

No. 616,234.

Patented Dec. 20, 1898.

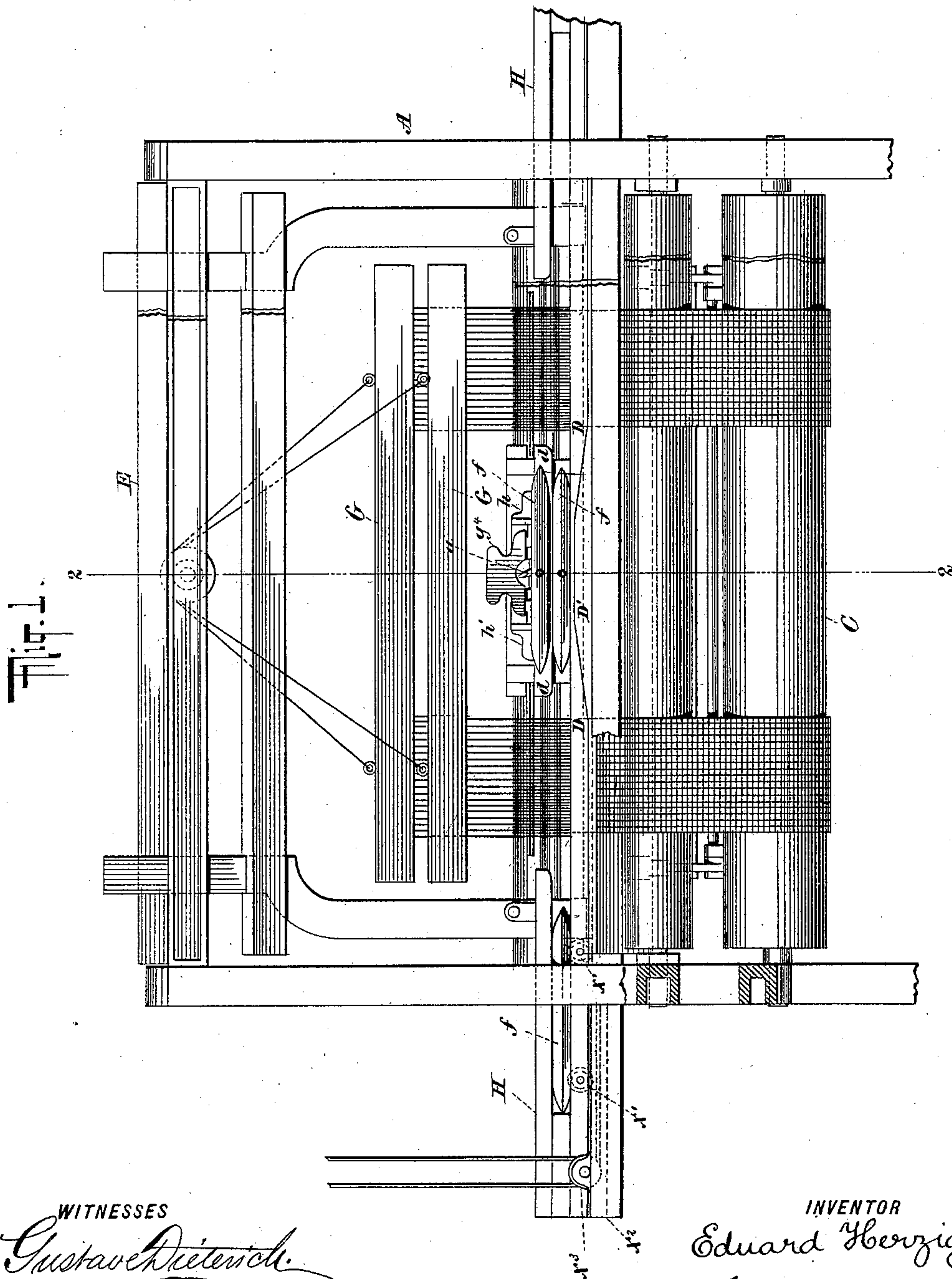
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SHUTTLE CHANGING MECHANISM FOR LOOMS.

(Application filed Mar. 31, 1897.)

(No Model.)

7 Sheets—Sheet 1.



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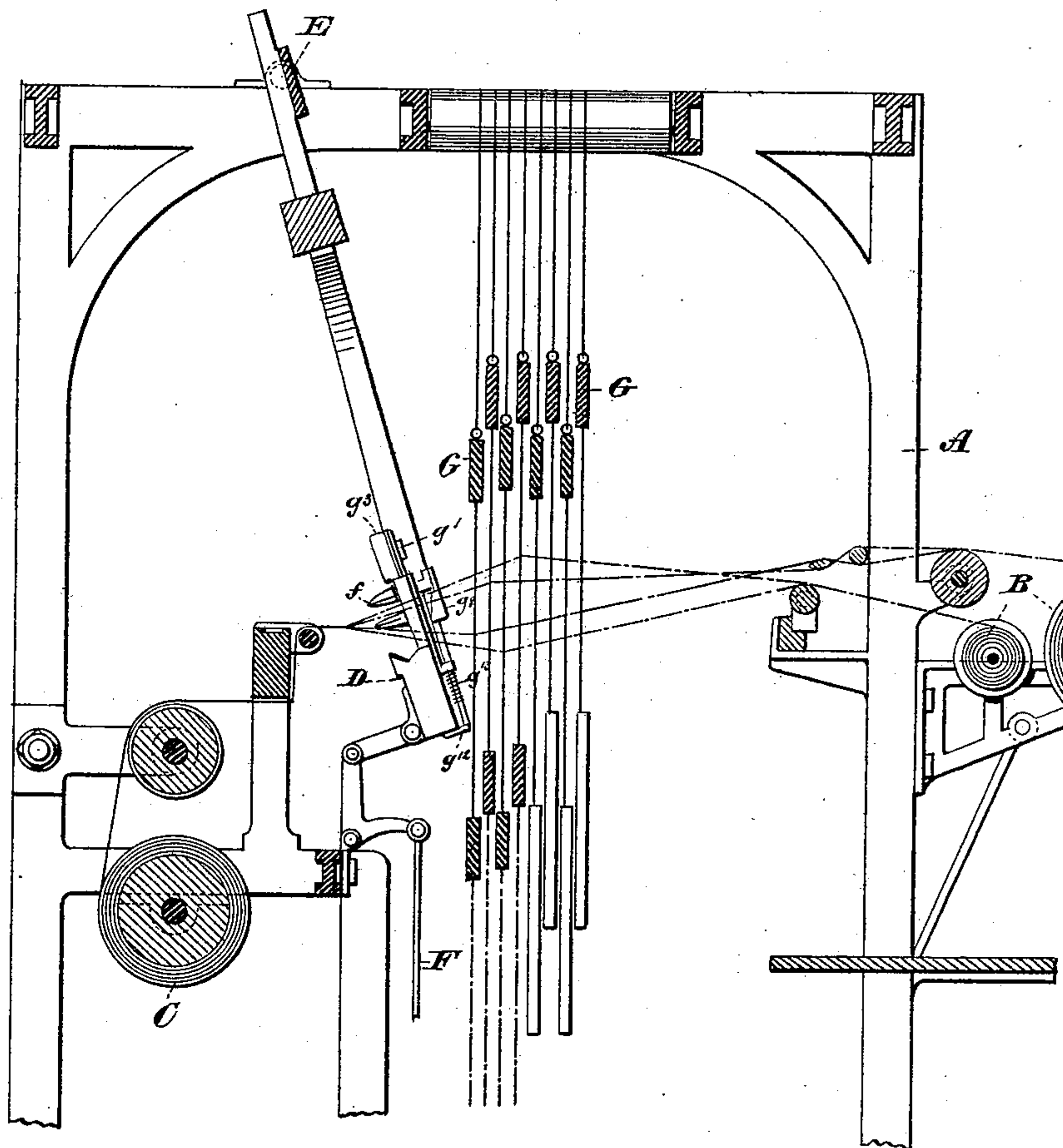
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Fig. 2.



WITNESSES

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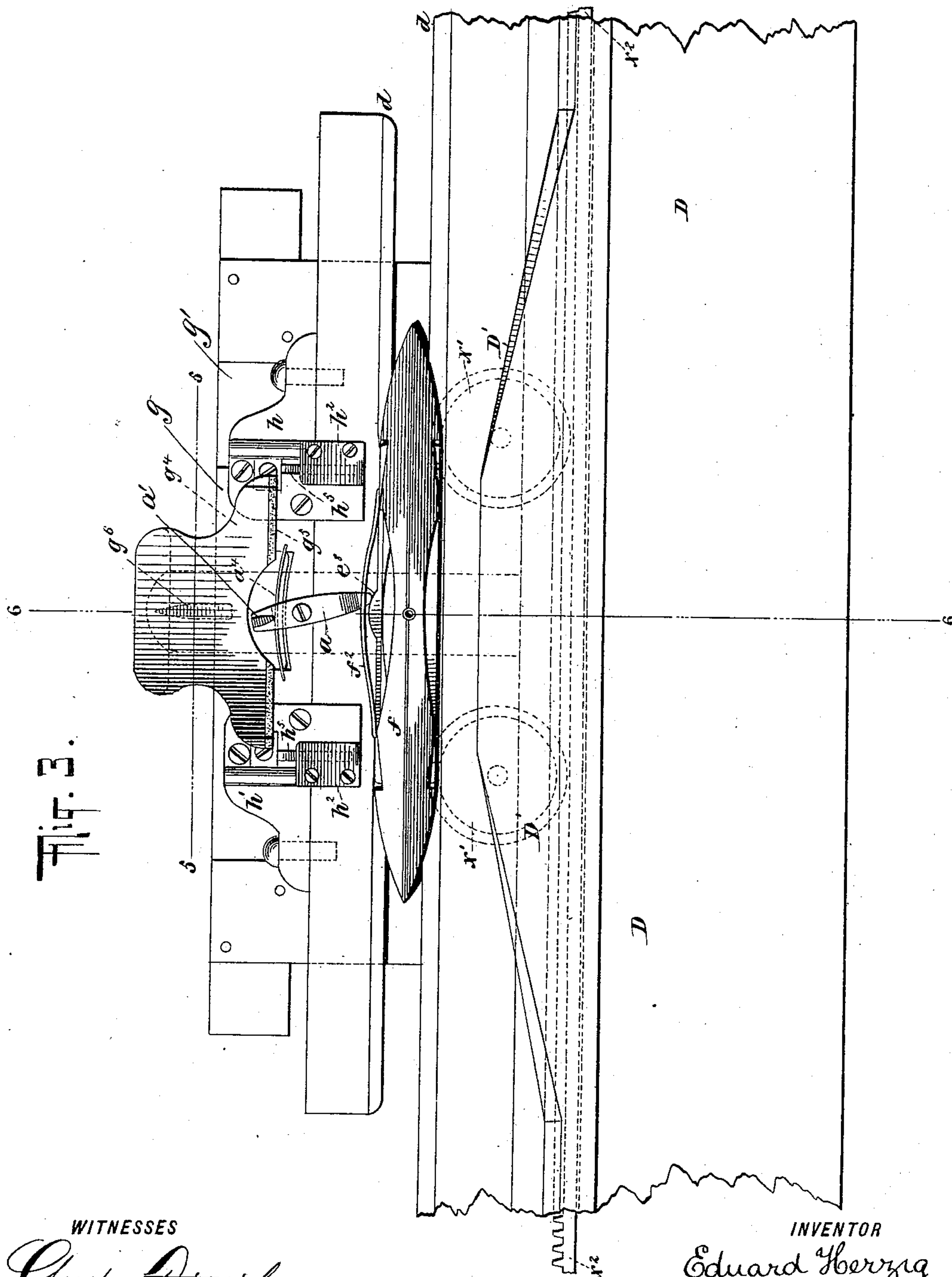
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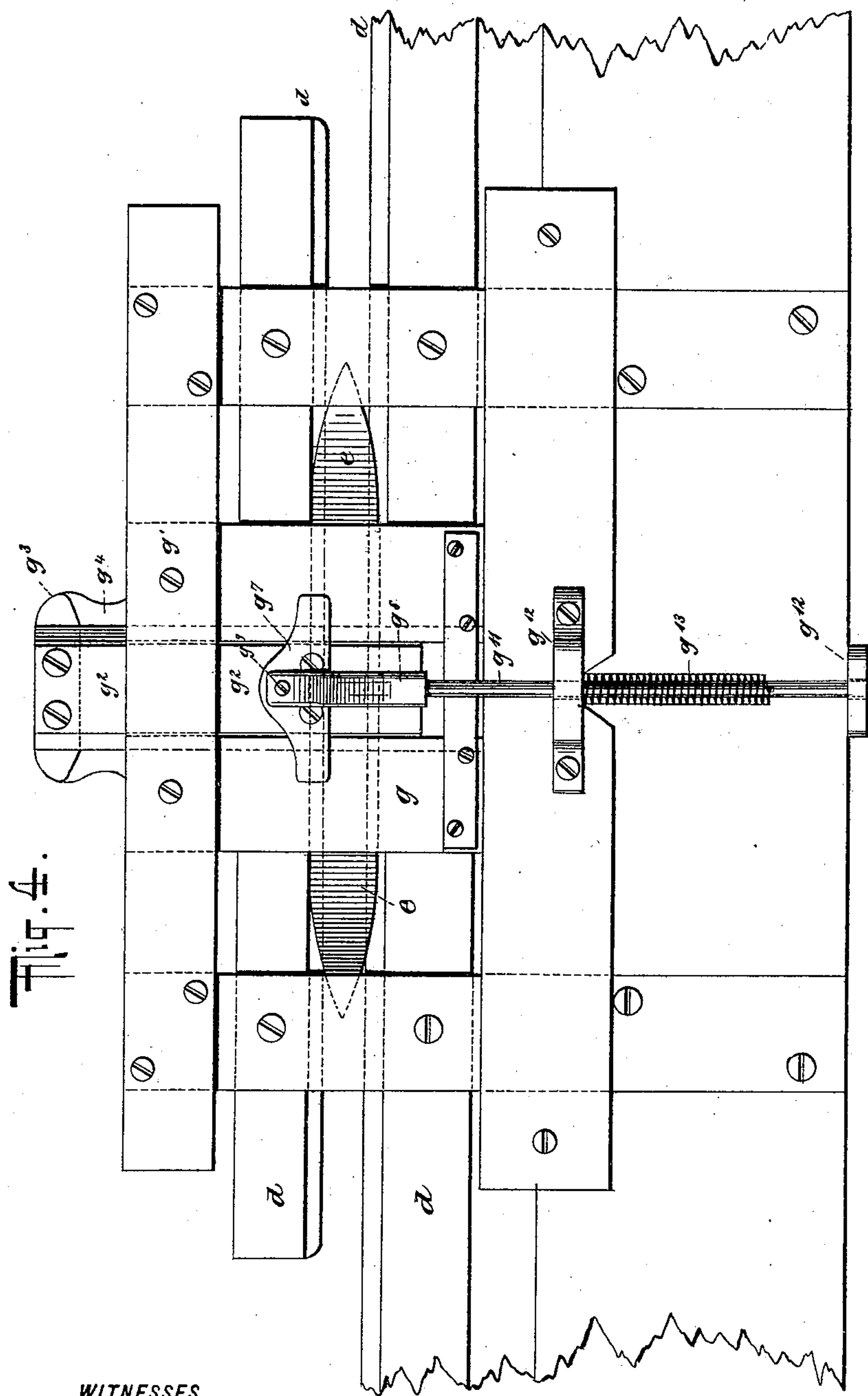
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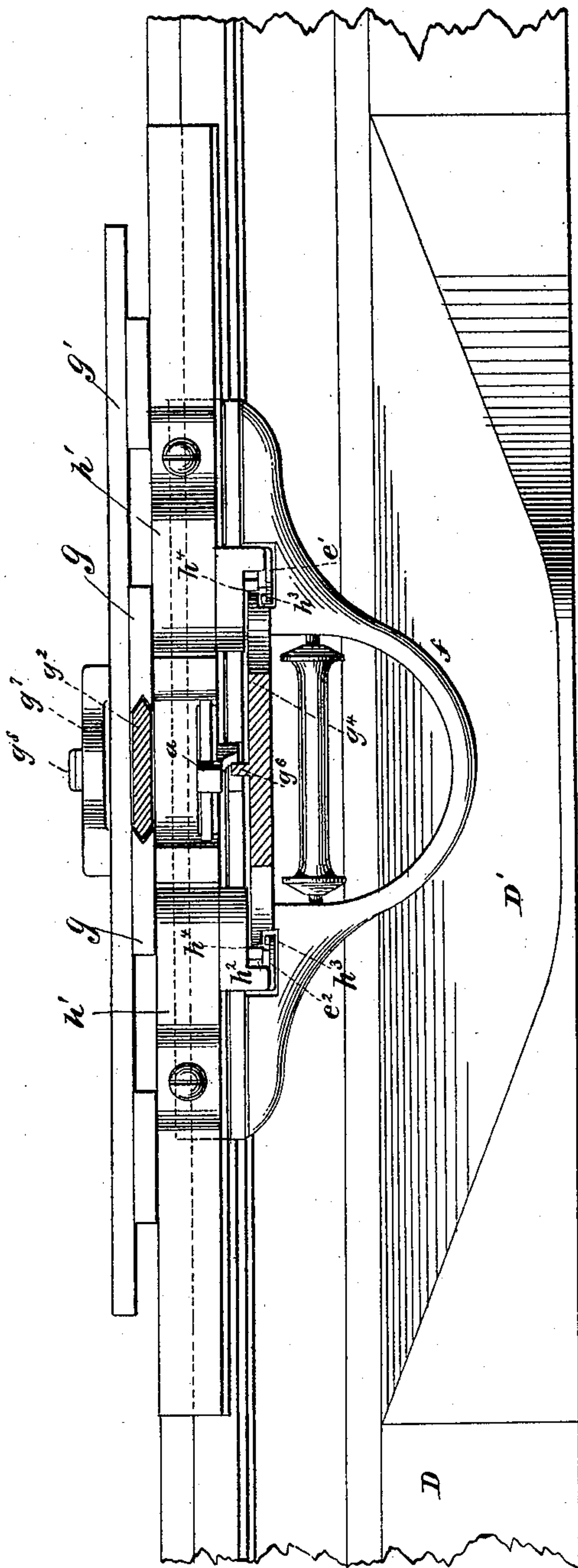
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(No Model.)

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Fig. 5.



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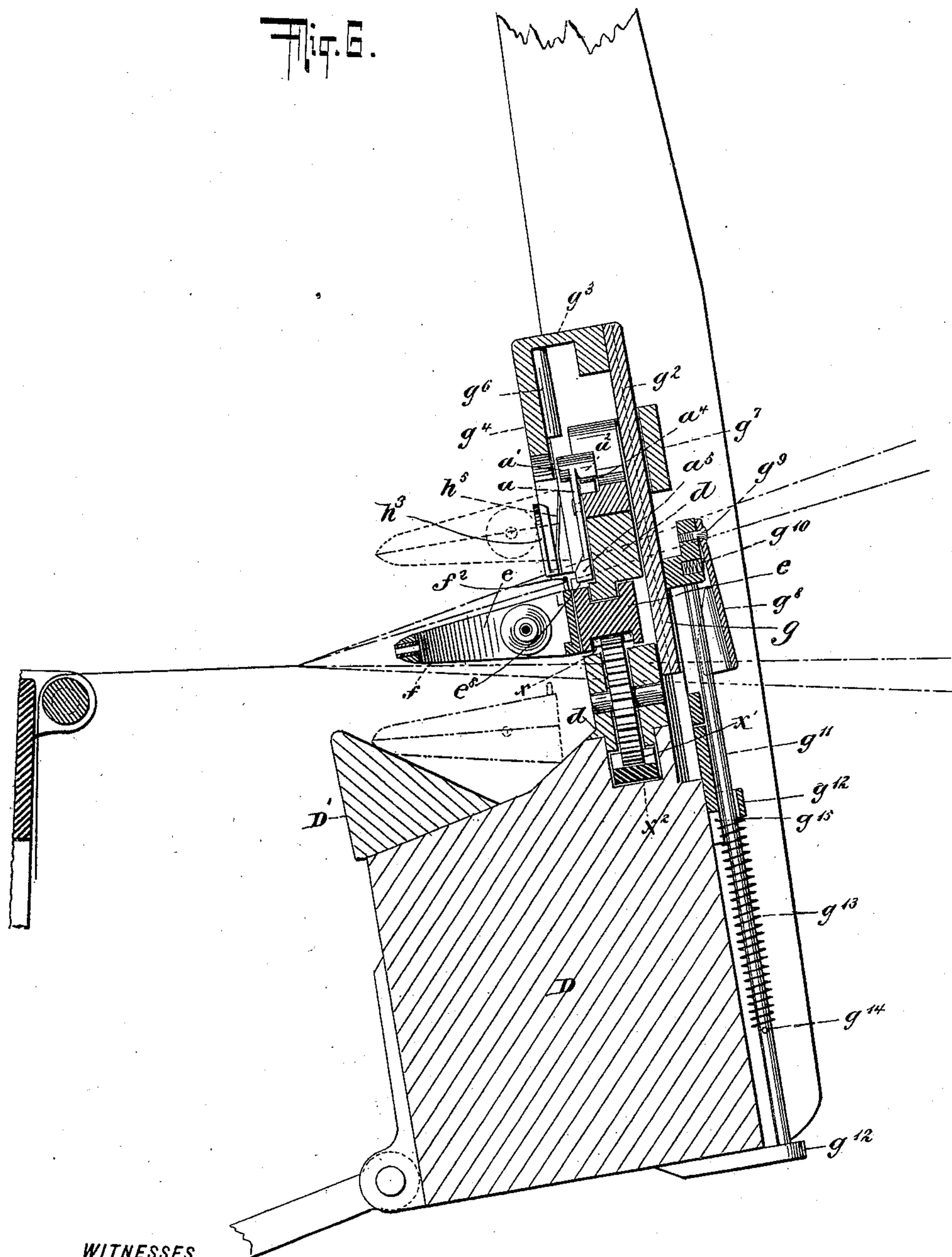
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SHUTTLE CHANGING MECHANISM FOR LOOMS.

(No Model.)

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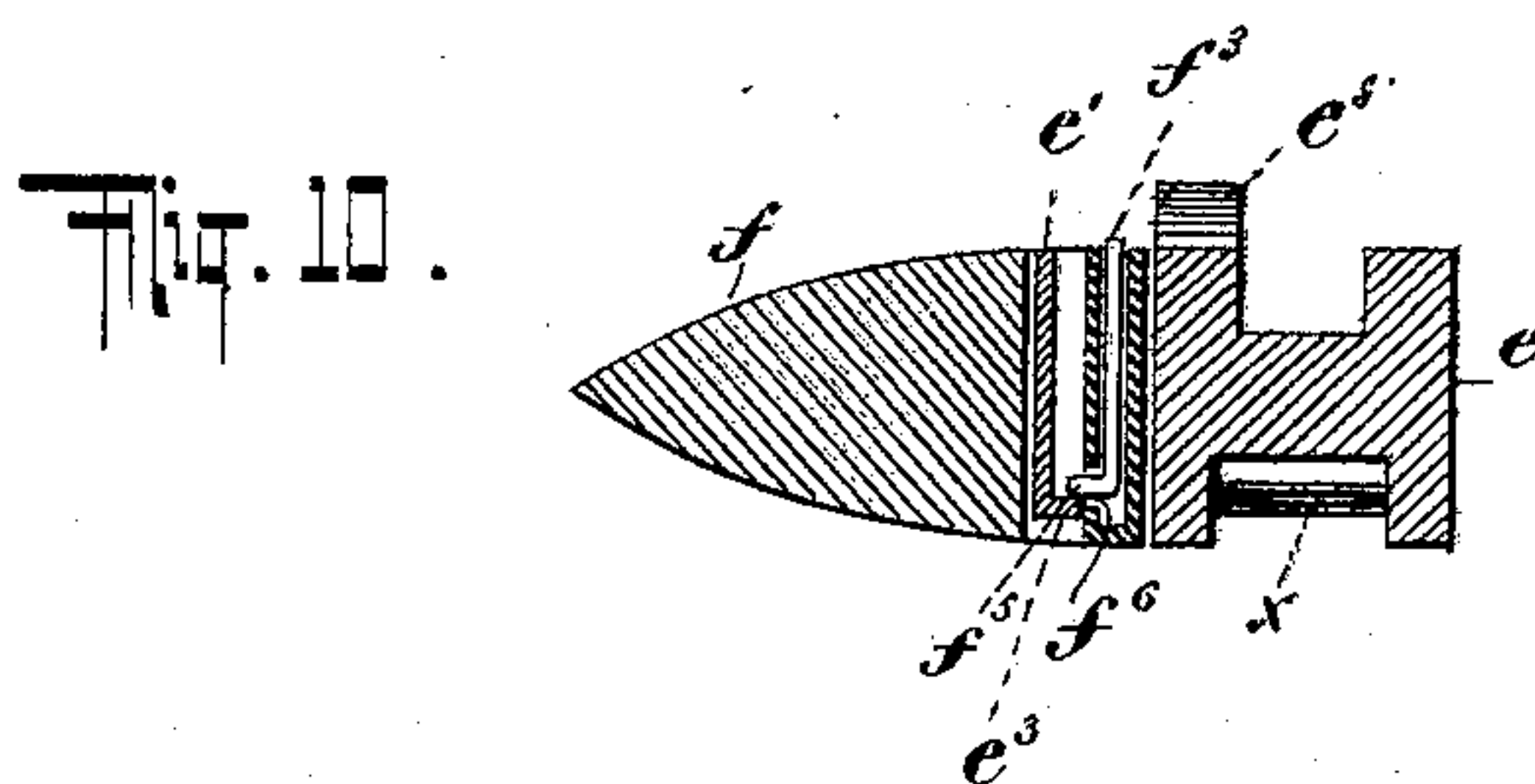
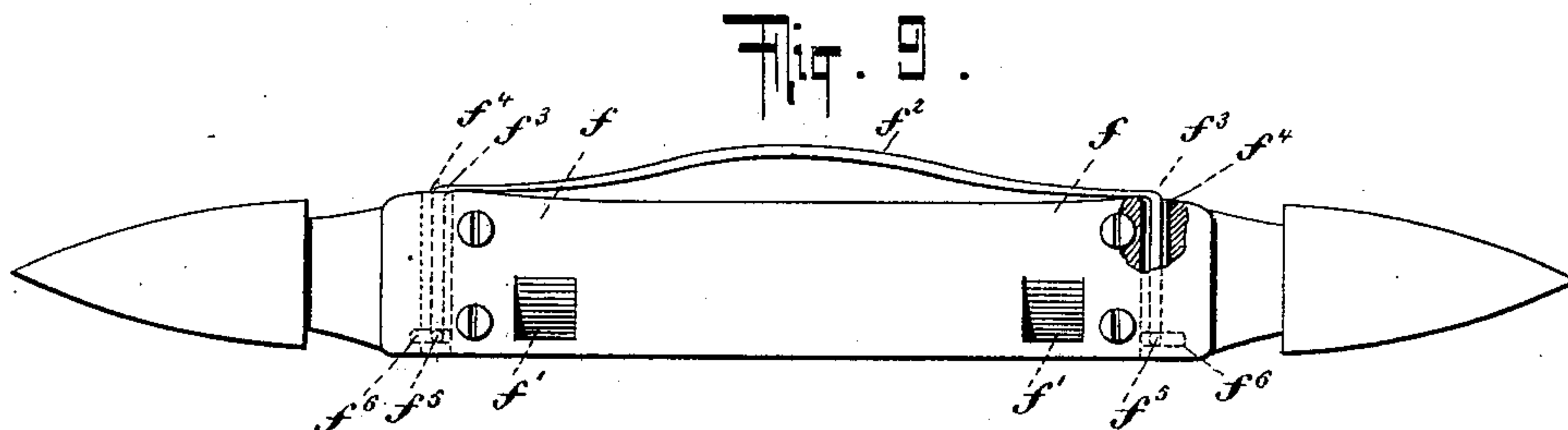
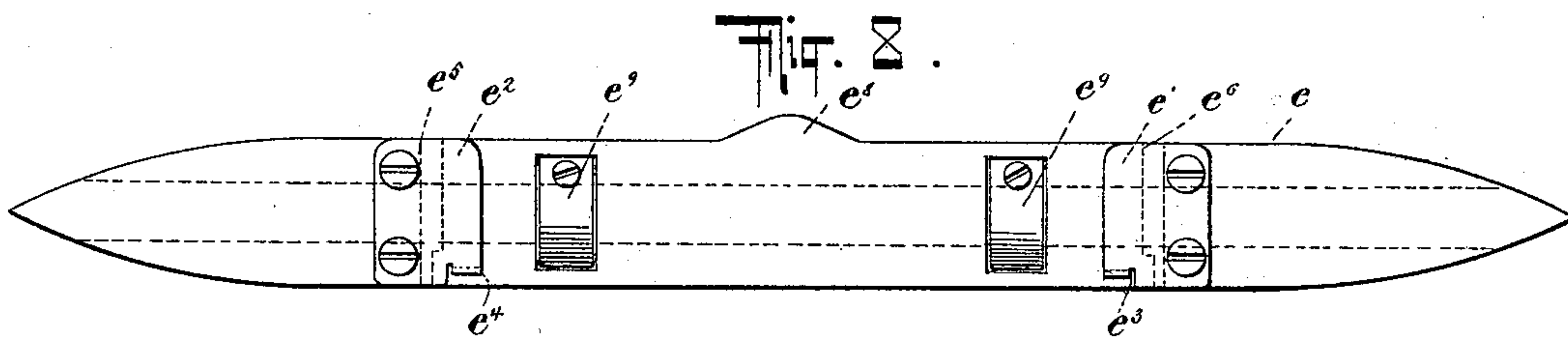
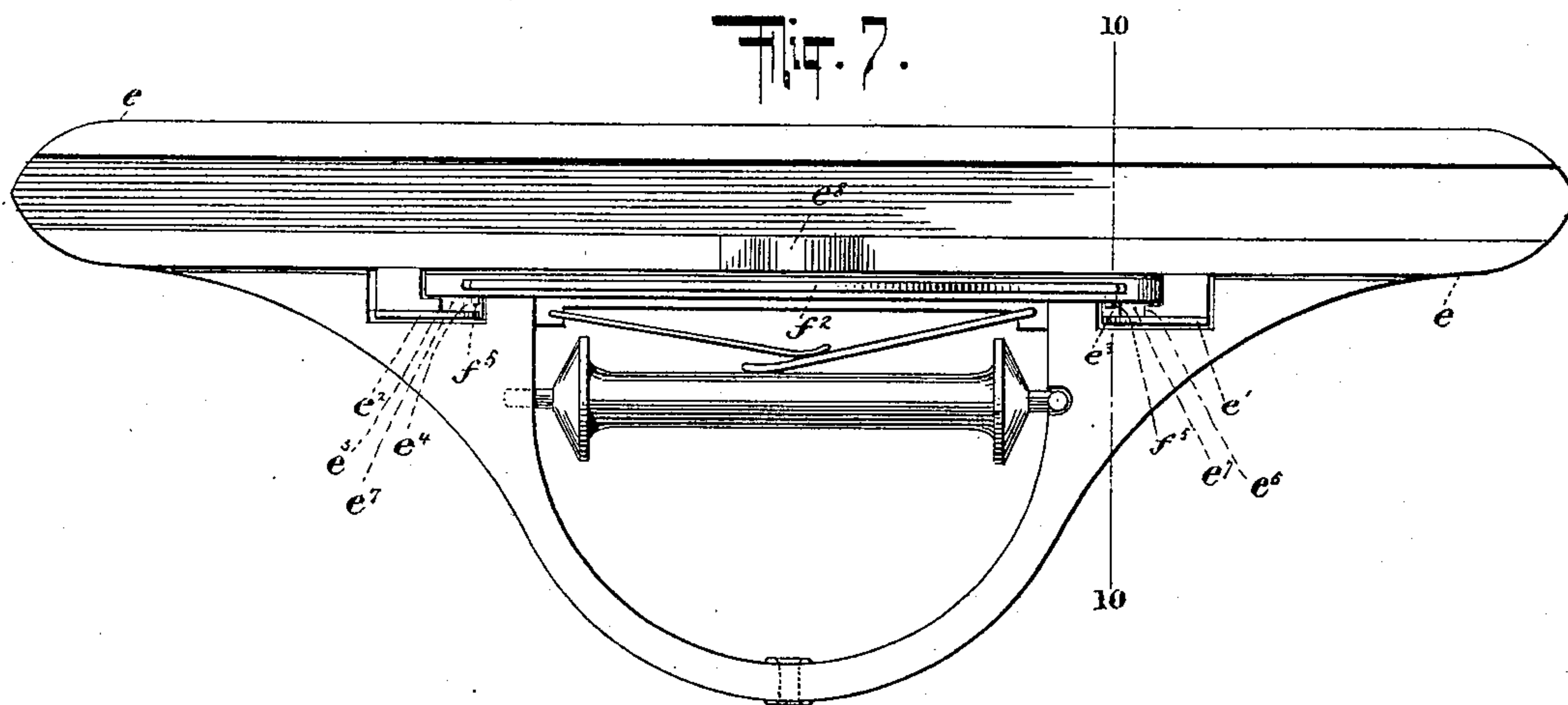
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SHUTTLE CHANGING MECHANISM FOR LOOMS.

(Application filed Mar. 31, 1897.)

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7 Sheets—Sheet 7.



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SHUTTLE-CHANGING MECHANISM FOR LOOMS.

SPECIFICATION forming part of Letters Patent No. 616,234, dated December 20, 1898.

Application filed March 31, 1897. Serial No. 630,043. (No model.)

To all whom it may concern:

Be it known that I, EDUARD HERZIG, a resident of West Hoboken, county of Hudson, State of New Jersey, have invented certain new and useful Improvements in Shuttle-Changing Mechanism for Looms, of which the following is a specification.

My invention relates to shuttle-changing mechanism for looms, and has for its object to produce a device by whose agency a spent or empty shuttle may be replaced by a full one when desired.

To this end my invention consists in the construction of shuttle-changer hereinafter set forth and claimed.

In the drawings, Figure 1 is a front elevation of a loom which, however, forms no part of my invention, but which shows a shuttle-changer embodying my invention in a position in which it may be used. Fig. 2 is a section through Fig. 1 on line 2 2 thereof, exhibiting clearly the position of the shuttle-changer on the batten. Fig. 3 is a front elevation of a portion of the batten carrying the shuttle-changing device. Fig. 4 is a rear elevation of the same. Fig. 5 is a section on line 5 5 of Fig. 3, showing the shuttle-changing device in plan. Fig. 6 is a section on line 6 6 of Fig. 3. Fig. 7 is a plan view of the shuttle-carrier, showing the shuttle engaged therewith. Fig. 8 is a front view of the shuttle-carrier. Fig. 9 is a rear view of the shuttle, and Fig. 10 is a section through the shuttle and shuttle-carrier on line 10 10 of Fig. 7.

Referring particularly to Figs. 1 and 2, A is the framework of the loom, carrying the usual beams B and take-up beam C and provided with a batten D, suspended at E and operated by the batten-working mechanism F. The loom is also provided with the usual healds G, as will be well understood. The loom is also provided with the usual shuttle-boxes H, carried by the batten. The batten D is formed with two ways *d*, constituting the shuttle-raceway and between which ways a grooved shuttle-carrier *e* travels. This shuttle-carrier *e* is shown as having a plane rear face. (See Figs. 4, 6, and 7.) Any suitable shuttle-driving mechanism may be employed.

In the drawings I have shown the shuttles as provided with teeth *x*, (see Figs. 6 and 10,) which mesh with suitably-driven pinions *x'* on the batten, (see Figs. 1, 3, and 6,) whereby the shuttles are driven. In the drawings the wheels *x'* are shown as driven by an oscillating rack *x²*, driven by a driven pinion *x³*. (See Figs. 1 and 3.) The shuttle-carrier is also provided upon its front face with a plurality of vertical guides *e' e²*, (see Figs. 7 and 8,) which are provided at their lower ends with inturned lugs *e³ e⁴*, which lugs are adapted to receive the impact of latches on the shuttle, as will be described.

Between the lugs *e³ e⁴* and the side faces *e⁵ e⁶* of the ways or guides *e' e²* a space *e⁷* is provided, which space *e⁷* allows the latches of the shuttle to pass freely through when the said latches have been pressed apart, as will be explained. The shuttle-carrier is likewise provided with a cam *e⁸* and with springs *e⁹*, (see Fig. 8, which serve to enter slots *f'* in the shuttle *f*. (See Fig. 9.) The shuttle *f* is pointed at both ends, as usual, and is provided upon its top with a curved spring *f²*, whose ends *f³* project downward through apertures *f⁴* in the shuttle and terminate with outwardly-turned latches *f⁵*, which are adapted to reach contact with the lugs *e³ e⁴* of the shuttle-carrier, as clearly shown in Fig. 10.

Pressing downward upon the bulged portion of the spring *f²* will have the effect of spreading its ends apart, thereby swinging the latches *f⁵* laterally in the slots *f⁶* of the rear wall of the shuttle and moving the said latches over the spaces *e⁷* between the lugs *e³ e⁴* and the side walls *e⁵ e⁶* of the guides *e' e²* of the shuttle-carrier, so that the shuttle which is supported mainly by the said latches resting against the said lugs will now be free to be driven downward, the said latches having been moved off the said lugs and the shuttle being now supported wholly by the springs *e⁹*, entering the slots *f' f'* of the shuttle. It will thus be evident that a sharp blow delivered upon the spring *f²* will have the effect of releasing the shuttle from the supports in the shuttle-carrier and driving the same downward. The mechanism for effecting this operation is best shown in Figs. 3, 4, 5, and 6. In these figures a pair of standards *g g* are shown rising from the lower rail or way *d*, mounted

on the batten D and secured to the upper rail d and joined at their top by a cross-piece g' , to which they are secured. An upright slide g^2 (shown in elevation in Figs. 4 and 6 and in section in Fig. 5) slides freely up and down in these standards g . This slide terminates at its upper end in a head g^3 , which extends toward the front of the shuttle-changer and is provided at the said front with a downwardly-projecting follower g^4 , which may be shod on the bottom with felt g^5 , Fig. 3, and is provided in the rear with a rib g^6 . Two brackets h h' are mounted upon the upper rail d of the shuttle-way and are provided with outwardly-projecting guides h^2 , which are provided with inwardly-projecting lugs h^3 , which lugs are adapted to receive the latches f^5 of the shuttles f . Between the lugs h^3 and the side walls of the ways spaces h^4 are provided, through which the latches f^5 of the shuttle may pass when the said latches are spread apart by pressing on the spring f^2 of the shuttle, so that the lugs h^3 serve to support the idle shuttle above the raceway until it is desired to bring it into action. The guides for the shuttle are likewise provided with leaf-springs h^5 , (see Figs. 3 and 6,) which may bear against the rear face of the idle shuttle. The slide g^2 is provided at the rear with a cross-head g^7 , (see Figs. 4, 5, and 6,) which cross-head is provided with a shoe or guide g^8 , hung loosely upon the pin g^9 and pressed outward by the spring g^{10} , seated in the cross-head. This shoe or guide g^8 embraces a rod g^{11} , working in guides g^{12} , the rod being surrounded by a spiral spring g^{13} , which is secured to the rod at g^{14} and to the batten at g^{15} . The rod g^{11} bears at its upper end against the cross-head g^7 , the spring g^{13} serving to raise the said rod and cross-head to restore the parts to position. Mounted also upon the batten is a pivoted latch-lever a . (Shown in front view in Fig. 3, in plan view in Fig. 5, and in side view in Fig. 6.) This latch-lever is pivoted intermediate of its ends and is provided at its upper end with a stop a' , projecting to the front, and a lug a^2 , projecting to the rear. This lug a^2 is flat-faced and rests at either extremity of the swing of the lever upon a flat leaf-spring a^4 , (best shown in Figs. 3 and 6,) which leaf-spring serves to hold the latch in its vertical position, except when it is swung aside by the cam e^8 on the shuttle-carrier. At its lower end the lever a is provided with a toe a^5 , which projects into the path of the cam e^8 , which is carried on the shuttle-carrier. When the lever a is in its vertical position—that is to say, when the shuttle-carrier is not immediately under it—the stop a' will be in the path of the rib g^6 on the follower g^4 , so that the head g^3 and its follower cannot be driven downward. When, however, the shuttle-carrier is in the positions shown in the figures, the cam e^8 will swing the lever a aside, so as to remove the stop a' from the path of the rib g^6 . The batten may

also be provided with a wall D' , which forms with the batten a trough for the reception of the shuttle when it is driven out of the shuttle-carrier.

Having described the construction of the device shown in the drawings, I will now proceed to describe the operation thereof.

It will be understood that in the normal operation of the loom a shuttle is carried by the shuttle-carrier, as shown in Figs. 7 and 10, the latches f^5 of the shuttle resting upon the lugs e^3 e^4 of the shuttle-carrier. This shuttle-carrier vibrates rapidly back and forth across the batten in the ways or guides d , laying the thread, the batten of course beating up after each shot. Meantime the idle shuttle is resting in the guides h^2 , the latches f^5 of the said shuttle resting on the lugs h^3 of the said guides, thus supporting the said idle shuttle clear of the active or working shuttle. The follower g^4 is in such position as to come against the spring f^2 of the idle shuttle. Now as the working shuttle oscillates back and forth in the raceway the cam e^8 will at each shot strike the toe a^5 of the pivoted lever a and swing it; but as long as the said lever a is in a vertical position the head g^3 , with its follower g^4 and guide g^2 , cannot be driven downward. When, however, it is desired to change the shuttles—that is to say, to remove the working shuttle from the shuttle-carrier and to replace it with the idle shuttle, which then becomes the working shuttle—the working shuttle is brought to the position shown in the drawings, where it is immediately under the guides carrying the idle shuttle, in which position the cam e^8 will swing the lever a into the position exhibited in Fig. 3, so that it will not impede the downward movement of the head g^3 . When the parts have come into this position, a sharp blow is dealt to the head g^3 , which produces the following effects: The follower g^4 is brought against the spring f^2 of the upper or inactive shuttle, which, as before explained, will have the effect of spreading the ends of the said spring, thereby moving the latches f^5 from contact with the lugs h^3 on the guides h^2 , so that as the follower g^4 continues to descend it will carry with it the upper shuttle, which, coming against the spring f^2 of the working shuttle f , presses down upon the said spring, thereby spreading its ends, thus moving the latches f^5 off the lugs e^3 e^4 of the carrier, thereby freeing the said working shuttle from its supports and driving the same into the trough of the batten and by the impact springing the idle shuttle into the shuttle-carrier, where its latches f^5 will come against the lugs e^3 e^4 of the shuttle-carrier and hold the said shuttle supported in the shuttle-carrier, which shuttle now becomes the working shuttle and may be carried back and forth by the shuttle-carrier. The head g^3 and its adjunctive mechanism are raised by the spring g^{13} and another idle shuttle placed in the guides h^2 .

Having described my invention, what I claim, and desire to secure by Letters Patent, is—

1. In a shuttle-changer, the combination of
5 a shuttle-carrier, shuttle-supporting means, a shuttle provided with latches and means for operating the latches.

2. In a shuttle-changer, the combination of
10 a shuttle-carrier, shuttle-supporting lugs carried thereby, a shuttle, engaging means carried by the said shuttle for engaging with the shuttle-supporting lugs, and means for operating the engaging means carried by the shuttle-carrier to free them from the shuttle-sup-
15 porting lugs, substantially as described.

3. In a shuttle-changer, the combination of a shuttle-carrier, shuttle-supporting means carried thereby, a shuttle, spring-pressed latches carried by the shuttle and adapted to
20 contact with the shuttle-supporting means on the shuttle-carrier and means projecting from the shuttle for operating the spring-pressed latches to release the shuttle from its carrier.

4. The combination of a shuttle provided
25 with latches and means for releasing said latches, a shuttle-carrier provided with shuttle-supporting means adapted to be engaged by the shuttle-latches, guides supported by the shuttle-carrier in position to guide a shut-
30 tle to the shuttle-supporting means, and means for operating the latch-releasing means and simultaneously driving a shuttle out of the shuttle-carrier, as and for the purposes set forth.

5. The combination of a shuttle provided
35 with latches and means for releasing said latches, a shuttle-carrier provided with shuttle-supporting means, a shuttle-supporter provided with shuttle-supporting means adapted
40 to be engaged by the shuttle-latches and positioned with respect to the shuttle-carrier so as to support a shuttle in position to be driven into the said shuttle-carrier, and means for engaging the latch-releasing means to release
45 the shuttle and for simultaneously driving the said shuttle into the shuttle-carrier.

6. In a shuttle-changer, the combination of a shuttle-carrier provided with shuttle-engag-
50 ing means, a shuttle-supporter provided with shuttle-engaging means and positioned with respect to the shuttle-carrier so as to support a shuttle in position to be driven into the said shuttle-carrier, and means for locking the said driving means against movement when
55 the shuttle-carrier is out of the position where it can receive a shuttle and for automatically unlocking said driving means whenever the shuttle-carrier is in a position where it can receive a shuttle.

7. In a shuttle-changer, the combination of a shuttle-carrier provided with shuttle-engag-
ing means, a shuttle-supporter provided with shuttle-engaging means and positioned with
5 respect to the shuttle-carrier so as to support a shuttle in position to be driven into the said shuttle-carrier, a stop for locking the driving mechanism, and a cam moving with the shut-

tle-carrier for automatically operating the stop at each throw of the shuttle so as to per-
mit the operation of the driving mechanism 70 only when the shuttle-carrier is in proper position to receive the idle shuttle.

8. In a shuttle-changer, the combination of a shuttle-carrier provided with shuttle-engag-
ing means, a shuttle-supporter provided with 75 shuttle-engaging means and positioned with respect to the shuttle-carrier so as to support a shuttle in position to be driven into the said shuttle-carrier, a swinging lever for stopping the driving mechanism, and a cam carried by 80 the shuttle-carrier for operating the said swinging lever.

9. In a shuttle-changer, the combination of a shuttle having latches and means for mov-
ing said latches, a shuttle-carrier having 85 lugged guides for supporting a shuttle, shuttle-supporting guides positioned with respect to the shuttle-carrier so as to support a shuttle in position to enter the guides of the shut-
90 tle-carrier, and a follower for engaging the means for moving the latches of the shuttle in the shuttle-supporting guide and for simul-
taneously driving the shuttle therefrom into the guides of the shuttle-carrier.

10. In a shuttle-changer, the combination 95 with a shuttle-carrier, of lugged shuttle-supporting guides so positioned with respect to the said shuttle-carrier as to support a shuttle in position to be fed to the said shuttle-carrier, latches upon the shuttle for engaging 100 the lugged shuttle-guides, and a follower for releasing the latches and ejecting the shuttle from the guides and feeding the same to the shuttle-carrier.

11. In a shuttle-changer, the combination 105 of a shuttle-carrier, of a shuttle-supporting device so positioned with respect to the shuttle-carrier as to feed a shuttle to it, engaging means on the shuttle for positively engaging the shuttle-support and the shuttle-carrier, 110 and a follower for releasing the engaging means of the shuttle in the shuttle-supporting device and engaging the same with the shuttle-carrier.

12. In a shuttle-changer, the combination 115 of a shuttle-carrier, of a shuttle-supporting device so positioned with respect to the shuttle-carrier as to feed a shuttle to it, engaging means on the shuttle for engaging the shuttle-support and the shuttle-carrier, a hand- 120 operated follower for ejecting the shuttle from its support and engaging the same with the shuttle-carrier, and a latch for locking the follower against movement when the shuttle-carrier is in a position where it cannot re- 125 ceive a shuttle and for automatically rendering the follower operative whenever the shuttle-carrier is in a position where it can receive a shuttle.

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