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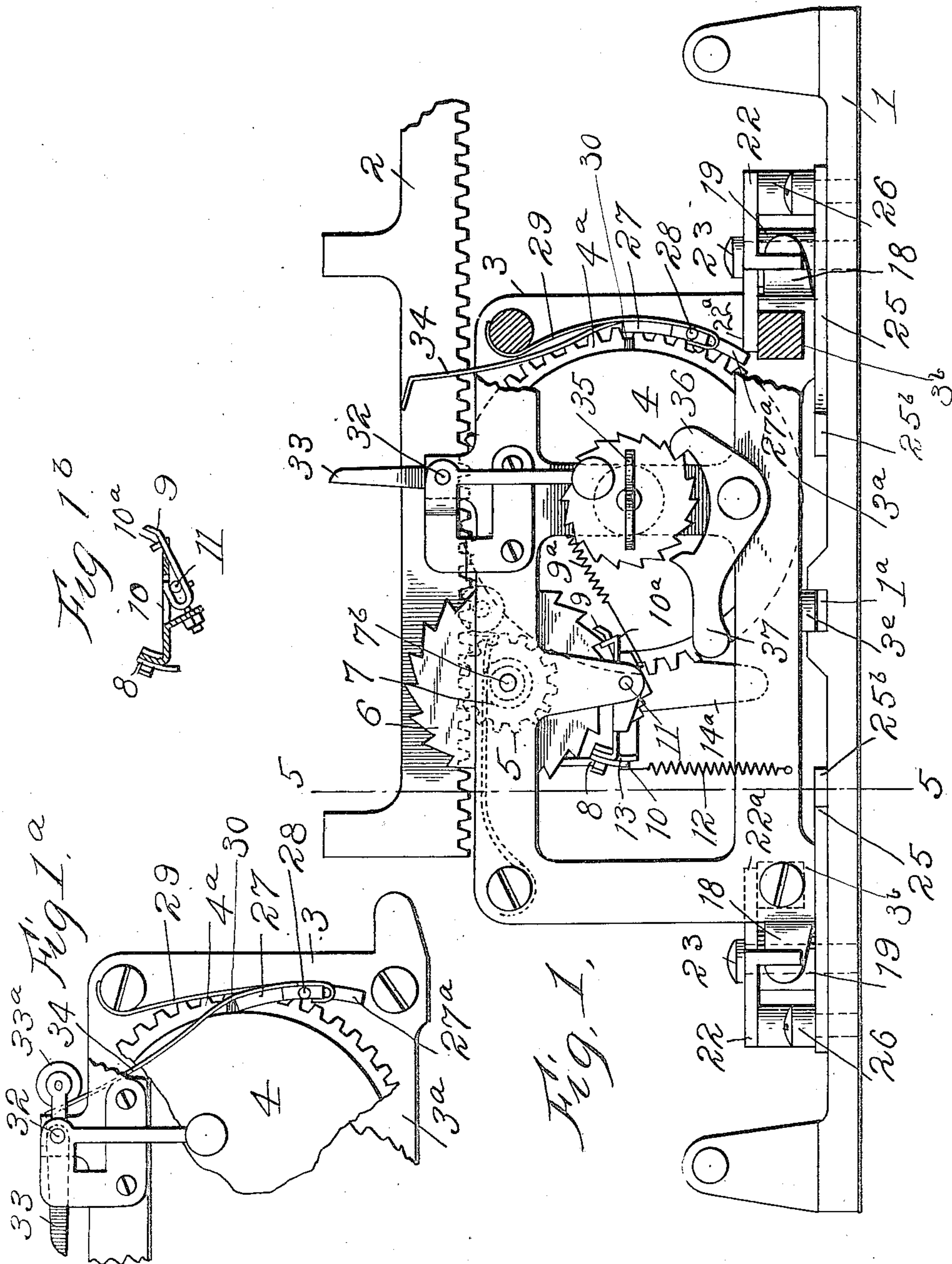
PATENTED DEC. 31, 1907.

J. B. SECOR.

CARRIAGE FEED MECHANISM FOR TYPE WRITING MACHINES.

APPLICATION FILED APR. 7, 1906.

4 SHEETS—SHEET 1.



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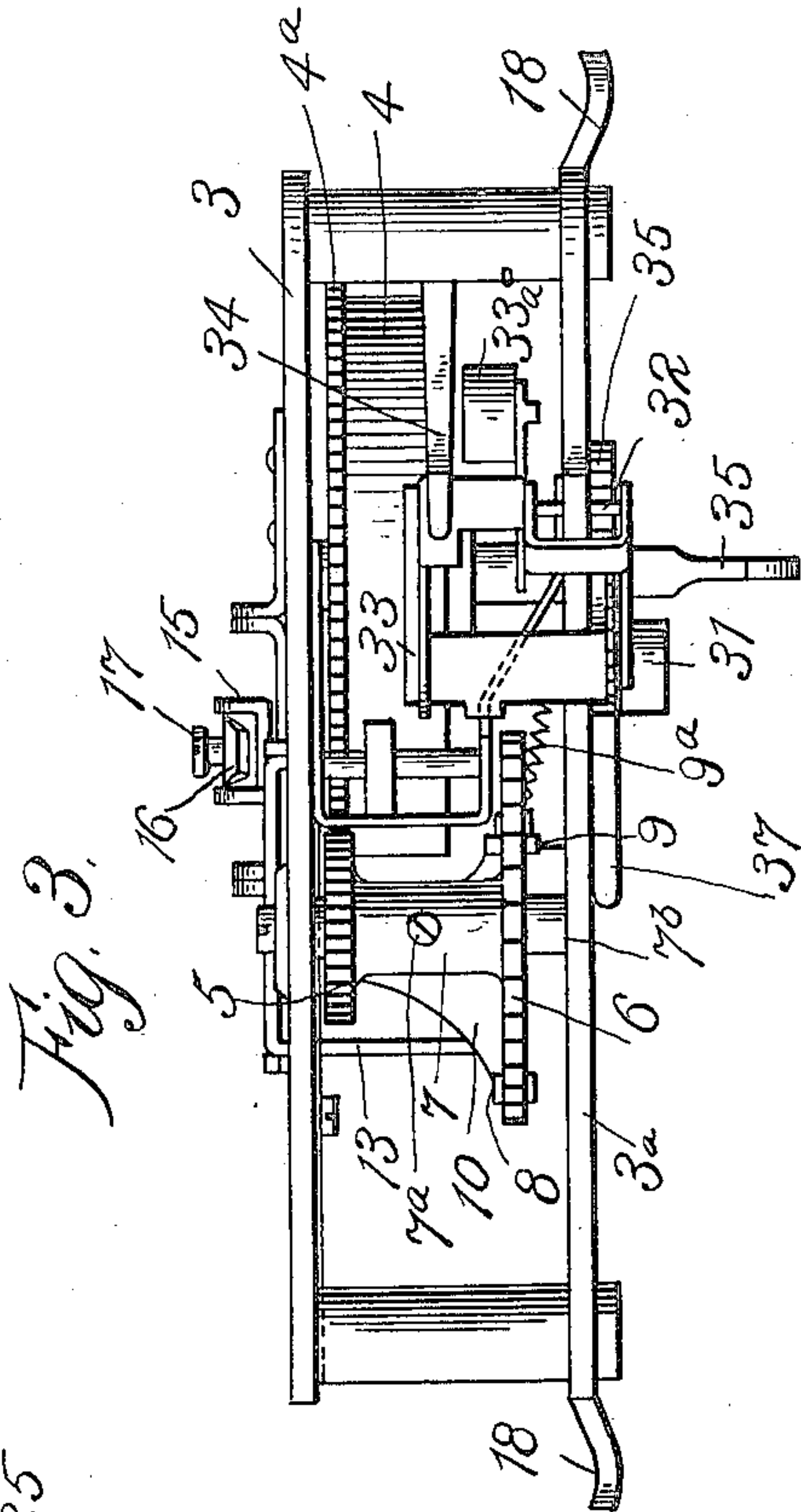
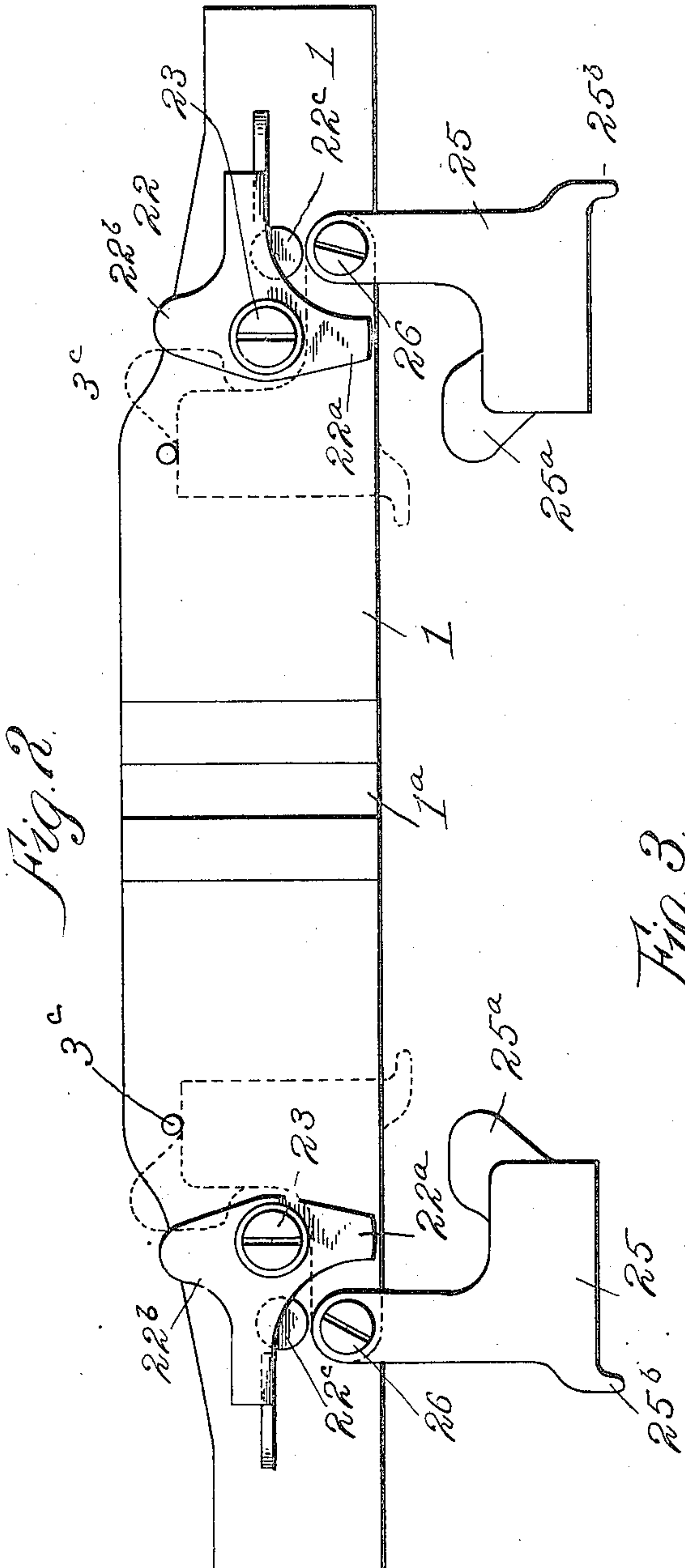
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4 SHEETS—SHEET 2.



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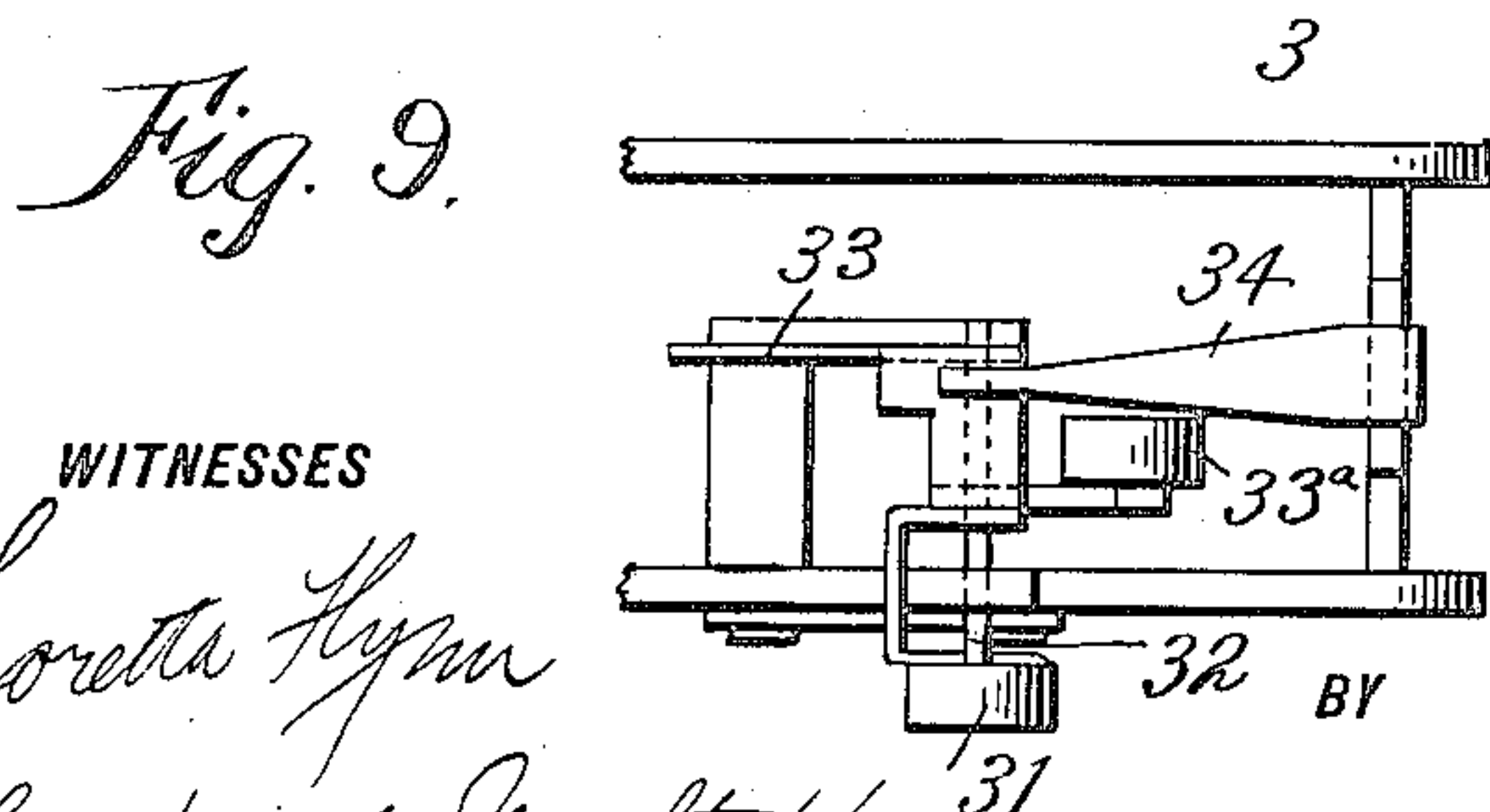
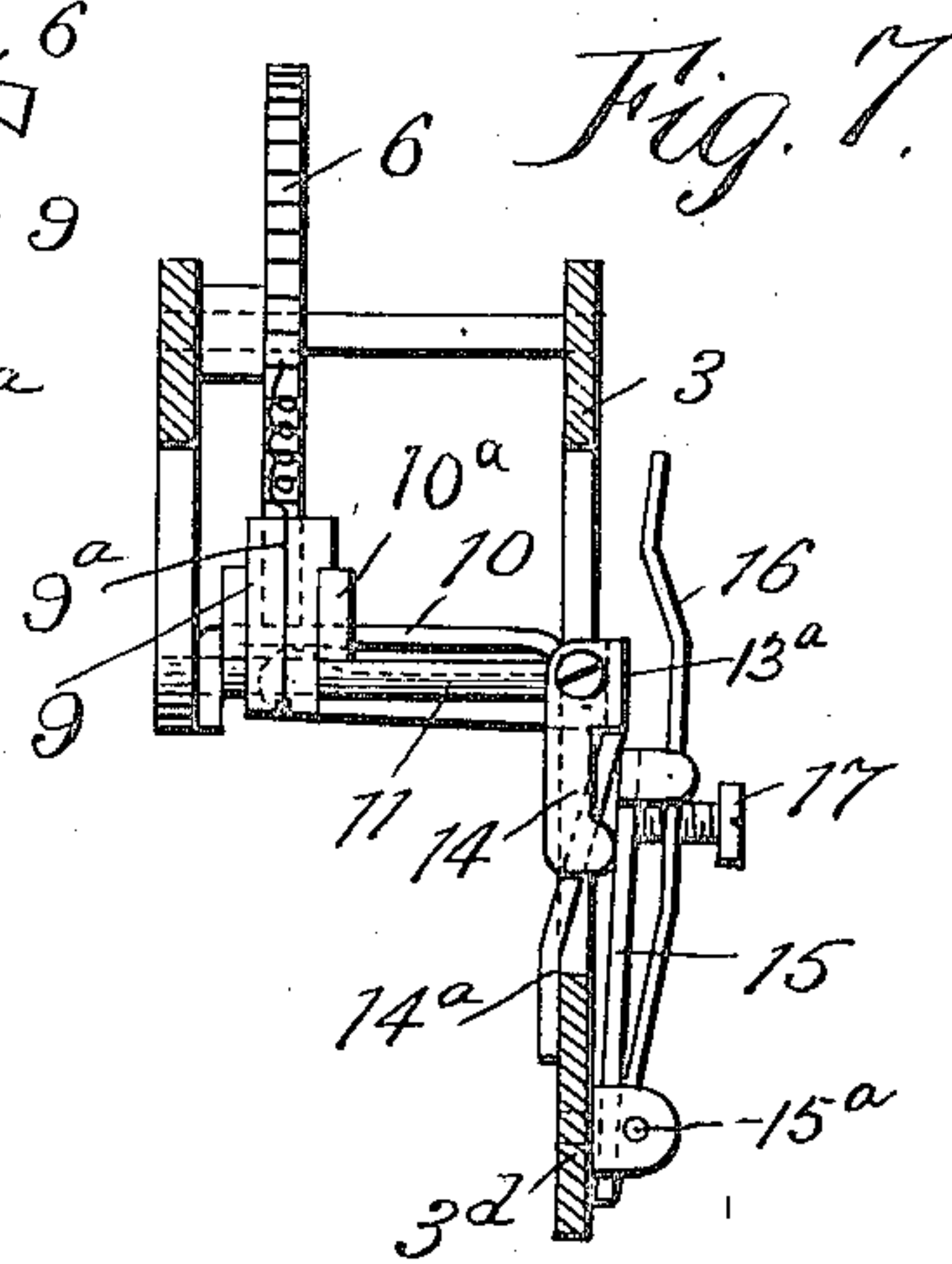
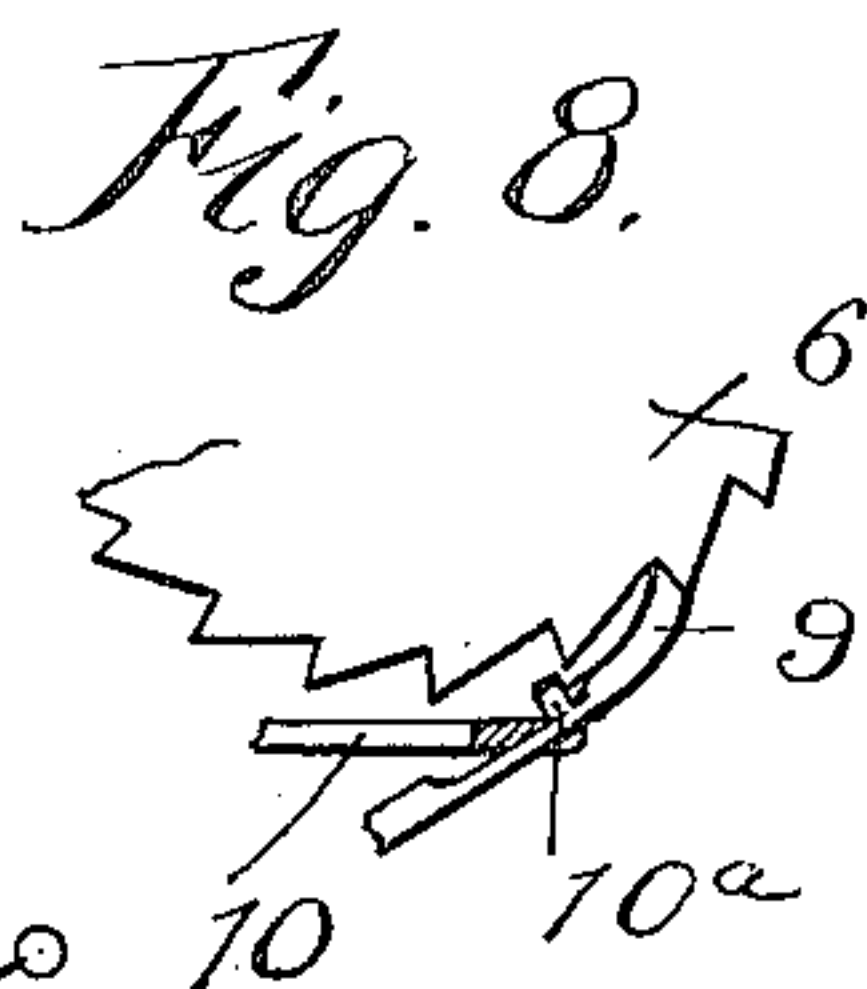
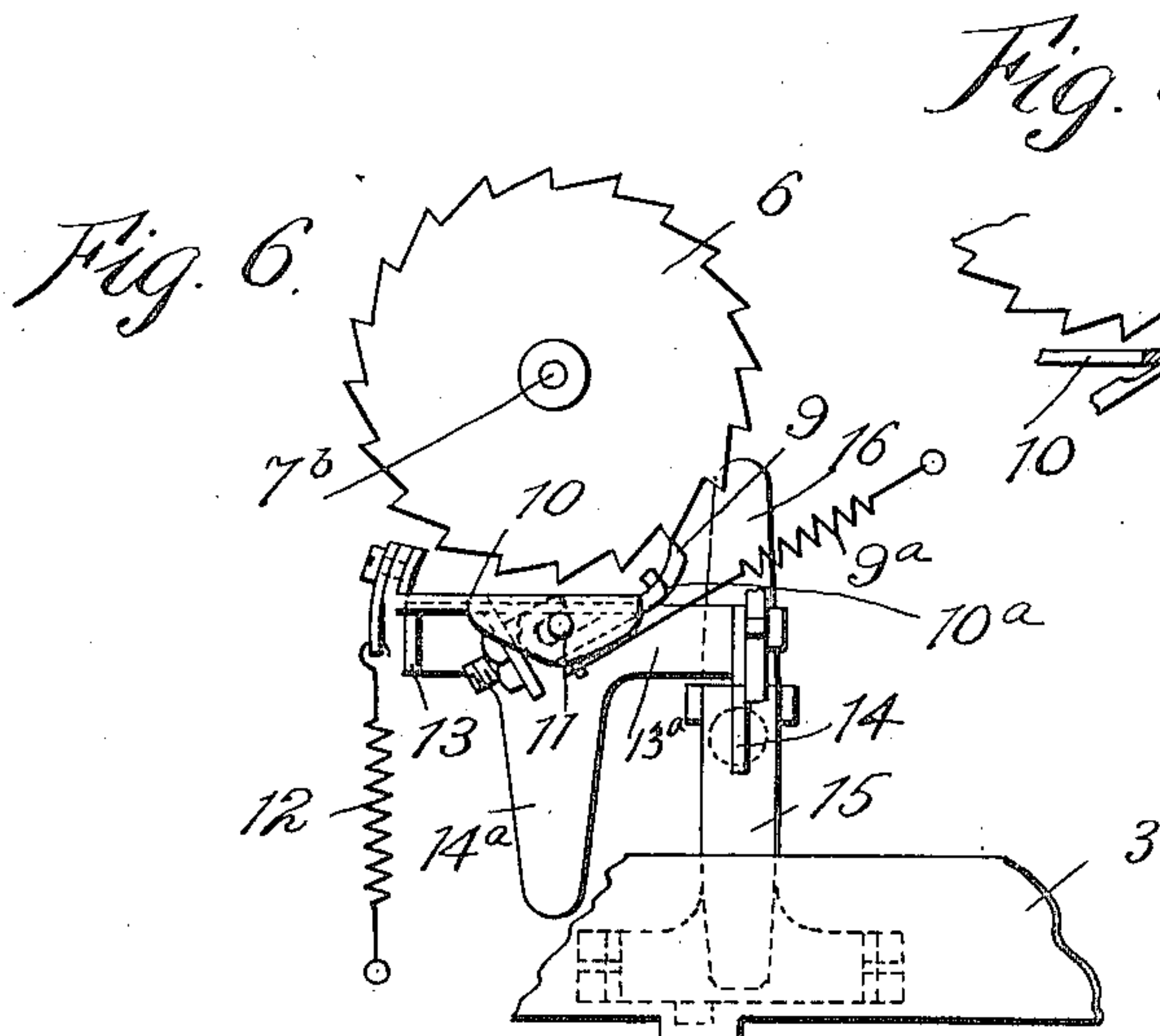
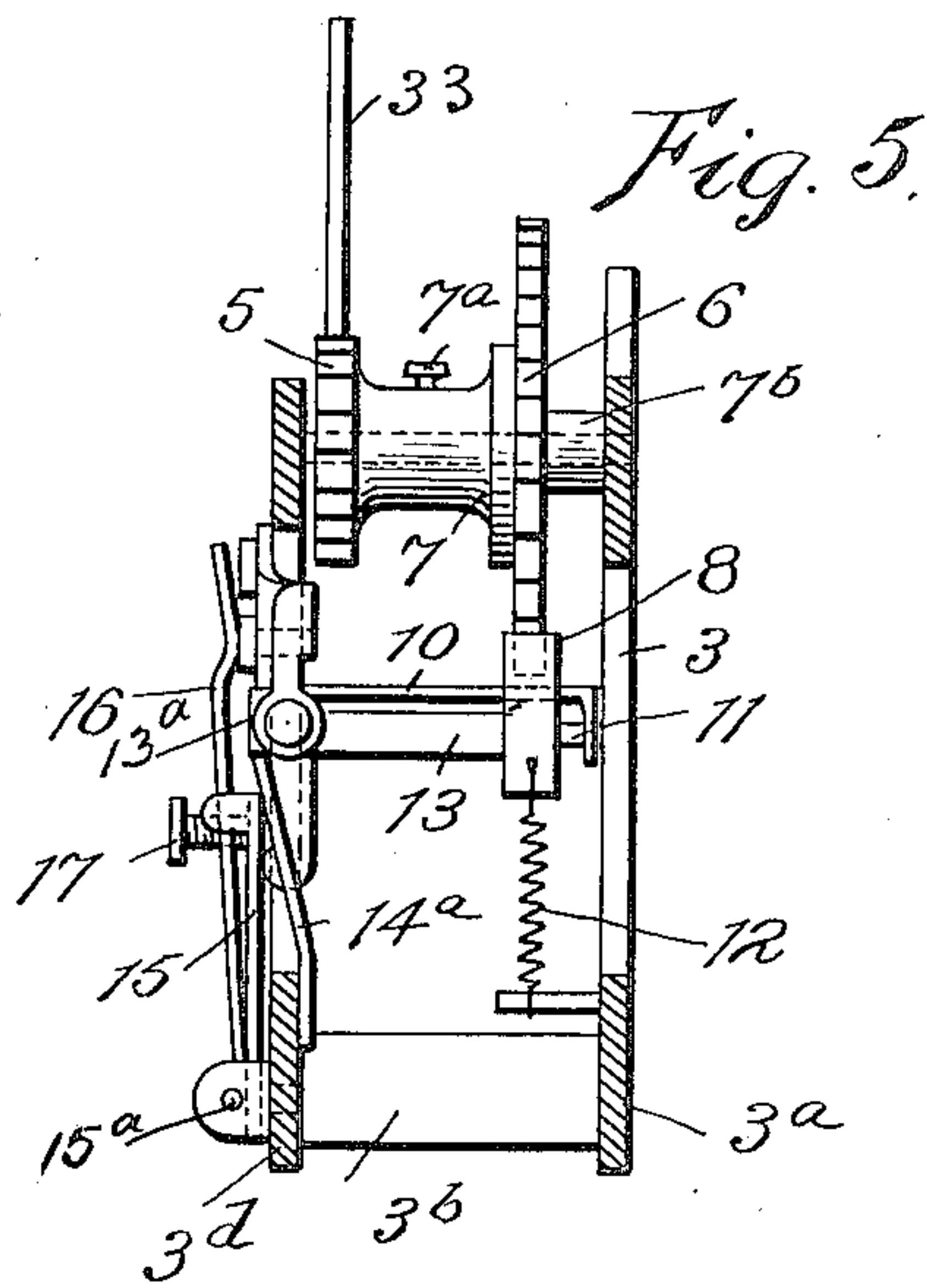
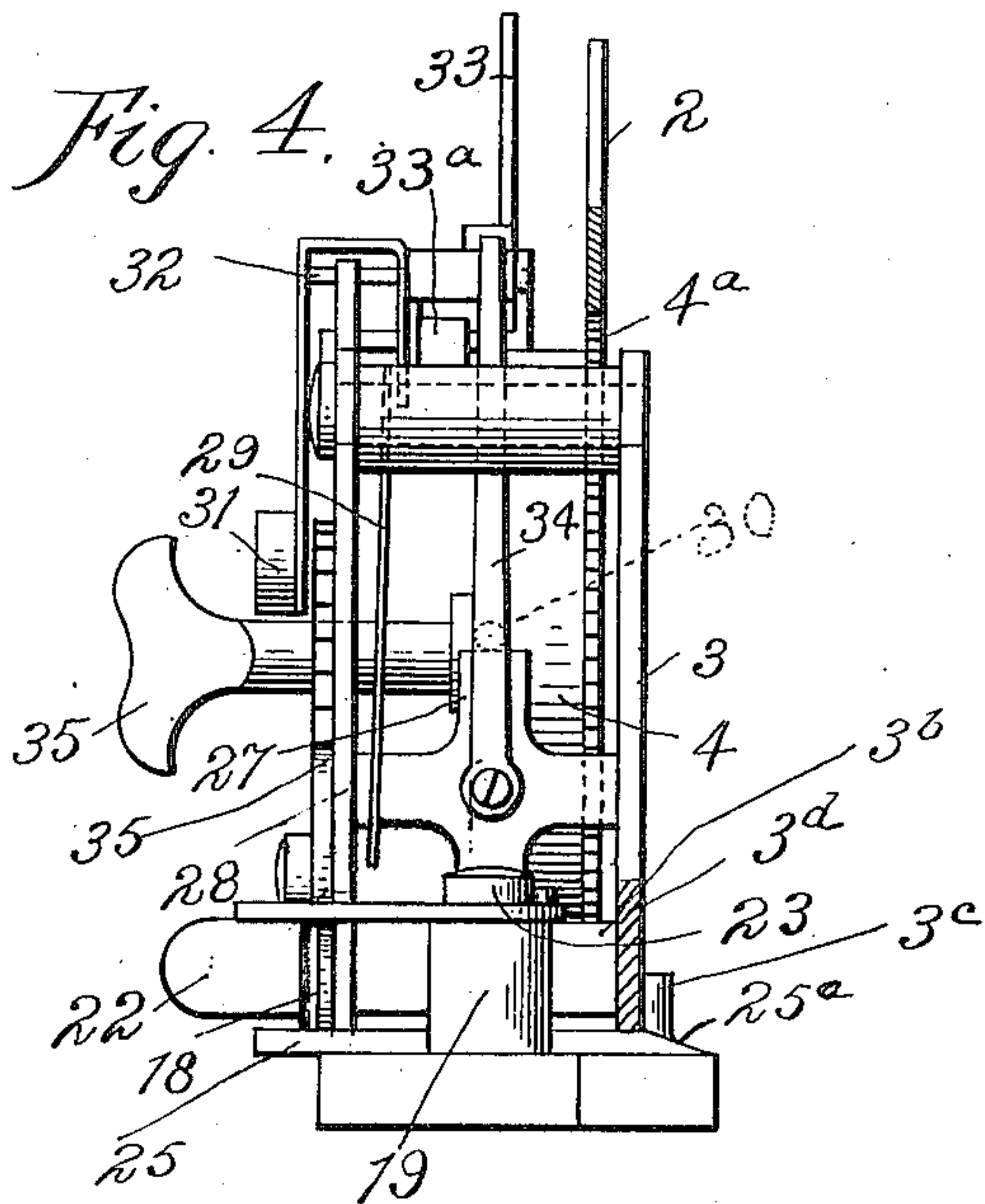
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CARRIAGE FEED MECHANISM FOR TYPE WRITING MACHINES.

APPLICATION FILED APR. 7, 1906.

4 SHEETS—SHEET 3.



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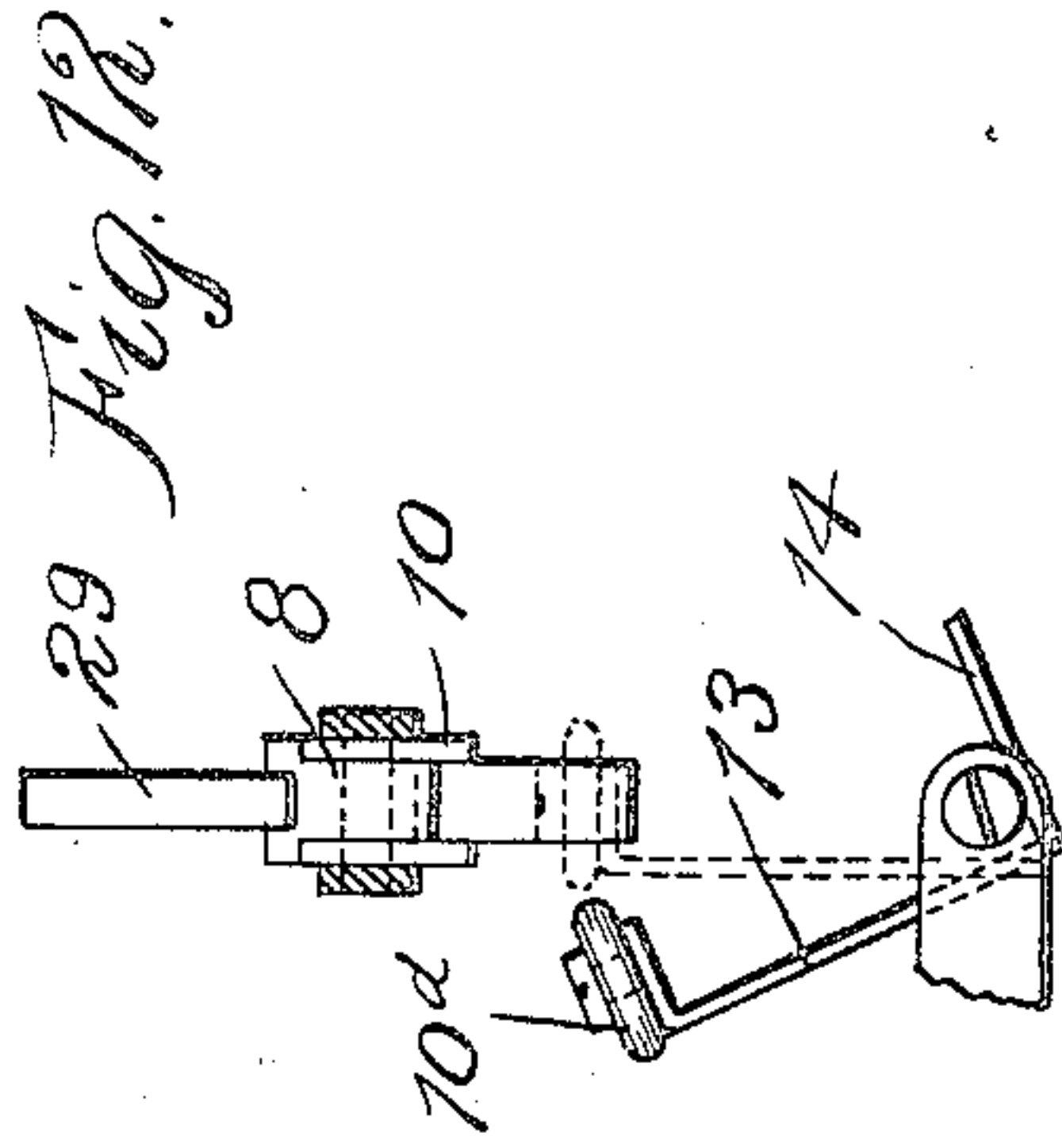
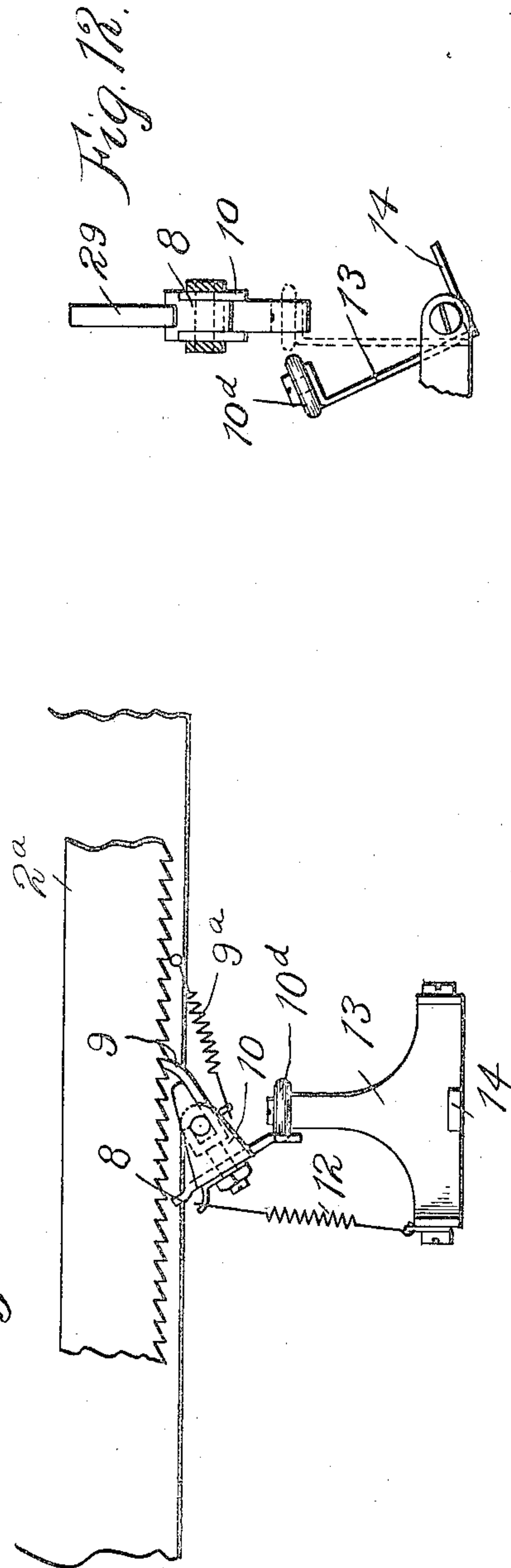
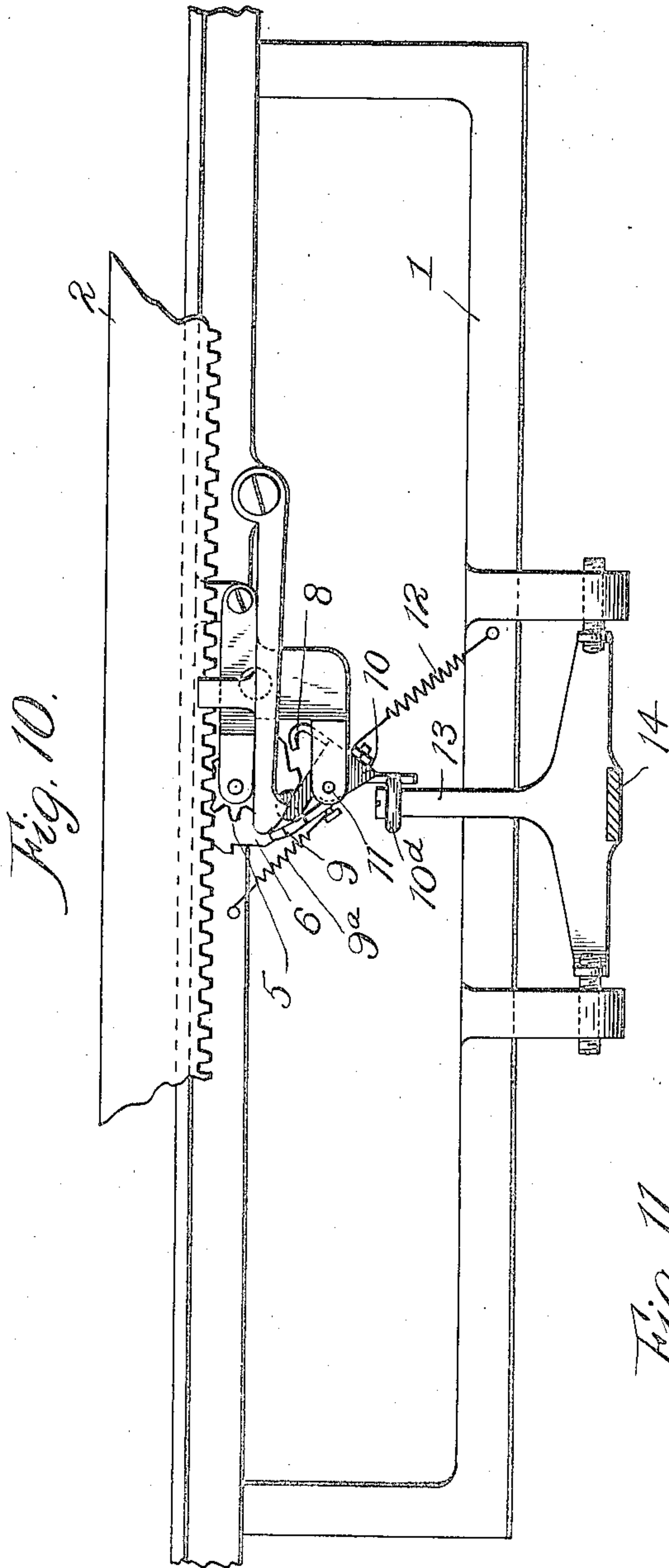
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CARRIAGE FEED MECHANISM FOR TYPE WRITING MACHINES.

APPLICATION FILED APR. 7, 1906.

4 SHEETS—SHEET 4.



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UNITED STATES PATENT OFFICE.

JEROME B. SECOR, OF DERBY, CONNECTICUT, ASSIGNOR TO WILLIAMS TYPEWRITER COMPANY, OF DERBY, CONNECTICUT, A CORPORATION OF IOWA.

CARRIAGE-FEED MECHANISM FOR TYPE-WRITING MACHINES.

No. 874,999.

Specification of Letters Patent.

Patented Dec. 31, 1907.

Application filed April 7, 1906. Serial No. 310,480.

To all whom it may concern:

Be it known that I, JEROME B. SECOR, a citizen of the United States, and resident of Derby, in the county of New Haven and State of Connecticut, have invented certain new and useful Improvements in Carriage-Feed Mechanism for Type-Writing Machines, of which the following is a specification.

My invention relates in part to an improved anchor-escapement by which the feed of the carriage is controlled.

It further relates to devices for holding the carriage-feed and escapement mechanism in place and permitting its removal from the carriage comprising clamps for holding the feed and escapement housing in position and a locking device by which the spring-barrel is automatically held against rotation when the said feed and escapement mechanism and accessories are removed from the machine-frame and clamps serving to hold the spring-barrel and escapement housing in position in the frame and also to disengage the lock and release the spring barrel in the act of securing the feed and escapement-mechanism in working position; also to means for setting the feed spring gear and the escapement pinion in mesh with the carriage-feed rack when the escapement apparatus is placed in the frame and permitting ready detachment of the parts from said rack when the feed and escapement apparatus is taken out.

The invention further relates to other details hereinafter described and particularly pointed out in the claims.

In the accompanying drawings: Figure 1 is a rear elevation of parts of a type-writing machine illustrating my invention showing the feed drum and toothed gear and other parts in operative position and the locking dog retracted. Fig. 1^a is a view of a portion of the same, showing the feed gear locked by the automatic dog against rotation and the position of other parts when the operating mechanism and its housing are removed from the frames. Fig. 1^b is a detail section of the rocking escapement pallets. Fig. 2 is a plan view of a portion of the machine-frame base and attachments in position to receive the carriage controlling mechanism. Fig. 3 is a top plan view of the carriage controlling mechanism in position to be inserted in the machine frame. Fig. 4 is a side elevation of the parts shown in and looking

from the right in Fig. 1. Fig. 5 is a vertical section on the line 5—5, Fig. 1, looking from the left. Fig. 6 is a detail front elevation of the escapement device. Fig. 7 is a vertical section: showing the escapement mechanism in elevation, looking from the right. Fig. 8 is a detail view showing the movable pallet in engagement with the teeth of the escapement ratchet wheel. Fig. 9 is a detail plan view of a portion of the housing - frame, the bell clapper tappet arm 33 mounted therein and the arm for holding said tappet depressed when the feed spring is locked. Fig. 10 is a front view of a slightly modified positive anchor pallet feed mechanism. Fig. 11 is a front view illustrating a modification of the same, showing same applied directly to a rack moved by the carriage. Fig. 12 is a side view of the same partly in section.

1 represents a portion of the machine-frame and 2 a portion of the carriage-feed rack.

3 indicates the removable housing-frame in which are mounted the spring-drum 4 and other members of the carriage feed and escapement mechanism facility for removal of which bodily from the machine-frame constitutes an important part of my invention. The spring-drum 4 carries the customary toothed wheel 4^a gearing with the carriage rack 2 to impart the step-by-step feed to the carriage under control of the escapement mechanism. The escapement mechanism comprises a pinion 5 meshing with the rack 2, independently of the driving wheel 4^a; a ratchet wheel 6 connected to the pinion 5 by a hollow shaft or sleeve 7 mounted on an inner shaft 7^b and fixed adjustably thereto by a set screw 7^a so as to rotate with said shaft 7^b; also anchor escapement pallets 8, 9, carried by a rocking plate 10, which oscillates on a pivot 11. This pivot may take the form of set screws seated in the plate 10 and adjustable in threaded openings in the frame 3. The use of a hollow connecting shaft or sleeve 7 is a convenience in making and is also advantageous in affording a limited adjustment; but it is not a necessity, as the connecting shaft may be made integral or rigidly united with the pinion 5 and ratchet wheel 6, and with its pivots. Plate 10 is actuated in one direction by a spring 12 and in the other by a compound bell crank lever having a horizontal arm 13 engaging beneath the project-

ing arm of the plate 10 so as to lift it in opposition to the tension of the spring 12, a vertical arm 14^a engaging a portion of the frame 3 to limit the return movement of the lever, and a vertical arm 14 which is pressed backward by the upper end of a vertical tappet arm 15 fulcrumed at bottom in the lower member of the housing frame 3 and carrying an adjustable arm 16 fixed at bottom to the arm 15, which receives the impact of a tappet of any suitable form from a universal bar, not shown. The second pallet 9 has an independent sliding and oscillating movement on the arbor 11 and is drawn into engagement with the teeth of the ratchet wheel by a separate spring 9^a. The edge of the rocking plate 10 is cut away to form a pair of guide prongs 10^a between which the pallet 9 slides, as shown in Figs. 1, 1^b, 6 and 7, so as to hold it against lateral movement and enable its intumed end to engage effectively with the teeth of the ratchet wheel 6.

As already stated the rocking plate 10 oscillates on the fixed pivot 11. The sliding tooth 9 oscillates in a vertical plane on the same pivot but has also a sliding movement thereon being turned up at its heel to embrace the pin 11, as shown in Fig. 1^b, and confined against lateral movement by the prongs 10^a of the rocking plate 10 while the tension spring 9^a (Fig. 1) attached at its lower end to a pin projecting from the back of the sliding tooth 9 draws the said tooth forward and upward into engagement with the ratchet wheel 6. The relatively adjustable lever arms 15, 16 are united at bottom and vibrate on a common horizontal axis formed by pivots 15^a shown in Figs. 5 and 7 and indicated in dotted lines in Fig. 6. The arm 16 is a stiff plate-spring with resilience tending to force it toward the arm 15 from which it is held apart by the set-screw 17. This set-screw being threaded in the plate or arm 16 and bearing by its end against the face of the arm 15, it will be apparent that by turning in the said set screw the arms 15, 16 will be forced wider apart or by turning back the set screw the said arms will be permitted to approach one another. The projecting upper end of the lever arm 16 receives the impact of a tappet (not shown) from a universal or space-key mechanism of any common or suitable form, and the movement is transmitted to the escapement mechanism by the arm 15, the extent of this movement being varied by turning the set screw 17 in or out. The movement is transmitted from the lever arm 15 to the escapement through a bell crank device constructed as follows:

13^a is a rocking plate mounted on horizontal pivots 13^b and having projecting from its respective ends a vertical arm 14 to receive the impact of the lever arm 15 and a horizontal arm 13 to throw up the rocking escapement plate 10 (see Fig. 1)

A pendent arm 14^a projects downward from the center part of the plate 13^a to limit the backward movement by impact with the fixed frame-member 3^d. The arms 13, 14 and 14^a and plate 13^a constitute a unitary rocking frame relatively rigid in all its parts, being made, in practice, from a single piece of sheet metal by stamping and bending up into the shape shown in Figs. 5, 6 and 7. This unitary frame rocks on the horizontal pivots 13^b in the ends of the central member 13^a, which thus serves as a rock-shaft, transmitting to the lifting arm 13 movement imparted to the arm 14 by the vibrating lever arm 15.

The variable prominence of the tappet-arm 16 permits the accurate regulation of the movement communicated to the escapement pallets from a universal escapement operating device actuated by the key-levers in customary manner. My present improvement does not involve any special peculiarity in the universal bar or its equivalent and therefore this need not be described.

I will now describe the manner in which the housing frame 3, with the entire feed and escapement mechanism mounted therein, is rigidly secured in the machine-frame for operation and readily detached so as to be removed bodily therefrom when required, and a special device to set the feed gear of the spring-barrel and the escapement pinion in mesh with carriage-feed-rack when the feed and escapement apparatus are placed in the machine and effect their ready detachment from said rack when removed; also the means by which the spring barrel is automatically locked against rotation in the act of removing the feed mechanism from the machine and consequently withdrawing the spring-barrel-gear from engagement with the carriage rack.

The front lower bottom bar 3^d is adapted to bear against rigid posts 3^c (Fig. 4) on the machine-frame to hold frame 3 against movement toward the front of the machine-frame. Frame 3 is held against longitudinal movement by a projection 3^e engaging a groove 1^a in frame 1 (Fig. 1). It is locked against backward movement and also held down by a pair of L or T shaped clamps 22 formed substantially as shown in Figs. 1 and 2, and turning on vertical pivots 23 extending through posts 19 the under surface of the clamps 22 resting on the posts 19 in the machine-frame 1. When turned into locking position, horizontally projecting arms 22^a of the pivoted clamps engage over the bottom cross-bars 3^b in the ends of the housing-frame 3 and the vertical front faces of the downwardly projecting operating handles of the pivoted clamps engage with curved lugs 18 and the horizontally projecting arms 22^b bear against posts 22^c rigid in machine frame 1 and forming a cam projection which will

force the clamps 22 down onto cross-bars 3^b and back against suitable stops in bars 3^b.

It is expedient to provide for a slight vertical movement of the housing-frame to facilitate detachment of the gearing from the carriage rack in removing the escapement and feed mechanism from the machine and to again press the gear and pinion up into full mesh with the carriage rack 2 when the mechanism is replaced in working position. To this end, I provide a pair of L-shaped bolster-plates 25, pivoted at 26 by one extremity to the machine-frame, and wedge-shaped on their free extremities 25^a whereby said ends of the pivoted bolster plates engage beneath the housing-frame when it is placed in position, so that by turning the said pivoted bolster frames on their pivots and forcing them forward beneath the housing-frame, the housing-frame with the entire feed and escapement mechanism is raised into normal position and securely held, with the feed gear 4^a and escapement-pinion 5 in mesh with the carriage-feed rack 2. 25^b are projections on bolsters 25 which project beyond the frame of the machine sufficiently to form handles for bolsters 25.

In order that the spring barrel 4 may be automatically locked against rotation when the feed-mechanism is removed from the machine-frame, I provide a detent dog 27 pivoted at 28 in the housing-frame 3 and pressed by a spring 29 into contact with the periphery of the spring barrel 4 so as to engage with one of the studs 30 projecting radially from the spring barrel and prevent the rotation of the latter unless said detent dog be retracted. After the housing-frame 3 is placed in position and raised by the pivoted bolster plates 25 so that the teeth 4^a on the spring-barrel are in full mesh with the carriage feed rack 2, the spring barrel is released by the act of locking the housing in position, so that the spring-barrel can communicate feed movement to the carriage. This is effected by the nose 22^a of the pivoted clamp 22 seen to the right in Figs. 1 and 2 engaging with the downwardly projecting tail 27^a of the detent dog 27 so as to press and hold this inward against the pressure of the spring 29 and thereby hold back the upper end of the detent dog out of each of the radial studs 30. Fig. 1 shows the parts in operating position in the machine frame. Fig. 1^a shows a part of the removable housing 3 and a part of the spring barrel 4 and its attached gear 4^a, with the detent dog 27 engaging one of the studs 30 to lock the spring barrel against rotation; also the shouldered tappet arm 33 of the bell hammer turned down out of the way, as hereinafter described.

In order to remove from the machine-frame, the housing 3 and the feed and escapement apparatus contained therein the pivoted clamps 22 are first turned back, releas-

ing the feed and escapement housing from the machine-frame and at the same time releasing the detent dog 27 so that it is pressed by the spring 29 into contact with the periphery of the spring drum and locks the latter against rotation. In removing the escapement housing 3 it is desirable to first release the clamp 22 which is in engagement with the spring drum detent dog 27 then run carriage a trifle to allow dog 27 to engage lug or projection 4^a on the spring drum 4. This will prevent any possible slip of the drum 4 and injury to the parts. The pivoted bolster plates 25 are then retracted permitting the feed housing-frame 3 to drop with the gear 4^a and pinion 5 out of mesh with the carriage feed rack 2. The entire feed and escapement apparatus may then be freely removed, the spring-drum remaining locked so long as it is out of operating position.

The bell-hammer 31 is pivoted at 32 in the housing frame 3 and is operated in a usual manner by contact of a suitable tappet-projection on the carriage with an upwardly projected tappet arm 33 held projected by a weight 33^a so connected with the bell-hammer arm as to operate the same when the carriage approaches the end of its forward movement and permit the free passage of said tappet projection in running back. Now in order to move and hold the tappet arm 33 down out of the way when the feed and escapement apparatus is to be removed from the machine-frame, a spring arm 34 is provided, projecting upwardly from the back of the detent dog 27 in position to engage with the tappet arm 33 when the detent dog is rocked forward to lock the spring barrel, so that when the detent dog is in this locking position the tappet arm 33 is held down in the horizontal position shown in Figs. 1^a and 3. 35 represents a winding device of common form for the spring arbor, having a detent and release dog 36 by manipulating which, by means of its projecting arm 37 the tension of the spring may be let down or regulated as required.

In Fig. 10, I have shown a device by which the anchor-escapement is actuated positively from the universal bar so as to impart step-by-step movement to the carriage without the use of a power spring. One carriage in this case is however preferably progressed by the customary spring arrangement about to be described allowing writing to be done at very great speed. This is especially the case when this form of mechanism is used on a Williams' typewriter. In this illustration part of the machine-frame as shown at 1 and 2 indicates the carriage feed rack. 8 represents the primary tappet which in the present illustration imparts positive rotation to the ratchet wheel 6 and through the pinion 5 fixed on same shaft transmits step-by-step motion to the feed rack 2 and the carriage

(not shown). The pallet 8 is carried by a plate 10 rocking on a pivot 11 and moved in one direction by one arm 13 of a bell crank lever, the other arm 14 of which is designed to be acted on by a suitable universal bar device (not shown). 12 represents the return spring imparting the retracting motion to the rocking plate 10 and pallet 8. 9 represents the secondary or check tappet sliding on the tappet 8 and drawn into engagement with the successive teeth of the ratchet wheel 6 by a spring 9^a. The contact between the bell crank arm 13 and the rocking plate 10 is through the medium of an anti-friction roller 10^d.

In operation the deflection of the rocking plate in one direction by action of the bell-crank 16, 14 imparts positive rotation to the ratchet wheel 6 to the extent of one tooth, by pressure of the active pallet 8, thereby moving the pinion 5 and carriage rack 2 one tooth forward. The check pallet 9 slides backward in the rocking frame to permit the active pallet 8 to complete its stroke. The movement of rocking plate then throws the check pallet 9 out of its engaged tooth and it is instantly drawn into engagement with the next tooth of the ratchet wheel by the action of its spring 9^a, permitting the active pallet 8 to slip over and engage its next tooth on the wheel on the return movement of the rocking plate. The gidding back or return movement of the carriage is freely permitted by slipping of the teeth of the ratchet wheel 6 over each pallet 8, 9.

In Figs. 11 and 12 I have shown another modification in which the anchor feed pallets 8, 9 act directly on a ratchet rack 2^a on the carriage, without the intervention of a pinion 5. In this illustration, as before the rocking plate 10 is actuated in one direction by a bell crank lever 13, 14 and in the opposite direction by a spring 12, and carries an active pallet 8 and a relatively sliding and pivoted check-pallet 9 actuated by a separate spring 9^a; but instead of actuating the carriage feed-rack through the medium of a ratchet wheel and pinion the pallets engage directly with a ratchet rack 2^a on the carriage. Each forward rocking movement of the plate 10 moves the carriage one step forward by positive action of the pallet 8 on a tooth of the rack 2^a, and, on the return stroke, the check pallet 9 by tension of the spring 9^a engages the rack 2^a to check retrograde movement while the pallet 8 engages a new tooth. On return movement of the carriage, or gidding back the sliding feed arm of the pallet 9 in the rocking plate 10 draws it out of engagement with the successive teeth of the rack.

I am aware that the combination of continuously acting means to impart feed movement to the carriage, a pinion gearing with a rack on the carriage to check such feed move-

ment and an escapement device consisting of oscillating dogs engaging a ratchet wheel attached to the said pinion so as to impart a step by step movement to the carriage is quite old.

I am also aware that it is old to employ in a carriage feed mechanism for typewriting machines a pair of escapement dogs oscillating in a plane transverse to the rotation of the escapement wheel, one of said dogs having a sliding as well as an oscillatory motion. In my improved carriage feed mechanism an important practical advantage results from the combination with the escapement wheel and a pallet rocking into and out of engagement therewith after the manner of a clock escapement, of a spring pressed dog moving in the plane of rotation of the escapement wheel, and having a sliding as well as an oscillatory movement in the plane of rotation of the escapement wheel and so arranged that the sliding dog is not lifted out of engagement with the tooth, until the fixed oscillating dog has entered fully into engagement with its particular tooth and vice versa.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent is:

1. In a typewriting machine the combination of a feed-movement spring-cylinder removable from the machine-frame, a spring detent automatically locking the cylinder against rotation when removed from the frame and a fastening device serving the combined purpose of securing the spring cylinder in the frame and retracting the spring detent to release the spring cylinder and restore it to operative condition.

2. In a typewriting machine the combination of a removable housing, feed and escapement mechanism mounted in said housing, a detent automatically locking the feed device against movement when removed from the machine-frame, and a clamp securing the housing in normal position in the frame and retracting the detent so as to release the feed device in the act of securing the housing in the frame.

3. In a typewriting machine the combination of a removable housing, a spring cylinder mounted therein, an automatic detent locking the spring cylinder against rotation when removed from the machine-frame an alarm bell-hammer mounted in the housing and an arm on the detent acting on the bell-hammer to retract it in the act of locking the spring-cylinder in order to facilitate removal of the housing from the frame.

4. In a typewriting machine the combination with a suitable escapement device, of a connected pair of arms one receiving impact from a suitable actuating device and the other transmitting the movement to the escapement, and means for changing the relative prominence of said arms so as to regu-

late the effect on the escapement, substantially as described.

5. In an escapement apparatus for type-writing machines, a transmitting device comprising a pair of connected arms rocking on a common center, one of said arms receiving the impact of an actuating device and the other communicating movement to the escapement, and means varying the relative prominence of said arms whereby the effect of the movement on the escapement may be varied, substantially as described.

6. In an escapement apparatus for type-writing machines, the combination of an escapement pallet, a pair of transmitting arms united at one end and rocking on a common axis, a transmitting device between one of said arms and the escapement pallet, and a set screw adjusting the free ends of said arms in distance asunder whereby the effect on the escapement pallets from the impact of an actuating device upon the other arm may be varied and regulated, substantially as described.

7. In a carriage feed mechanism for type-writing machines the combination of a carriage, means for imparting movement thereto, a toothed rack traveling with said carriage, a pinion gearing with said rack to check its movement, a ratchet wheel rotating with said pinion, an escapement pallet engaging said ratchet wheel, oscillating in a plane parallel with the movement of the carriage and having a rigid dog and a spring pressed pivoted dog having also a sliding movement in the plane of rotation and suitable means for imparting oscillatory motion to said pallet.

8. In a carriage feed mechanism for type-writing machines the combination of a sliding carriage, continuously acting means imparting feed movement thereto, a rack and pinion checking such carriage movement, a ratchet wheel fixed to said pinion to control its rotation and an escapement device oscillating in a plane parallel with the rotation of the pinion having a rigid tooth and a spring-pressed tooth capable of both pivoted and sliding movement in the plane of rotation of the ratchet wheel.

9. In a writing machine, an escapement device having a rigid tooth and cut away to form a seat and guiding prongs and having a tooth pivoted thereto, resting in said seat and capable of sliding movement between said prongs.

10. In a writing machine, a movable toothed escapement device in combination with pallets movable into and out of engagement therewith, a spring for actuating said pallets in one direction, and a compound lever consisting of two connected relatively ad-

justable arms, one receiving the impact of an actuating device, and the other transmitting movement to the pallets varied by the adjustment of the arms of said compound lever in relative prominence.

11. In a writing machine, a movable toothed escapement device in combination with pallets movable into and out of engagement therewith, a spring actuating the pallets in one direction, a compound lever consisting of connected nearly parallel receiving and transmitting arms, means for adjusting said arms in relative prominence and a tappet lever actuated by the transmitting arm of the compound lever and transmitting movement to the escapement pallets with effect variable by the relative adjustment of the arms of the compound lever.

12. In a writing machine, a movable toothed escapement device in combination with pallets movable into and out of engagement therewith, a spring actuating the pallets in one direction, a compound lever consisting of connected nearly parallel receiving and transmitting arms, means for adjusting said arms in relative prominence and a bell crank tappet lever actuated by the transmitting arm of the compound lever and transmitting movement to the escapement pallets with effect variable by the relative adjustment of the arms of the compound lever.

13. In a writing machine, the combination with a machine-frame, of a removable frame mounted therein, a spring drum gear mounted within said movable frame for dogging said spring drum when the removable frame is taken from the machine frame and clamping means for holding said removable frame in position and releasing said dogging means when drawn into clamping position.

14. In a writing machine, the combination with a machine-frame and a removable frame mounted therein and a suitable gear carried thereby, of a clamp for the removable frame and means operated by said clamp for locking said gear when the removable frame is in unclamped position and releasing the said gear when the frame is in said clamped position.

15. In a writing machine the combination with a machine-frame and a removable frame, of a bell hammer, an actuating arm projecting from said removable frame, a clamp for holding the removable frame in place and means operated upon releasing of said clamp for depressing said bell hammer actuating arm.

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