915,015.

A. T. BROWN.

TYPE WRITING MACHINE.

APPLICATION FILED OCT. 21, 1904.

Patented Mar. 9, 1909.

3 SHEETS—SHEET 1.

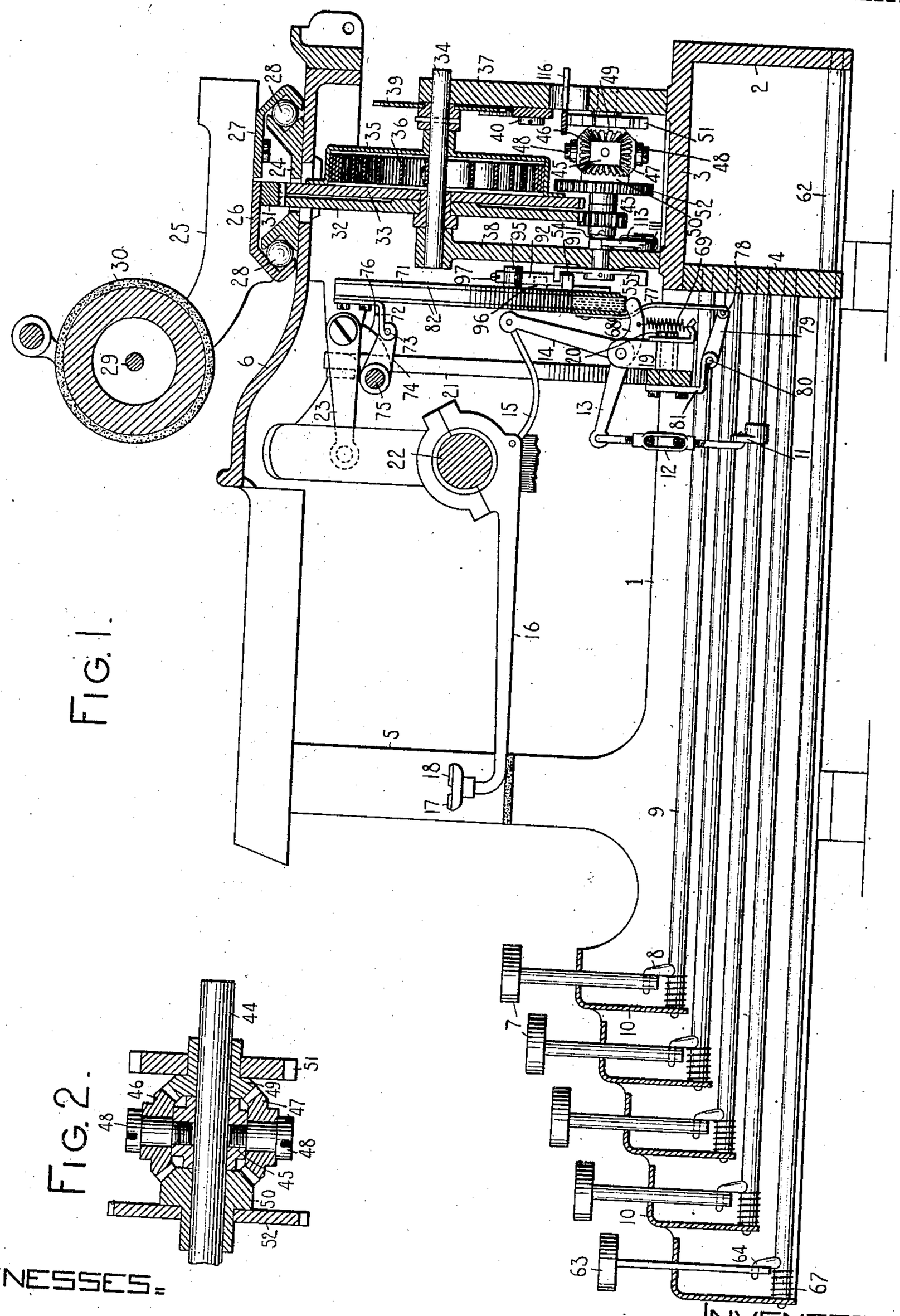

FIG. 1.

FIG. 2.

WITNESSES=

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J. B. Reeves.

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3 SHEETS—SHEET 2.

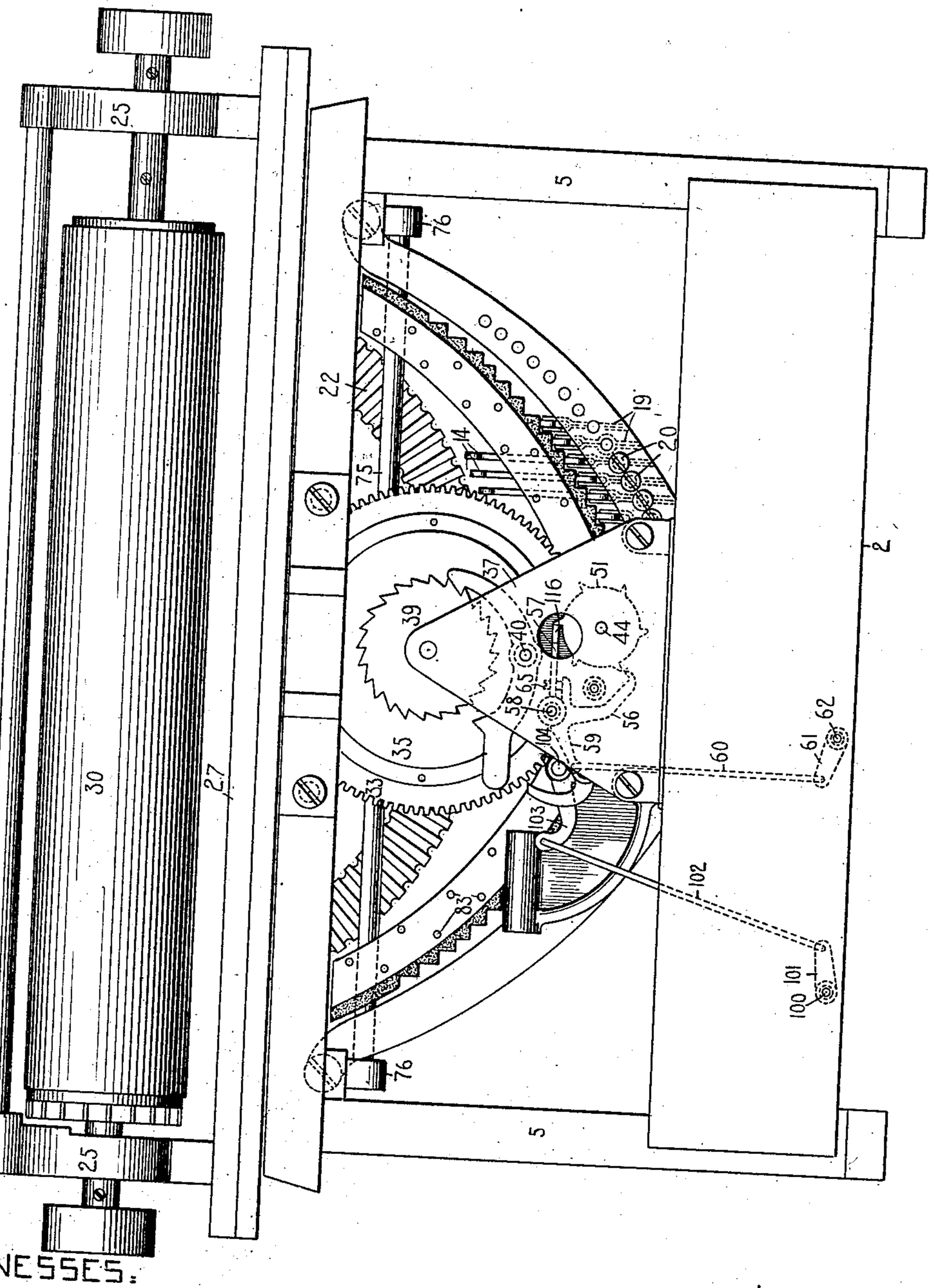

FIG. 3.

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3 SHEETS—SHEET 3.

FIG. 4.

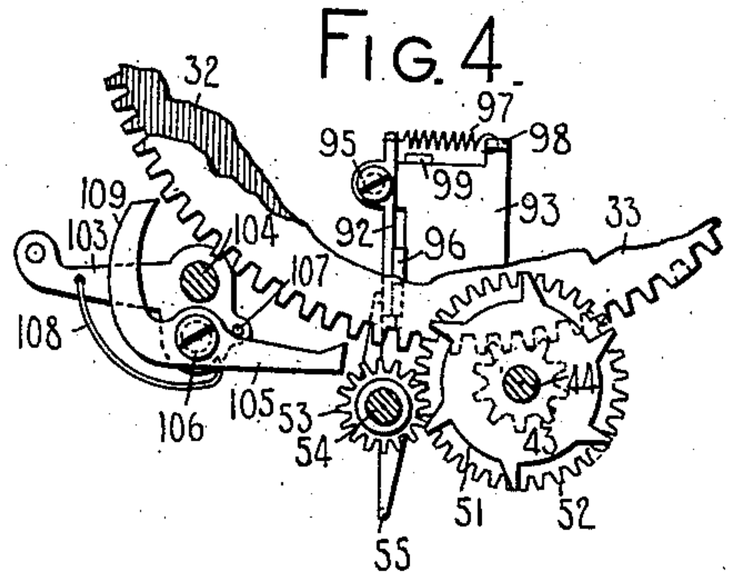


FIG. 6.

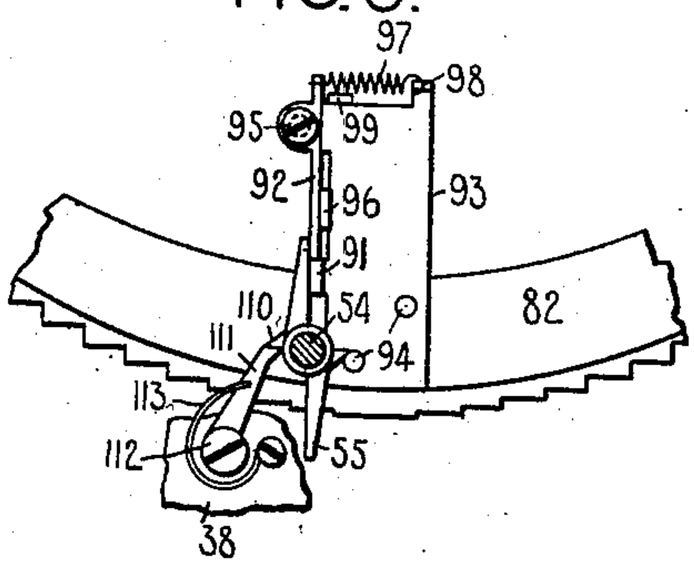


FIG. 7.

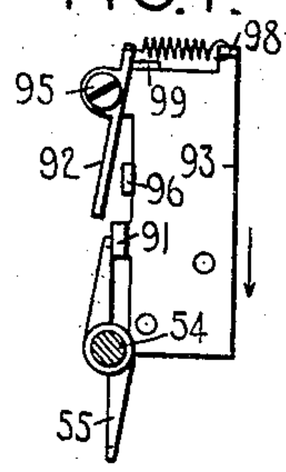


FIG. 5.

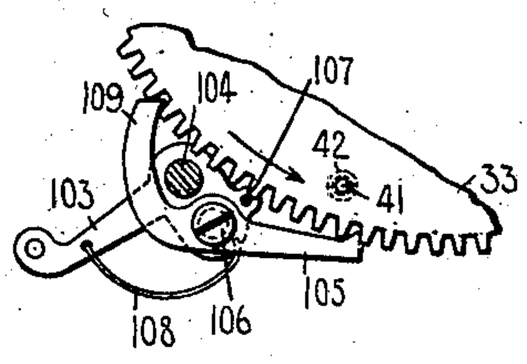


FIG. 9.

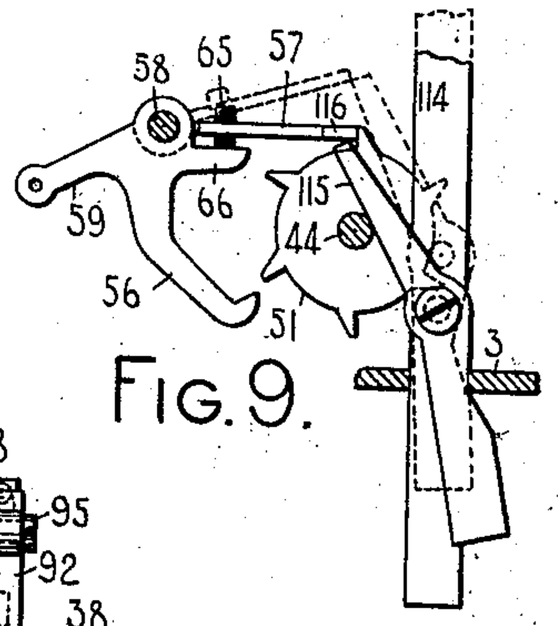
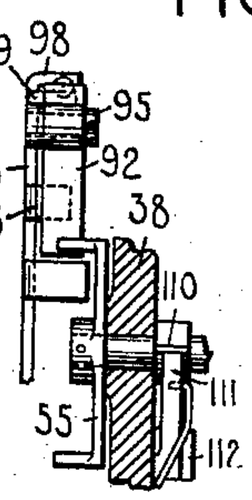


FIG. 8.



WITNESSES:

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UNITED STATES PATENT OFFICE.

ALEXANDER T. BROWN, OF SYRACUSE, NEW YORK.

TYPE-WRITING MACHINE.

No. 915,015. Specification of Letters Patent. Patented March 9, 1909.

Original application filed June 29, 1904, Serial No. 214,625. Divided and this application filed October 21, 1904. Serial No. 229,485.

To all whom it may concern:

Be it known that I, ALEXANDER T. BROWN, citizen of the United States, and resident of Syracuse, in the county of Onondaga and State of New York, have invented certain new and useful Improvements in Type-Writing Machines, of which the following is a specification.

My invention relates to typewriting machines and more especially to the carriage feed mechanism of such machines and it consists in certain features of construction and combinations of parts which will be fully set forth herein and particularly pointed out in the claims.

The present case is a division of my prior application Serial No. 214,625, filed June 29, 1904.

One embodiment of my invention is illustrated in the accompanying drawings, in which—

Figure 1 is a longitudinal sectional view of a typewriting machine; Fig. 2 is a sectional view through the epicycloidal train of the escapement mechanism; Fig. 3 is a rear elevation of the machine; Fig. 4 is a detail view showing a portion of the carriage feed mechanism as seen from the rear, including a device for feeding the carriage toward the right; Fig. 5 is a detail view of the backspacing mechanism; and Figs. 6, 7, 8 and 9 are detail views of the escapement mechanism.

I have illustrated my invention as applied to a front-strike typewriter, but many of the features thereof are also applicable to other sorts of typewriters. The base portion of the main frame of the machine here illustrated comprises side plates 1, a back plate 2, a shelf 3 and a transverse partition 4. Posts 5 rising from the said base portion support a top plate 6 upon which the carriage is mounted. The keys 7 have their stems pivoted to arms 8 projecting from rock shafts 9, which are journaled at their forward ends in frame plates 10 and at their rear ends in the partition 4. Each of said rock shafts carries an arm 11, which is connected by a link 12 to one arm 13 of a three armed sub-lever, another arm 14 of which is connected by a link 15 to a type bar 16 which carries at its outer end two types 17 and 18. The sub-levers are pivoted in hangers 19 which are secured by screws 20 to a fixed segment 21 which is rigidly mounted in the main frame. The type bars 16 are journaled by ball bearings on a segment 22, which is supported by arms 23 for an up and down case shift motion.

The mechanism thus far described is not claimed herein, as such mechanism forms the subject-matter of other applications of mine copending herewith.

The carriage is mounted on, and is supported solely by, a single rail 24 which lies flat on the top plate 6 and has race-ways formed in its front and rear edges respectively. The carriage comprises two end pieces 25, which are connected together by longitudinally extending bars 26 and 27, which have formed therein race-ways which coöperate with the race-ways in the rail 6 to receive anti-friction balls or rollers 28. The carriage is thus mounted on ball bearings for travel transversely of the machine. The end pieces 25 extend toward the front of the machine and have journaled therein the shaft 29 of a platen 30. The rail 24 may be detachably secured to the main frame, so that said rail and carriage may be removed together from the machine.

A rack bar 31 is secured to the underside of the carriage rail 26 and said rack bar is in mesh with two gear wheels 32 and 33 which are mounted side by side on a shaft 34 and extend through slots formed for the purpose in the top plate 6 and rail 24. The gear wheel 33 has fixed to one face thereof a spring drum 35 in which is coiled a spring 36, the outer end of which is secured to said spring drum and the inner end of which is secured to the shaft 34, on which the spring drum 35 is journaled. The shaft 34 is journaled in two vertical frame pieces 37 and 38, which are rigidly mounted on the shelf 3, to which they are secured. The tension of the spring 36 may be regulated by means of a ratchet wheel 39 which is controlled in the usual manner by a pawl 40 pivoted on the frame piece 37. It will be perceived that the carriage is driven by the spring 36 acting through the gear wheel 33. The step by step feed of the carriage is controlled by an escapement mechanism which is geared to the gear wheel 32. The gear wheel 32 is loosely mounted on the hub of the gear wheel 33, but the freedom of motion of one of these wheels relatively to the other is limited by a screw or pin 41 (Fig. 5) which is secured to one of said gear wheels and projects into an opening 42 in the other, said

opening being of greater diameter than the screw or pin, so as to admit of enough play to take up any lost motion that may exist between the teeth of said gear wheels and the teeth of the rack bar 31. If the carriage is removed from the machine, this connection between the two wheels prevents relative rotation of such wheels, so that the main spring is controlled by the escapement mechanism, whether the carriage is in position on the machine or not. The gear wheel 32 meshes with a pinion 43 which is fixed on a shaft 44 (Fig. 4) on which is rigidly mounted a squared block 45 (Figs. 1 and 2). Two beveled gears 46 and 47 are journaled on shouldered screws 48 which are threaded into the block 45. These beveled gears mesh with beveled gears 49 and 50 which are journaled on the shaft 44, the whole constituting a bevel-gear epicycloidal train. An escapement wheel 51 is rigidly mounted on the hub of the bevel-gear 49, and a gear wheel 52 is rigidly mounted on the hub of the bevel-gear 50.

As best shown in Fig. 4, the gear wheel 52 meshes with a pinion 53 which is fixed on a shaft 54 which is journaled in the frame plates 37 and 38. Said shaft 54 extends through the frame piece 38 and has fixed on the end thereof in front of said frame piece a two-toothed escapement wheel 55. The construction is such that the shaft 44 is controlled by both of the escapement wheels 52 and 55, and said shaft is free to turn when either of said escapement wheels is released, and if both of said escapement wheels be released at the same time the shaft is free to turn through a distance equal to the sum of the distances permitted by the two escapements separately. In the present instance the shaft 54 is geared to move through three times the angular distance of the gear wheel 52, and the ratchet wheel 55 has two teeth while the ratchet wheel 51 has six teeth. This being the case, it will be perceived that the two escapement wheels are designed to afford the same extent of feed movement to the carriage. The escapement wheel 55 is controlled by feed dogs which are connected with the universal bar so that said escapement wheel is under the control of the character keys. The escapement wheel 51 is controlled by feed dogs which are operated by the space key, so that when the last letter of a word is printed the key corresponding to such letter and the space key may be struck at the same time with the result that the carriage will be fed a double distance to space between words. In Fig. 1 the shaft 54 is shown broken away a short distance behind the frame piece 38 in order to show the mechanism mounted on the shaft 44.

The escapement wheel 51 is controlled by two feed dogs 56 and 57, both of which are pivoted on a rod 58 supported by the frame pieces 37 and 38. The feed dog 56 is formed on, or consists of, one arm of a bell crank lever, the other arm 59 of which is connected by a link 60 to an arm 61 projecting from a rock shaft 62 which is journaled at its rear end in the back plate 2 and at its front end in one of the frame plates 10 and which is operated by a space key 63, the stem of which is pivoted to an arm 64 projecting from said rock shaft. The dog 56 is normally out of the path of the tooth of the escapement wheel 51, as shown in Fig. 3. The dog 57 extends substantially horizontally from the rod 58 and normally lies in engagement with one of the teeth of the escapement wheel. This dog has an adjusting screw 65 threaded through it, and the lower end of said screw is in position to be engaged by an arm 66 integral with the dog 56. The construction is such that when the space key 63 is depressed the dog 56 is thrown into the path of a tooth of the escapement wheel and the dog 57 is lifted out of the path of the teeth of said wheel by the arm 66 engaging the screw 65. The amount of motion thus imparted to the dog 64 may be regulated by adjusting said screw. When the key 63 is released the parts are returned to normal position, withdrawing the dog 56 and permitting the dog 57 to drop into the path of the next succeeding tooth of the escapement wheel, by a spring 67 (Fig. 1) coiled about the shaft 62 and connected at one end to the frame plate 10 and at the other end to the arm 64.

Each of the sub-levers 13, 14 has a rearwardly extending arm 68 to which is connected one end of a spring 69, the other end of which is connected to the washer 70 of the screw 20 by which the hanger 19 is secured to the segment 21. The arms 68 operate the universal bar 71. Said universal bar has the form of a stepped segment and it is mounted for parallel motion up and down. To this end two brackets 72 are secured to the universal bar near the ends thereof and each of said brackets has pivoted thereto at 73, an arm 74 which is rigidly connected to a rock shaft 75, which is journaled in brackets 76 of the top plate 6. A bracket or arm 77 is fixed to the universal bar near the middle thereof and said bracket is pivotally connected at 78 to a link 79 which is pivoted at 80 to a bracket 81 which is rigidly secured to the fixed segment 21. The link 79 is of the same length as the arms 74 and is parallel to said arms, so that said arms and link guide the universal bar for parallel motion. All of the sub-levers 13, 14 are mounted to swing in substantially vertical planes, and the universal bar is stepped on its under side, as shown in Fig. 3, and each of the arms 68 coöperates with one of the steps.

In order to make the universal bar light and to avoid noise, I prefer to construct that part of said universal bar which is engaged

by the arms 68 of wood or other organic material, and said universal bar is accordingly built up of two thin segmental plates 82 having a layer of wood or similar material interposed between them, the whole being connected together by rivets 83 (Fig. 3). The organic material projects beyond the metallic plates and has the steps formed therein, as clearly shown in Fig. 3. The escapement wheel 55 has its teeth projecting from its front face substantially parallel to its axis of rotation, as shown in Figs. 1 and 8. The middle portion of the universal bar lies directly in front of this escapement wheel and the feed dogs 91 and 92 are mounted directly on said universal bar, as best shown in Figs. 1 and 6. While any suitable feed dogs might be employed, yet I prefer to use the construction illustrated in the drawings, in which the fixed dog 91 consists of an ear bent up from a piece of sheet metal 93, which is secured, as by rivets 94, to the rear face of the universal bar. The loose dog 92 is pivoted on a screw 95 which is threaded into an ear of the plate 93. Said screw stands approximately over the shaft 61, so that when the universal bar is reciprocated the pivot of the loose dog moves in a direction substantially toward and from the particular tooth of the escapement wheel with which the feed dogs are cooperating at the time.

In the normal position of the parts shown in Fig. 6, the loose dog 92 is engaged by a tooth of the ratchet wheel, which presses it against a stop 96, which stop consists of an ear bent up from the plate 93. The dog 92 extends a short distance above its pivot where it is connected to one end of a light spring 97, the other end of which is connected to an ear 98 bent up from the plate 93. When the universal bar and the feed dogs are raised by the depression of a key to their upper position, the spring 97 moves the loose dog 92 to the position shown in said Fig. 7, against a stop 99, which consists of an ear bent up from the plate 93. When the key is released the tooth of the escapement wheel escapes past the fixed dog 91 and the next tooth engages the loose dog 92. The escapement wheel 55 being so geared to the carriage that a single letter space movement of said carriage turns said escapement wheel through half of a complete rotation, the pressure of the tooth of the escapement wheel against the feed dogs is very light and consequently offers a very slight frictional resistance to the movement of the feed dogs, thus lessening the work thrown on the character keys by the escapement. The escapement wheel 51 is not geared up in this way, as the space key has no other work to do than that of operating said escapement, and a light touch on said key is therefore comparatively unimportant.

I have provided a back spacing device for imparting to the carriage a step-by-step movement toward the right. This device comprises a rock shaft 100 (Fig. 3), which is mounted in the framework and is operated by a back spacing key in the same manner as the rock shaft 62 by the space key. The shaft 100 has an arm 101 rigidly secured thereto, and said arm is connected by a link 102 with an arm 103, which is mounted on a rod or shaft 104, which is mounted in the frame plates 37 and 38.

As best shown in Figs. 4 and 5, the arm 103 forms part of a rock frame on which a pawl 105 is pivoted at 106. When the parts are in their normal position shown in Fig. 4, the pawl 105 is pressed into engagement with a stop pin 107 projecting from the rock frame, by a spring 108, which is connected at one end to said pawl and at the other end to the arm 103. When the arm 103 is drawn down by the depression of the back-spacing key, the stop 107 is moved away from the pawl 105 which drops into engagement with one of the teeth of the gear wheel 32 and moves said gear wheel backward. The pawl 105 has a tail 109, which, at the end of the stroke of the pawl enters the space between two of the teeth of the gear wheel and stops the motion of all of the parts, thus positively preventing any overthrow of the wheel. When the carriage is moved toward the right either by the back-spacing mechanism just described or by hand, the escapement wheel 51 turns in a direction the reverse of that in which it turns in the ordinary operation of the machine, and the loose dog 57 acts as a pawl or detent and the wheel 51 as a ratchet wheel. In order to prevent the escapement wheel 55 from turning when the back spacing mechanism is operated, the shaft 54 on which said escapement wheel is mounted has fixed thereon, just behind the frame plate 38, a two toothed ratchet wheel 110 (Figs. 6 and 8), and a pawl or detent 111 pivoted to the frame plate 38 at 112, is pressed into engagement with said ratchet wheel by a spring 113 which is connected at one end to the pawl and at the other end to the frame piece. If the escapement wheel 55 were free to turn backward when the back space mechanism is operated, both of the escapement wheels might turn backward and the motion of the gear 32 might thus be divided between the two escapement wheels, in which case the escapement wheel 51 might not turn far enough for the next tooth thereof to be caught by the dog 57.

A carriage release device may comprise a slide 114 (Fig. 9), guided by a slot in the shelf 3, and said slide may have pivoted thereto a dog 115, having its end beneath an arm 116 projecting from the feed dog 57. Any suitable release handle may be connected with said slide to raise the same and

lift the feed dog out of engagement with the escapement wheel. Said escapement wheel will then be free to turn to any extent in either direction, and the carriage will, in consequence, be free to move in either direction.

The construction and mounting of the universal bar and the associated mechanism for operating said universal bar, shown and described herein, form the subject-matter of an application of mine filed January 3rd, 1908, Serial No. 409,214, which application is a division of the present application.

Various changes in the details of construction and arrangement may be made without departing from my invention.

What I claim as new and desire to secure by Letters Patent, is:—

1. In a typewriting machine, the combination with the carriage, of feed dogs for controlling the feed of said carriage; and a universal bar mounted for bodily motion of translation and on which said feed dogs are directly mounted.

2. In a typewriting machine, the combination of a universal bar mounted for bodily motion of translation; and a feed dog mounted on said bodily movable universal bar.

3. In a typewriting machine, the combination of a universal bar mounted for motion such that all points thereof move in equal and parallel paths and having a pair of feed dogs mounted directly thereon.

4. In a typewriting machine, the combination with the carriage, of an escapement wheel operatively connected with said carriage; a universal bar having a bodily motion of translation; and feed dogs on said universal bar and coöperating with said escapement wheel.

5. In a typewriting machine, the combination with the carriage, of a plurality of escapement wheels geared to said carriage; and means for preventing backward rotation of one of said escapement wheels.

6. In a typewriting machine, the combination of a detachable carriage having a rack bar rigidly mounted thereon; a driving spring; an escapement wheel geared to said rack bar; means for detachably securing said carriage to the main frame; and an escapement mechanism adapted to control said spring whether the carriage is in position on the machine or not.

7. In a typewriting machine, the combination of a detachable carriage; a driving spring for said carriage; an escapement mechanism for controlling said carriage; and means whereby said escapement mechanism controls said spring whether the carriage be in position on the machine or not.

8. In a typewriting machine, the combination with the carriage, of a plurality of escapement wheels for controlling the feed of said carriage in one direction; a step-by-step device for feeding said carriage in the other direction; and means for preventing backward rotation of one of said escapement wheels.

9. In a typewriting machine, the combination with the carriage, of a plurality of escapement wheels for controlling the feed of said carriage in one direction, one only of said escapement wheels being capable of backward rotation.

10. In a typewriting machine, the combination with the carriage, of an escapement wheel; a reciprocatory member consisting of a piece of sheet metal; a fixed dog consisting of an ear bent up from said sheet metal member; a loose dog pivoted on said sheet metal member; and ears bent up from said sheet metal member and constituting stops to limit the motion of said loose dog about its pivot.

Signed at Syracuse, in the county of Onondaga, and State of New York, this 17th day of October, A. D. 1904.

ALEXANDER T. BROWN.

Witnesses:

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LENA E. HAYES.