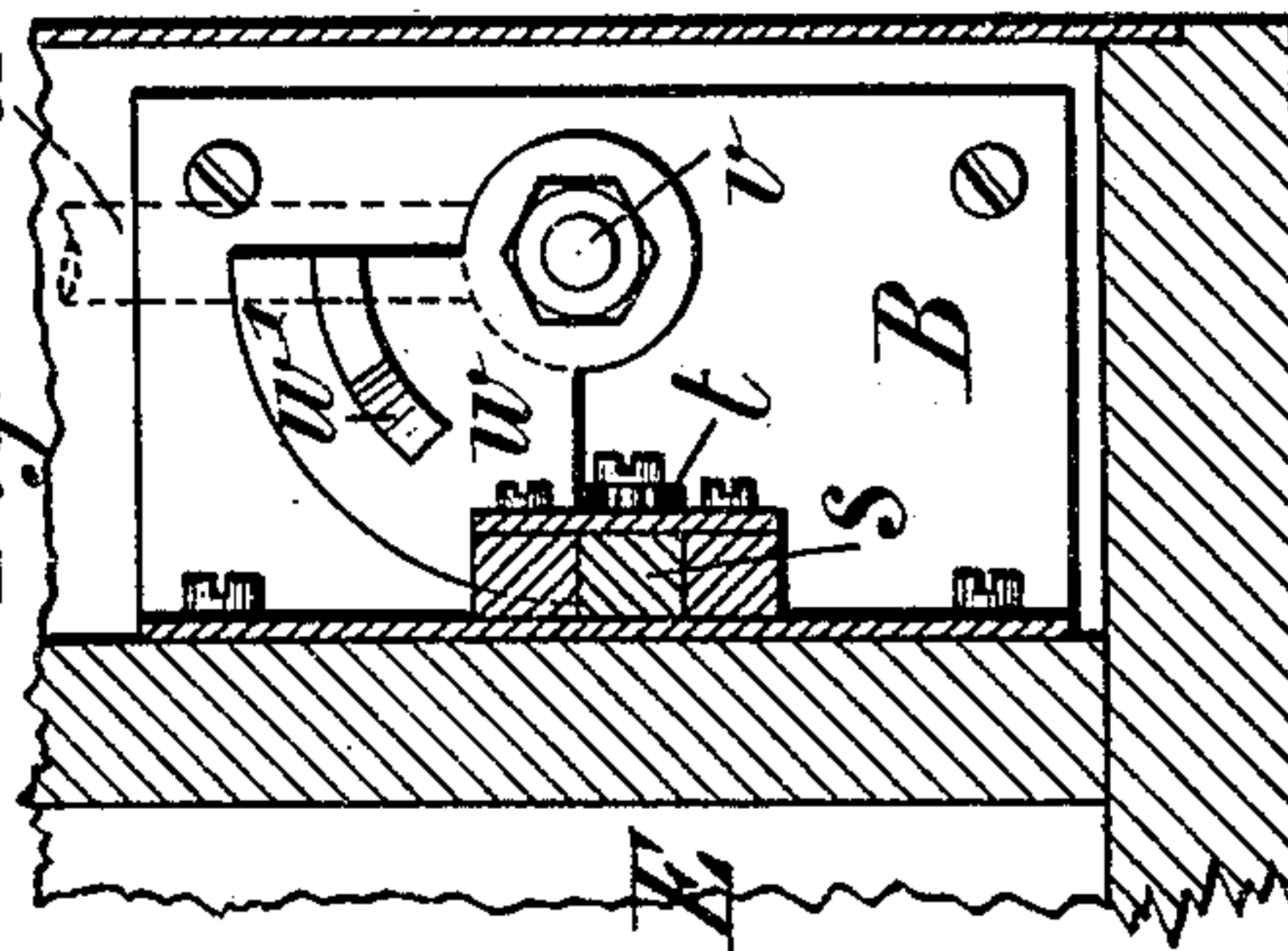


Fig. 14.

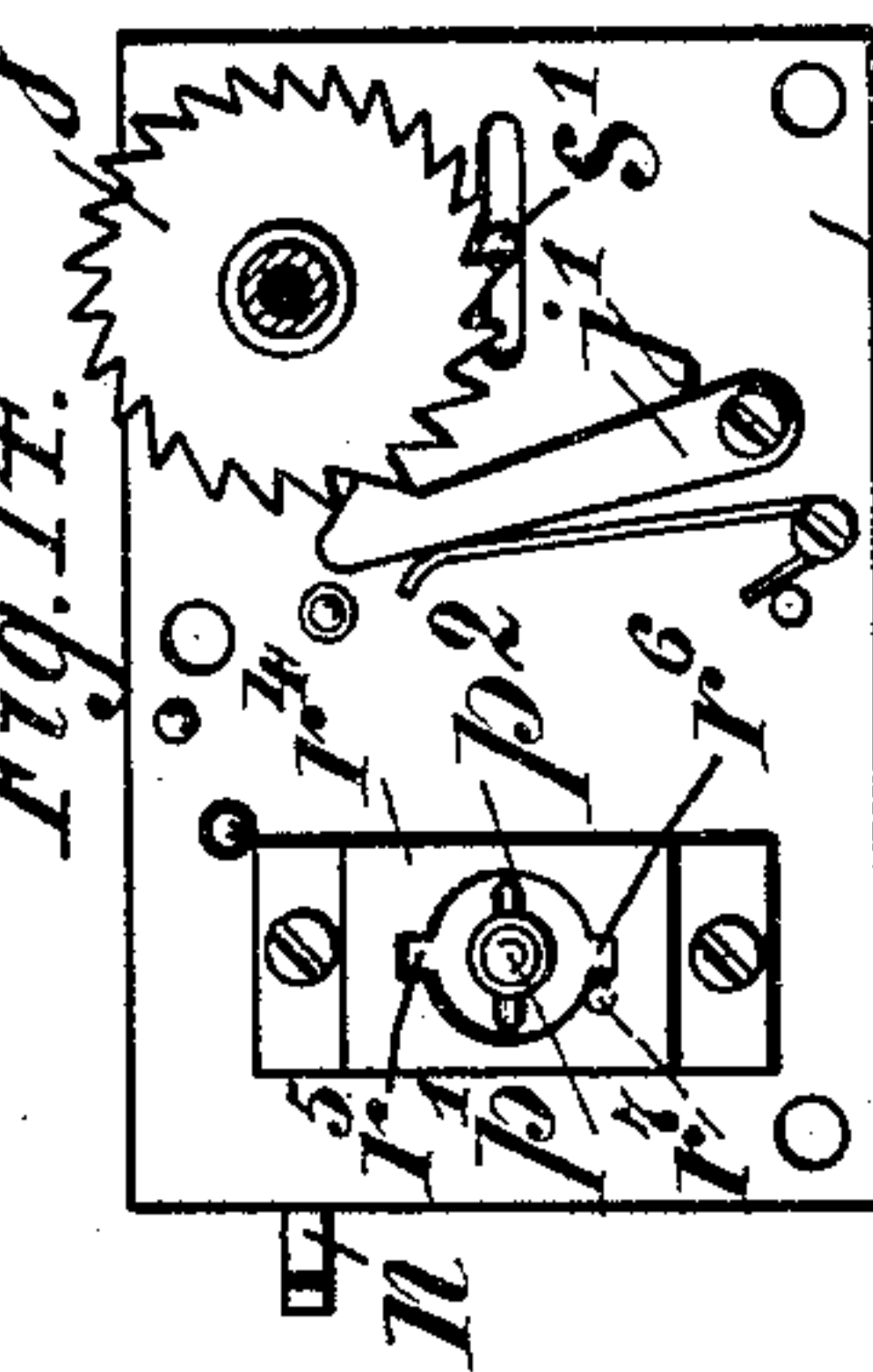


Fig. 9.

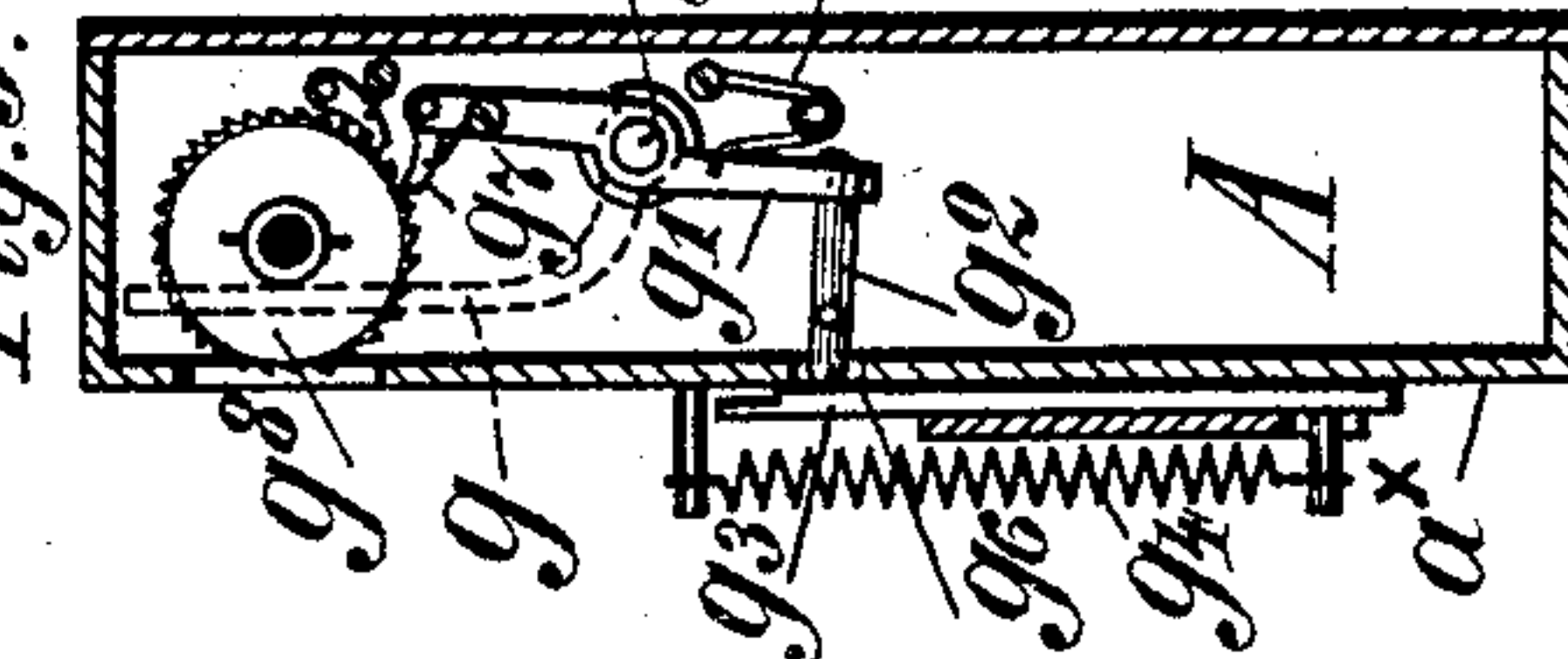
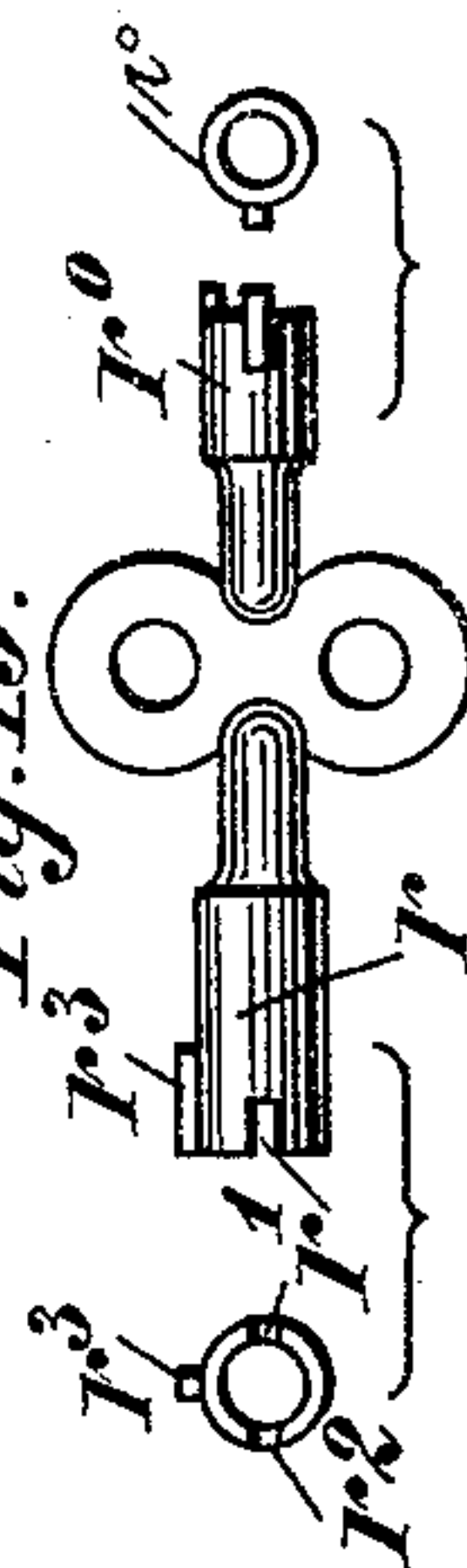


Fig. 15.



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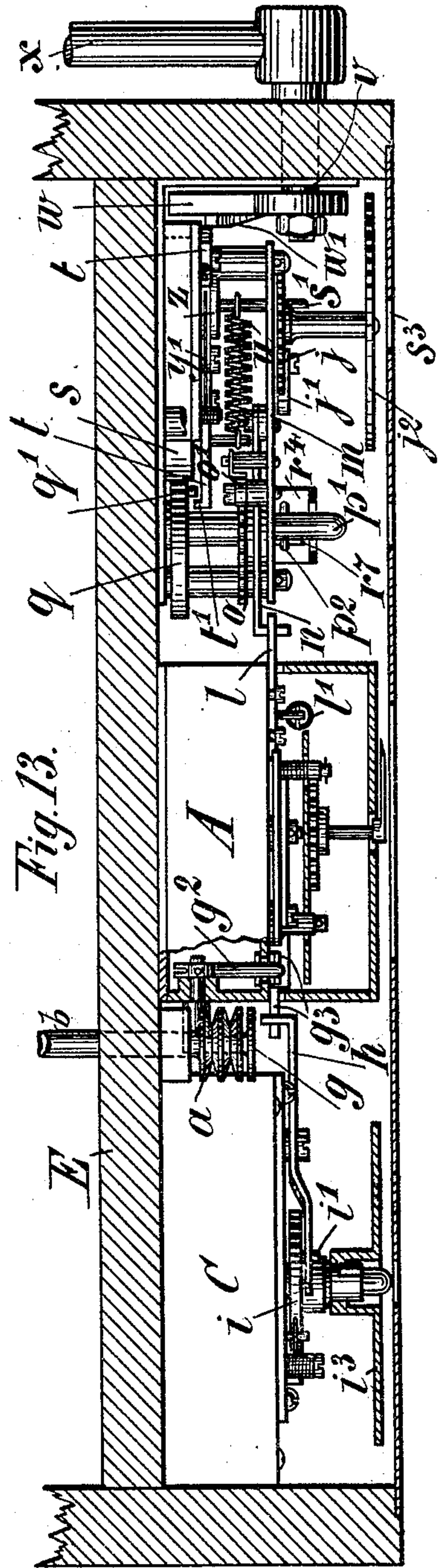
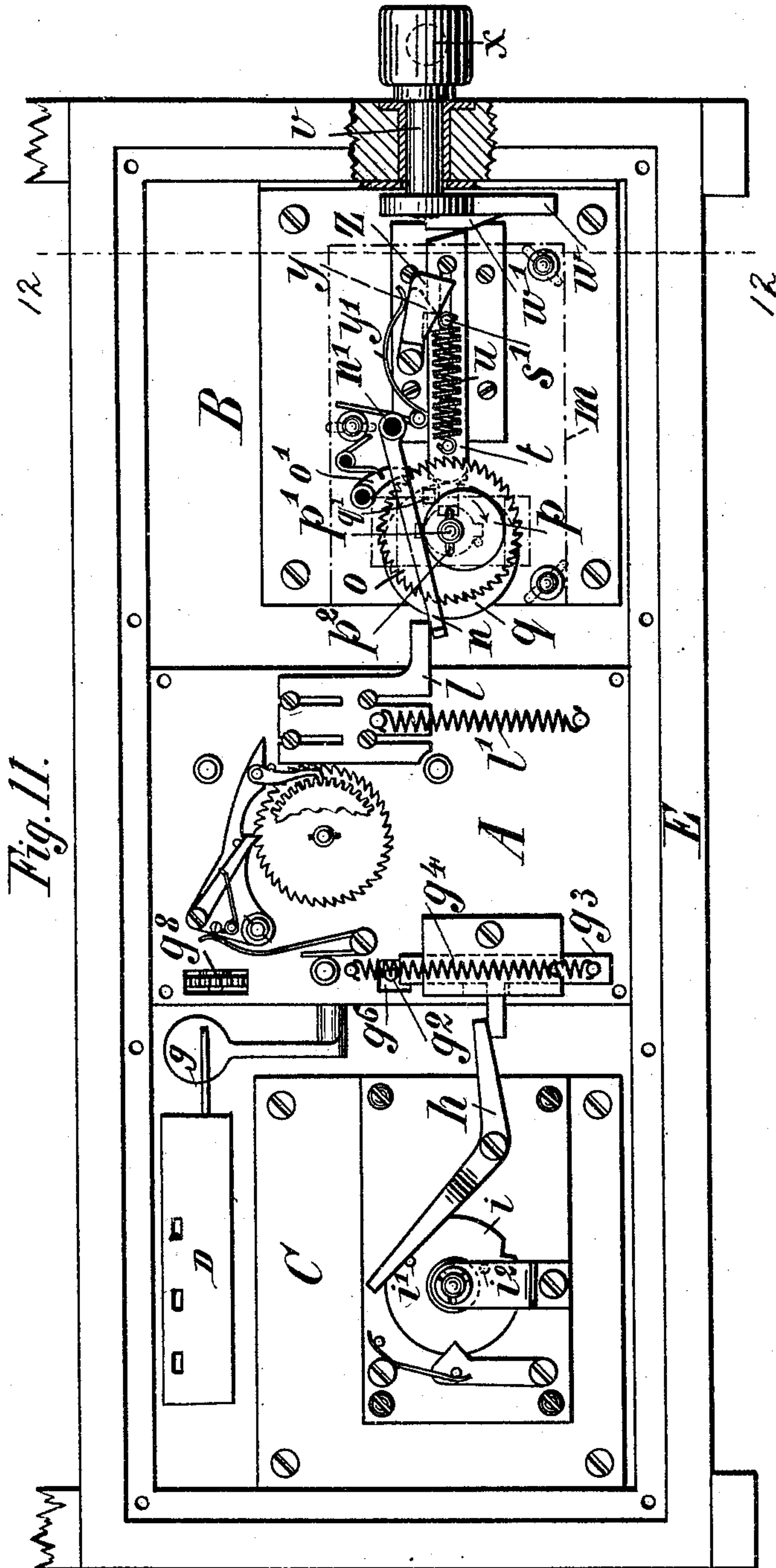
(No Model.)

3 Sheets—Sheet 3.

F. ERHARDT.  
FARE INDICATOR AND REGISTER.

No. 509,799.

Patented Nov. 28, 1893.



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Inventor:  
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Atty.



# UNITED STATES PATENT OFFICE.

FRIEDRICH ERHARDT, OF HAMBURG, GERMANY, ASSIGNOR TO THE TAX-AMETER FABRIK WESTENDARP & PIEPER, OF SAME PLACE.

## FARE INDICATOR AND REGISTER.

SPECIFICATION forming part of Letters Patent No. 509,799, dated November 28, 1893.

Application filed March 23, 1891. Serial No. 386,160. (No model.) Patented in Belgium March 7, 1891, No. 94,049; in England March 7, 1891, No. 4,130; in Sweden March 7, 1891, No. 3,787; in Norway March 7, 1891, No. 2,131; in Switzerland March 7, 1891, No. 3,485; in France March 7, 1891, No. 211,966; in Germany March 8, 1891, No. 61,345; in Italy March 31, 1891, No. 29,232, and in Austria-Hungary September 9, 1891, No. 30,222 and No. 50,900.

*To all whom it may concern:*

Be it known that I, FRIEDRICH ERHARDT, a subject of the King of Hungary, and a resident of Hamburg, in the German Empire, have invented certain new and useful Improvements in and Relating to Fare-Indicators, of which the following is a specification.

My invention (for which I have obtained Letters Patent in Germany, No. 61,345, dated March 8, 1891; in Belgium, No. 94,049, dated March 7, 1891; in England, No. 4,130, dated March 7, 1891; in Sweden, No. 3,787, dated March 7, 1891; in Norway, No. 2,131, dated March 7, 1891; in Switzerland, No. 3,485, dated March 7, 1891; in France, No. 211,966, dated March 7, 1891; in Italy, No. 29,232, dated March 31, 1891; in Austria-Hungary, No. 30,222 and No. 50,900, dated September 9, 1891), relates to improvements in devices connected with apparatus for automatically indicating the fare due on a cab or other public conveyance; said fare-registering or indicating apparatus being of any construction and particularly of the kind forming subject of United States Patents No. 183,960, dated October 31, 1876, and No. 383,758, dated May 29, 1888, granted to Wilhelm Nedler, and No. 450,602, dated April 14, 1891, granted to Dencker and Erhardt.

The object of this invention is to effectually protect the passengers against the fraudulent tampering on the part of the driver by rendering the fare-registering apparatus visible from the outside, whether said fare-registering apparatus is in or out of action or whether the vehicle is free for service or hire, and to which higher or lower tariff the fare registering apparatus is set by the driver. I attain this object by the mechanism illustrated in the accompanying drawings, in which—

Figure 1 is a side view of a cab provided with my invention. Fig. 2 is a cross section of the driver's seat at the rear of which the casing of the fare-register and the safety devices is received; Fig. 3 a front view of said casing and a rear view of the driver's seat. Fig. 4 is a detail view of one of the rear wheels of a cab, showing an air pump, or other pneu-

matic mechanism connected to the axle of the cab and operated by a cam on the wheel-hub. Fig. 5 is a detail side elevation of said parts, the wheel being removed. Fig. 6 is a vertical section of the parts shown in Fig. 5, the section plane being in the longitudinal line of the axle. Fig. 7 is a plan view of the same parts, the axle being removed. Fig. 8 is a rear elevation of the apparatus, the dial-plates and cover being removed to expose the operative parts. Fig. 9 is a vertical transverse section in the line 9—9, Fig. 8. Fig. 10 is a vertical transverse section upon the line 10—10, Fig. 8. Fig. 11 is a rear elevation of the apparatus similar to that shown in Fig. 8, but with the operative parts in a different position. Fig. 12 is a transverse section of the apparatus, taken in the plane 12—12, Fig. 11. Fig. 13, is a horizontal section of the casing, the interior mechanism being shown in plan view. Fig. 14 is a detail view showing the devices for controlling the registrations, by numerals, of the number of journeys made by the cab. Fig. 15 is a detail view showing in side elevation and in end views the form of the key by which the automatic fare-register is rendered operative, or inoperative.

In the said drawings the fare-indicator A, and the counter D, for registering the distance traveled by the vehicle are of well known construction and the former, therefore, is not specifically illustrated in Figs. 8, 9, 11 and 13 and the latter requires no special illustration in Fig. 8.

The same letters and figures refer to the same or similar parts throughout the several views.

On one side of the fare-indicating apparatus A, which for instance, may be of the type described in the specification forming part of Letters Patent No. 450,602 being actuated either from a wheel nave or a clock work, is arranged a device B Figs. 3, 8, 10, 11, 12 and 13 for controlling the engagement and disengagement of the fare registering apparatus and on the other side of the latter means C and D for setting the apparatus to a higher or lower tariff and for registering



the distance passed over, which is likewise actuated by the wheel nave, these devices being provided in a closed casing E so arranged in the carriage that it will always be in the sight of the passenger, for example at the rear of the driver's seat (Figs. 1 to 3).

In the present example the motion of the apparatus derived from the wheel or axle of the vehicle is assumed to be effected by pneumatic transmission. To this end on the fixed axle 1 of the vehicle is fastened a box or casing F into which fits a reciprocating rod  $d$  extending at one end through the wall of the box F and projecting within the path of a cam 2 on the boss of the rotating wheel 3 while at its other end the rod is guided by an aperture in the partition  $f'$  and is provided with a flat head  $d'$  which is designed not only to limit the stroke of the rod  $d$  against the tendency of a spring  $f$  surrounding the rod, but also to press upon a diaphragm or an india rubber bellows  $c$  inclosed within the remaining space of the box F. The pressure thus intermittently exerted upon the bellows  $c$  on the rotation of the wheel 3 is transmitted through an air tight pipe  $b$  to a bellows  $a$ , Fig. 13, provided within the casing E and is thence communicated to a lever  $g$  adapted to transmit the action of the bellows  $a$  upon the fare indicating apparatus A, proportionately to the greater or smaller angle of oscillation of this lever the mechanism of the fare indicating apparatus proper is then actuated in various degrees in the well known manner so that this apparatus according as the movement of the lever  $g$  is limited, will advance with more or less speed and may therefore be set to indicate on its dial plate a higher or lower tariff.

In order to confine the way of the lever  $g$  within given bounds a lever  $g'$  (Fig. 9), secured upon the axis  $g^a$  of the lever  $g$  and acted upon by the spring  $g^5$ , is provided which strikes with a pin  $g^2$  extending through a slot  $g^6$  in the front plate  $a^x$  of the apparatus against a stepped bar  $g^3$  Fig. 9. The latter is adapted to be displaced over the slot  $g^6$  and acted upon by a bell crank lever  $h$  against the tendency of a spring  $g^4$  in accordance with the position of a disk  $i$ , which is provided at unequal distances from its center of rotation with pins  $i'$ ,  $i^2$  adapted to actuate the bell crank lever  $h$  in such a manner that it may displace the said bar  $g^3$  against the tendency of the spring  $g^4$ . Thus one or the other step of the bar  $g^3$  is caused to come in the path of the pin  $g^2$  and thereby the oscillating motion of the lever limited accordingly for the reason that the advance of a ratchet wheel  $g^8$  Fig. 9 of the fare-indicating apparatus proper by the engagement with a pawl  $g^7$  of the lever  $g'$  will be retarded or accelerated according as the lever  $h$  rests upon the nave of the disk  $i$  or upon one or the other of the pins  $i'$ ,  $i^2$ . Accordingly the position of the disk  $i$  requires to be changed but the passengers must be precluded from effecting the

change and the driver allowed to do so only in sight of the passengers with the aid of a particularly shaped key  $r^0$  (Fig. 15) fitting to the head of the axis, upon which the disk  $i$  is keyed.

In order to obviate fraud the position of the disk  $i$  must admit of being at any time inspected by the passengers, for which purpose upon the axis of the disk  $i$ , a disk  $i^3$  Fig. 13, is fixed, having various colors or bearing suitable inscriptions, which, when the key is inserted turns with the disk  $i$  behind the cover plate of the closed casing E, so that through an aperture in the cover plate the tariff according to which the fare indicating apparatus is actuated may always be observed.

The fare indicating apparatus proper is put in and out of action, that is to say connected with the mechanism actuated by a clock work or by a carriage wheel in the well known manner by raising or lowering the slide  $l$ , as for instance, that described in the specification of the United States Letters Patent No. 450,602 aforesaid, but to effectually prevent this slide and consequently the hand indicating on the dial plate the amount to be paid, being tampered with, the device for imparting suitable movement to the slide  $l$  is constructed as follows:

Upon one side of the fare indicator upon a plate  $m$  (Fig. 13) in the interior of the casing E is arranged an arm  $n$  Figs. 8 and 11 adapted to turn upon the fulcrum  $n'$  in such a manner that its free end comes within reach of the slide  $l$ , and that under the action of a spring  $l'$  applied to the said slide it will continually bear against an eccentric  $p$  adapted to turn with the axis  $p'$ . The throw of the eccentric  $p$  corresponds to the movement of the slide  $l$  necessary for putting the fare indicating apparatus in and out of action. Upon the axis  $p'$  is moreover placed a ratchet wheel  $o$ , into which engages a pawl  $o'$  pivoted to the plate  $m$ . By this means the axis  $p'$  with the eccentric is prevented turning in any other direction than prescribed. By reason of this arrangement the slide  $l$  can never return to the original position before it has completed the movement once commenced, it being allowed to return only when the mechanism for actuating the fare indicating apparatus has first in sight of the passengers been put either in or out of action. The eccentric  $p$  is turned through the medium of the double key (Fig. 15) having an extremity  $r$  which may be made of various shapes and connected with the key tube,  $r^0$ , this extremity being made to fit the head  $p^2$  of the axis  $p'$  see Figs. 8, 11, 13 and 14. Now to prevent the eccentric  $p$  being turned too far so that the slide  $l$  after its arrival in one or the other extreme position would commence its return movement too soon. At the extremity  $r$  of the key a bit  $r^3$  is provided and around the head of the axis  $p'$  a bridge piece  $r^4$  is placed forming the key plate which has



suitable apertures  $r^5, r^6$  see Fig. 14 at diametrically opposite points and below this bridge piece upon the plate  $m$  a stop  $r^7$ . According to this arrangement a turning movement of the eccentric  $p$  (in the direction of the arrow Figs. 8 and 11) can take place only when the bit  $r^3$  is inserted into the aperture  $r^5$  in the bridge piece  $r^4$ . Exactly after half a revolution of the eccentric and key the bit  $r^3$  strikes against the stop  $r^7$  and is then opposite the aperture  $r^6$ . In this position a turning movement of the key in one or the other direction is not possible at all, unless the key is first drawn from the key hole and inserted again so that the bit  $r^3$  enters the aperture  $r^5$ . Therefore, the slide  $l$  can be moved from one to the other terminal position only when the fare indicating apparatus is put in or out of action, and it is therefore impossible to place the slide  $l$  during the journey in an intermediate position for causing an incorrect operation of the fare-indicating apparatus, as this would at once be recognized by the passenger or the cab-superintendent as the key would stick in its place.

For further increasing the safety, certainty of action, and control over the apparatus, upon the axis carrying the eccentric  $p$  and ratchet wheel  $o$  is secured a larger eccentric  $q$  which effects the displacement of a bar  $s$  placed at a right angle to the axis  $p'$ , only in one direction, and which is provided at its face with a projection  $q'$  serving as a stop. This stop is so arranged that when the eccentric  $p$  and disengaging lever  $n$  have assumed the position shown in Fig 11 it would bear upon the nose  $t'$  forming part of a second bar  $t$  placed in front of and parallel with the slide  $s$ , which acts in such a manner, that the eccentric  $p$ , the lever  $n$  and the slide  $l$  of the fare registering apparatus cannot be moved farther, unless the bar  $t$  has been slid inward by a signaling device accessible from the outside to such an extent that its nose  $t'$  is moved out of the path of the projection  $q'$  (Figs. 11 and 13). The two bars  $s$  and  $t$  are guided horizontally and connected with each other by a spring  $u$  in such a manner that one of them, viz. that denoted by  $s$  is forced to the left, the other one  $t$  to the right and as the bar  $s$  bears upon the eccentric  $q$  the second bar  $t$  in the position of rest of the eccentric is just drawn back to the right so far that its nose  $t'$  must meet with the projection  $q'$  in the turning movement of the eccentrics  $p$  and  $q$ . The displacement of the nose  $t'$  on the bar  $t$  from the path of the projection  $q'$  takes place in a suitable manner by means of a cam  $w w'$  placed in the interior of the casing  $E$  which is arranged upon the rotary axis  $v$  of a signaling device which under certain conditions can be turned from the outside. This signaling device may consist of an arm  $x$  carrying a plate or a flag (Figs. 1 and 3) with a suitable inscription which when turned by the driver through the medium of the axis  $v$  and cam  $w w'$  causes the bar  $t$  to be moved

to the left until a pawl  $y$  pivoted to the stationary guide of the bar  $t$  under the action of a spring  $y'$  drops into a suitable notch in the bar  $t$  in order to hold the same against the action of the spring  $u$  in such a position (Fig. 11) that the projection  $q'$  on the eccentric  $q$  cannot come within the reach of the nose  $t'$ . It is only then that the eccentric  $p$  can be turned with the right key introduced through the key plate  $r^4$ , and that by raising the slide  $l$  the fare-indicating apparatus can be put out of action (Fig. 8). In this turning movement of the shaft  $p'$  effected by the key the eccentric  $q$ , which has a lead of an angle of ninety degrees relatively to the eccentric  $p$ , forces the bar  $s$  back, causing it to act by means of the pin  $s'$ , carrying the spring  $u$  and extending through the guide slot in the bar  $t$  against the rising edge of a plate  $z$ , laterally connected with the pawl  $y$  thereby disengaging the pawl at the proper moment from the bar  $t$  (acted upon by the spring  $u$  which has meanwhile been put under tension). In this position of the eccentric (Fig. 8) the rear end of the bar  $s$  is in the path of the cam  $w$  (Figs. 8 and 10) so that the latter, or the signaling device, is prevented from turning farther. The signaling arm  $x$  placed in the upright position and the flag or plate of which serves to show outside that the vehicle is for hire, or on its home journey, or although unoccupied is otherwise let can therefore be turned down (Figs. 10 to 13) which indicates that the carriage is occupied, only after the eccentrics  $p$  and  $q$  have been turned through one hundred and eighty degrees and the fare registering apparatus has again been properly put in action. In this turning movement of the shaft  $p'$  with the eccentrics  $p$  and  $q$  the projection  $q'$  on the latter strikes once more against the nose  $t'$  of the bar  $t$  released as described by the pin  $s'$  so that it is not possible to turn the eccentric farther or disengage the fare indicating apparatus until by the movement of the arm  $x$  and flag to the position corresponding to "unoccupied" the bar  $t$  is caused by the part  $w'$  on the cam  $w$  to advance so as to bring the nose  $t'$  out of the path of the projection  $q'$  and stop it by the pawl  $y$ .

The operation of this safety device for putting the fare indicating apparatus in and out of action is as follows: Suppose the vehicle to be unoccupied, the fare-indicating apparatus out of action (Fig. 8) and the signaling arm  $x$  in the corresponding upright position. In this position the arm is blocked on the one hand by the rear end of the bar  $s$  and on the other hand by the bent piece  $x'$  arranged outside and serving as a stop (Figs. 3 and 8) the pawl  $y$  is disengaged from the bar  $t$  by the pin  $s'$ , and the nose  $t'$  on the bar is in the path of the projection  $q'$  on the eccentric  $q$ . This however is still in such a position (Fig. 8) that the eccentrics  $p$  and  $q$  can be turned through one hundred and eighty degrees before the projection  $q'$  meets the nose  $t'$ . Now



if on a passenger entering the vehicle the fare indicating apparatus is to be put in action and the signaling arm to be lowered (Figs. 11 to 13) the key (Fig. 15) carried by the driver must be inserted with the bit  $r^3$  into the aperture  $r^5$  in the key plate  $r^4$  under the observation of the passenger and turned through one hundred and eighty degrees as it is only then that the cam  $w$  is released by the bar  $s$  and the lowering of the signaling arm  $x$  becomes possible. In the lowering of the signaling arm  $x$  the cam  $w'$  causes the bar  $t$  to advance, whereby the projection  $q'$  is released again from the nose  $t'$  so that the latter after the completion of the journey would enable the eccentrics  $p$  and  $q$  to be turned farther, but not the bars  $s$ , which in this turning movement is forced against the lateral surface of the cam  $w$  and thus checks the movement of the eccentrics. Accordingly the signaling arm  $x$  must in any case first be put upright or in the position in which it indicates that the vehicle is not occupied before the disengagement of the fare indicating apparatus by the continued turning of the eccentrics becomes possible. In this movement the bar  $s$  as already stated is moved in such a manner that it blocks the signaling arm in the position occupied, while the bar  $t$  is released, so that the operation of the signaling arm depends upon the fare-indicating apparatus being previously put in action and vice versa and the disengagement of the latter again on the previous upward movement of the signaling arm to the position corresponding to "unoccupied" effectually obviating the fraudulent operation of the fare indicating apparatus, because this would be possible only in the sight of the passenger or the superintendent.

By my invention the more or less imperfect safety devices heretofore provided in connection with the well known fare indicating apparatus themselves, and used for a similar purpose are rendered superfluous.

From the foregoing description it will be seen that a to-and-fro movement of the bar  $s$  causes the fare indicating apparatus to be put once in and out of action, and thus corresponds to a complete journey, therefore the movement of the said bar may be advantageously transmitted to a counter which serves for controlling the number of the several journeys made. For this purpose it is expedient to make the pin  $s'$  connected with the bar  $s$  and carrying the spring  $u$  (Figs. 13

and 14) in the form of a pawl or tooth which on the displacement of the said bar  $s$  engages with a ratchet wheel  $j$  arrested by the pawl  $j'$  and thus causes this wheel to turn with a step-by-step movement. Upon the axis of this ratchet wheel  $j$  a disk  $j^2$  may be placed, which provided with a suitable succession of figures, indicates through an aperture  $s^3$  in the cover plate of the casing E the number of journeys made by the vehicle.

In cases where it is desired to obtain an indication of the distance passed over by the vehicle either during a single journey or altogether it is expedient to provide within the closed casing E a suitable registering device D (Fig. 8) which consists of a counter constructed in the well known manner, and to actuate the same by the lever  $g$ . The latter then imparts its movement obtained from the wheel of the vehicle directly to the arm  $k$  of the counter which indicates the corresponding distance through a suitable aperture in the cover plate (Fig. 3) of the casing E.

What I claim is—

1. The combination with a fare register for public vehicles of a lever  $n$ , bars  $s$  and  $t$ , a spring connecting said bars, eccentrics  $p$  and  $q$  the latter having a projecting point  $q'$ , a signal arm, an axis supporting the latter, and provided with a cam  $w, w'$ , adapted to move in the path of the end  $t'$  of the bar  $t$ , and a key adapted to rotate the eccentrics  $p$  and  $q$ , substantially as described.

2. In a fare register, the combination with the automatic devices of a spring-actuated, stepped plate, a spring thrown lever  $g'$  having a pin adapted to engage a step on said plate, a pawl  $g^7$ , a ratchet  $g^8$ , a bell-crank lever  $h$ , one end engaging the stepped plate, a disk having pins and a nave upon any one of which the other arm of said bell-crank lever may rest, a slide  $l$ , spring  $l'$ , lever  $n$ , eccentrics  $p$  and  $q$ , the latter having a projection  $q'$ , ratchet  $o$ , spring actuated slide  $s$ , bar  $t$ , having a nose  $t'$ , an axis  $v$  having cams  $w$  and  $w'$ , a signal bearing arm  $x$ , and a key adapted to engage the shaft of the eccentric  $p$ , substantially as described.

In testimony that I claim the foregoing as my invention I have signed my name, in presence of two witnesses, this 28th day of February, 1891.

FRIEDRICH ERHARDT.

Witnesses:

W. PRESTON,  
DIEDRICH PETERSEN.