

J. T. SCHAAFF.
TYPE WRITING MACHINE.
APPLICATION FILED FEB. 28, 1910.

997,010.

Patented July 4, 1911.

2 SHEETS—SHEET 1.

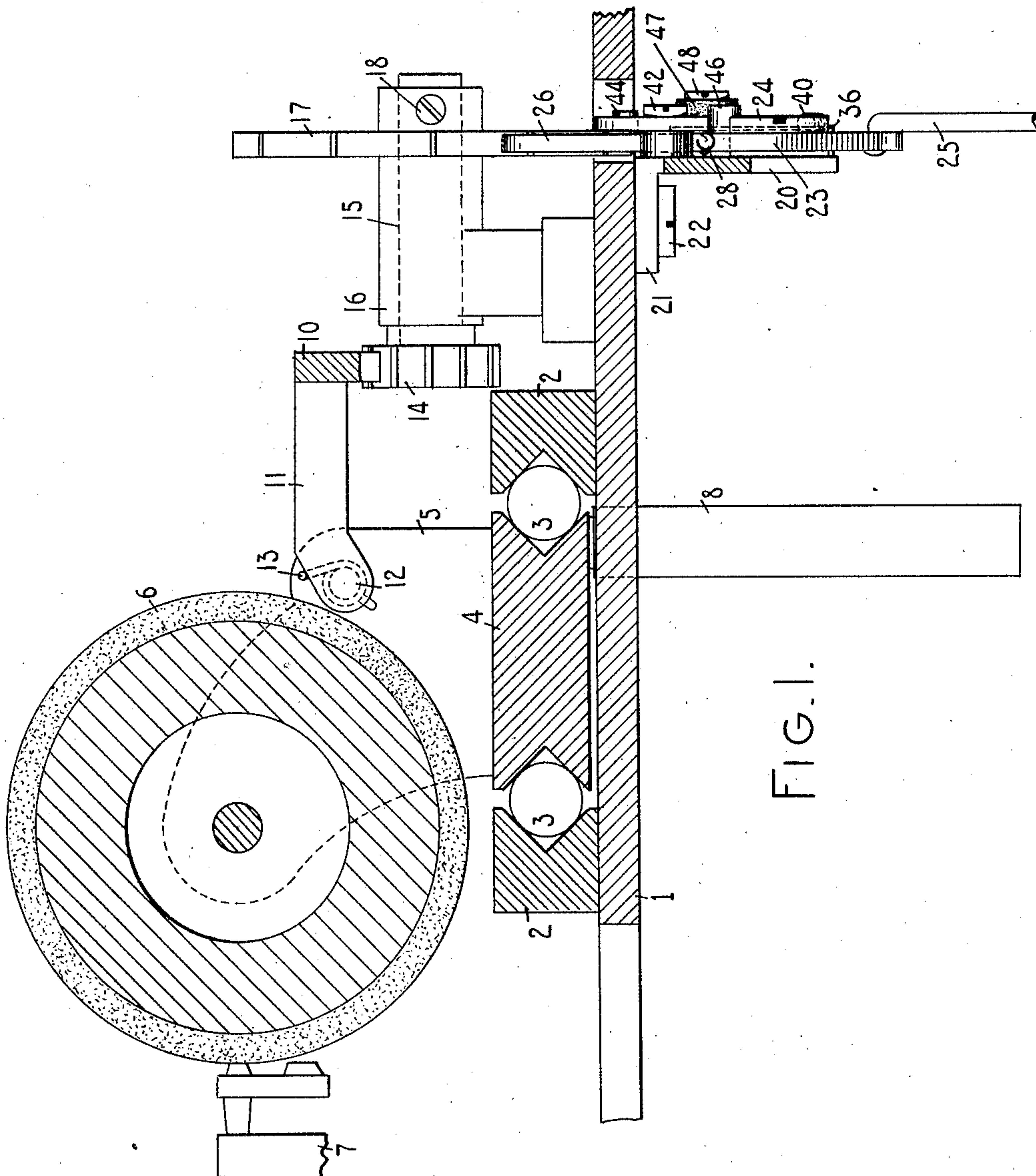


FIG. 1.

WITNESSES:

E. M. Wells

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INVENTOR:

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By Jacob Felsch

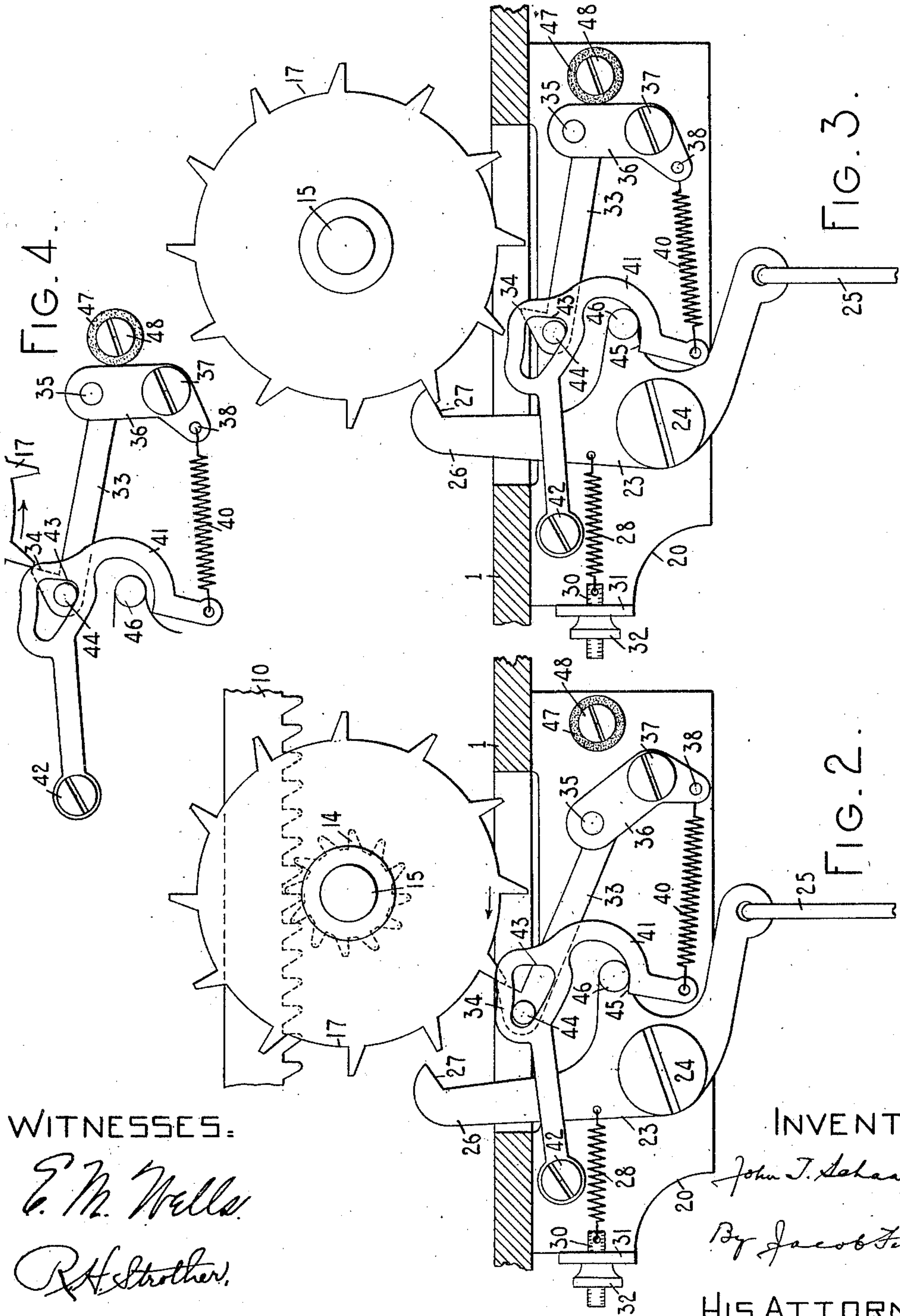
HIS ATTORNEY

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2 SHEETS-SHEET 2.



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E. M. Wells.
R. H. Strother.

INVENTOR:

John T. Schaaff
By Jacob F. Felt

HIS ATTORNEY

UNITED STATES PATENT OFFICE.

JOHN T. SCHAAFF, OF WASHINGTON, DISTRICT OF COLUMBIA, ASSIGNOR TO UNION TYPEWRITER COMPANY, OF ILION, NEW YORK, A CORPORATION OF NEW YORK.

TYPE-WRITING MACHINE.

997,010.

Specification of Letters Patent.

Patented July 4, 1911.

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To all whom it may concern:

Be it known that I, JOHN T. SCHAAFF, citizen of the United States, and resident of the city of Washington, in the District of Columbia, 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 escapements of such machines, the object of my invention being to provide an improved escapement. The principal respect in which it is my purpose to improve these devices is that of lessening or largely eliminating the noise that results from the operation of this part of a typewriter. I have also produced an escapement in which the tension of the carriage spring assists in restoring the parts to normal position and also one in which the carriage can be moved backward and the teeth of the escapement rack or wheel will snap successively over one of the dogs of the escapement. These objects are attained by improved and very simple devices.

My invention consists in certain features of construction and combinations and arrangements of parts, all of which will be fully set forth herein and particularly pointed out in the claims.

In the accompanying drawings, Figure 1 is a side elevation of my escapement, some of the associated parts of a typewriting machine being shown conventionally in front-to-back vertical section. Figs. 2 and 3 are rear elevations of my escapement mechanism, Fig. 2 showing the parts when the keys are in normal position and Fig. 3 showing said parts as they stand when a key is fully depressed. Fig. 4 is a similar view but with parts omitted, this figure illustrating the action of the escapement when the carriage is moved to the right by hand.

My invention is applicable, or readily adaptable, to typewriting machines generally, and the associated parts of the machine are here represented only conventionally.

1 represents the top plate of a typewriter having fixed thereon rails 2 which are grooved to receive anti-friction rollers 3 that cooperate with a grooved bar 4 forming part of a carriage 5 in which a platen 6 is mounted. I have shown a type bar 7 in the act of printing against the front face of the platen

6. The carriage is power driven, being drawn across the machine by the usual spring drum 8. Said carriage has a feed rack 10 mounted on the ends of arms 11 which are pivoted at 12 to the carriage 5 and are pressed down by springs 13. The rack 10 meshes with the usual feed pinion 14 rigidly mounted on the front end of a shaft 15 which is journaled in the bracket 16 mounted on the top plate 1. On the rear end of the shaft 15 is mounted an escapement wheel 17 which is rigidly secured on said shaft by means of a set screw 18 threaded through the hub of the wheel. The top plate 1 is formed with a suitable opening, as shown, into which the wheel 17 partly extends and through which the feed dogs work.

The feed dogs are mounted on a bracket 20 which is here shown with an angle-branch 21 that is secured to the underside of the top plate by means of screws 22. A lever 23 is pivoted to the bracket 20 by means of a screw 24, said lever having an approximately horizontal arm, to the free end of which is pivoted the upper end of a link 25, the lower end of which is connected with the universal bar of the typewriter and with the space key in such a manner that whenever one of the keys is operated this link is pulled downward. The lever 23 has an upstanding arm 26 which constitutes one of the feed dogs, said arm being formed with a nose 27 adapted, when the link 25 is drawn downward, to engage and hold one of the teeth of the wheel 17, as shown in Fig. 3. The lever 23 is normally held back, as shown in Fig. 2, by means of a spring 28 which is connected at one end to the lever and at the other end to a square screw-threaded rod 30 which passes through a square hole in an ear 31 of the bracket 20 and has a thumb-nut 32 threaded thereon and pressing against said ear. The threads on the screw 30 are of course mainly or wholly on the corners of said screws but this is sufficient to enable the tension of the spring 28 to be regulated by means of the thumb-nut 32.

The spring 28 holds the dog 26 normally out of engagement with the wheel. Said wheel is normally engaged by a dog 33 having a nose or hook 34 at its free end for engagement with the teeth of the wheel 17. The dog 33 is pivoted at 35 to a link or lever 36 which in turn is pivoted to the bracket

20 on a screw 37. The lever 36 preferably consists of two plates spaced apart and connected together by the pin 35 and by another pin 38, said pin 35 serving as a pivot for the dog 33 and the pin 38 serving as a connection for one end of a spring 40, the other end of which is connected to the lower end of an irregular-shaped lever 41 which is pivoted to the bracket 20 at the left of the dog 26, as shown in Fig. 2, on a screw 42. This lever 41 is a guide for the free end of the dog 33. To this end, said lever has a slot 43 therein into which a pin 44 projects from the side of the dog. The tension of the spring 40 tends to raise the free end of this lever 41 and to move the dog 33 into engagement with the escapement wheel and hold it there as shown in Fig. 2. Said lever has a horizontal part 45 that lies beneath a pin 46 projecting from an arm of the lever 23 in such position that when the link 25 is drawn downward to the position shown in Fig. 3, said pin 46 draws the lever 41 downward and withdraws the dog 33 from engagement with the escapement wheel at the same time that the dog 26 is thrown into engagement with said wheel. When said dog 33 is thus drawn out of engagement with the wheel the spring 40, acting on the lever 36, throws said lever back to the position shown in Fig. 3 where it is arrested by a buffer consisting of a felt or other non-resonant washer 47 secured by a screw 48 to the bracket 20. When the key is released and the link 25 rises under the impulse of the spring 28 and also under the impulse of the carriage spring, as will be explained presently, the lever 41 is raised by the spring 40 and moves the dog 33 into the path of one of the teeth of the escapement wheel. When the dog 26 is entirely out of engagement with said escapement wheel the latter rotates under the impulse of the main spring of the carriage and one of its teeth, engaging the dog 33, carries said dog with it, the pin 44 moving along the slot 43 until said dog can move no farther, when the parts are arrested, as shown in Fig. 2.

It will be observed that when the parts stand as shown in Fig. 2, the dog 33 and the upper arm of the lever 36 constitute in effect the two links or members of a toggle or knee-joint. The tension of the carriage spring is tending to straighten this joint and the tension of the spring 40 is tending to break it. Said spring 40 is a light spring and its tension is weak so that the joint straightens out to a certain extent but does not come entirely straight. It is of course theoretically impossible to pull a toggle entirely straight where there is any appreciable force resisting the turning of one of the links of the toggle. When a tooth of the escapement wheel strikes the dog 33, said dog at first offers only a very slight re-

sistance to the motion of the escapement wheel but as the link 36 approaches nearer and nearer to a dead center position the resistance very rapidly increases until at last it becomes greater than the power of the carriage spring. The escapement wheel is thus stopped by the gradual approach of the link to a dead center position, said link having a light spring resisting its motion. The escapement wheel is thus stopped by a force which is at first slight but which in the latter part of the motion of the wheel rapidly increases until it becomes of such power that the carriage cannot overcome it. The shock of arrest of the escapement wheel and carriage therefore is cushioned. There is no severe shock or jar and no sound of a blow as there is with an ordinary escapement. It has been found that this dead centering method of stopping the escapement rack very greatly diminishes the noise made by the escapement. It will of course be seen that this principle of connecting the stepping dog of the escapement with a pivoted link in such a way that the rack is arrested by bringing said link to a position approaching a dead center position, can be embodied in a wide variety of forms, and my invention is not limited to the specific construction shown.

The buffer 47 is not absolutely essential; in fact, I have constructed escapements on this principle in which there was no stop at all for the lever 36 but in which the motion of said lever, under the impulse of the spring corresponding to the present spring 40, was arrested merely by virtue of the fact that said spring 40 came to a dead center position. It will be seen in Fig. 3 that if the said stop or buffer were removed the lever 36 could move only a short distance farther under the impulse of the spring 40. In the specific form of construction shown in the present instance I have preferred to show this buffer because the slot 43 is here closed at both ends and the buffer avoids allowing the pin 44 to strike against the end of said slot, which would make a slight clicking noise.

The escapement wheel shown in the drawings has twelve teeth and when said wheel is at rest one of these teeth stands, as shown, almost directly beneath the shaft 15. If the dog 26 engaged the third tooth from the one referred to, it would move into and out of engagement on a line parallel with the radius of the wheel, and said wheel would be stationary during the motion of said dog as long as the dog was at all in engagement with the tooth. I prefer, however, to make the dog 26 engage the second tooth from the one vertically under the shaft 15 so that this dog does not move radially into engagement with the tooth but moves at such an angle that, when the wheel

is freed from the stepping dog 33, the tension of the carriage spring tends to move the dog 26 to disengaging position and to raise the universal bar and the key. With this construction, when the key begins to rise and the holding dog to move out of engagement with the wheel, the wheel begins to turn immediately without waiting for the dog to become entirely disengaged, and said wheel quickens the return stroke of the universal bar and connected parts. This makes a more elastic and a more rapid escapement.

For some of the purposes of my invention the escapement wheel 17 may be loosely mounted on the shaft 15 and connected therewith by the pawl and ratchet mechanism commonly employed for the purpose, so that when the carriage was drawn to the right to begin a new line the wheel would stand still and the shaft 15 could turn by virtue of the pawl and ratchet connection. I prefer, however, to mount the wheel 17 rigidly on the shaft, as above described, and to allow the stepping dog 33 to snap over the teeth of the wheel when the latter turns in reverse direction. As soon as the wheel begins to turn in the direction of the arrow in Fig. 4, the dog 33 moves back to the right-hand end of the slot 43, as shown in said figure, said dog being so moved by the spring 40. Each tooth of the wheel striking on the inclined side of the nose or hook 34, cams said hook downward, rocking the dog about its pivot 35 and, through the pin 44, depressing the lever 41 against the tension of its spring 40. When the carriage is fully restored to the right and is released to the action of its driving spring, the wheel 17 turns in the direction indicated by the arrow in Fig. 2 until the dog 33 is restored to the position shown in said Fig. 2, which is the normal position of the parts.

By the word "escapement" as used in the claims I refer to a device for controlling the feed of a power driven carriage, as distinguished from a force feed; and by the term "knee joint" I mean two devices jointed together and one of them anchored and arranged to be moved to a dead-center position or to a position approaching a dead-center position.

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

1. In a typewriting machine, the combination of a power driven carriage, and escapement mechanism for controlling the feed of said carriage, said mechanism including a rack and a toggle arranged to be moved by said rack to a position approaching a dead-center position, to lessen the shock and noise due to the operation of said escapement mechanism.

2. In a typewriting machine, the combination of a power driven carriage, and es-

capement mechanism for controlling the feed of said carriage, said mechanism including a rack and a toggle arranged to be moved by said rack to a position approaching a dead-center position, to lessen the shock and noise due to the operation of said escapement mechanism, and a spring tending to move said toggle away from dead-center position.

3. In a typewriting machine having a power driven carriage and an escapement for controlling the feed of said carriage, said escapement comprising a rack and a movable dog, the combination with said dog of a link arranged to be moved to a position approaching a dead-center position by the pressure of a tooth of said rack against said dog, to reduce the shock and noise due to the operation of said escapement.

4. In a typewriting machine having a power driven carriage and an escapement for controlling the feed of said carriage, said escapement comprising a rack and a movable dog, the combination with said dog of a link pivoted to said dog and to the framework, so that the link and the dog constitute the two members of a knee-joint arranged to be moved by the pressure of a rack-tooth to a position approaching a dead-center position.

5. In a typewriting machine having a power driven carriage and an escapement for controlling the feed of said carriage, said escapement comprising a rack and a movable dog, the combination with said dog of a link pivoted to said dog and to the framework, so that the link and the dog constitute the two members of a knee-joint arranged to be moved by the pressure of a rack-tooth to a position approaching a dead-center position, and said dog having a hooked end that engages the teeth of the rack.

6. In the carriage escapement of a typewriting machine, the combination with a rack, of a stepping dog consisting of a floating bar or link, a second link pivoted to the framework and to said dog so that said dog and second link together constitute a knee-joint, and a guide for the free end of said dog.

7. In the carriage escapement of a typewriting machine, the combination with a rack, of a stepping dog consisting of a floating bar or link, a second link pivoted to the framework and to said dog so that said dog and second link together constitute a knee-joint, a guide for the free end of said dog, and means for moving said guide toward and from said rack in the operation of said escapement.

8. In the carriage escapement of a typewriting machine, the combination with a rack, of a stepping dog consisting of a float-

ing bar or link, a second link pivoted to the framework and to said dog so that said dog and second link together constitute a knee-joint, and a guide for the free end of said dog, said dog normally engaging said rack and said guide being free to yield to permit said rack to be moved backward.

9. In the carriage escapement of a typewriting machine, the combination with a rack, of a movably mounted holding dog, operating means connected with said holding dog, a stepping dog consisting of a floating bar or link, a second link pivoted to the framework and to said stepping dog so that said stepping dog and said second link together constitute a knee-joint, and means whereby the engagement and disengagement of said stepping dog are controlled by said holding dog.

10. In the carriage escapement of a typewriting machine, the combination with a rack, of a movably mounted holding dog, operating means connected with said holding dog, a stepping dog consisting of a floating bar or link, a second link pivoted to the framework and to said stepping dog so that said stepping dog and said second link together constitute a knee-joint, a pivoted guide for the free end of said stepping dog, and means whereby said guide is controlled by said holding dog to effect the engagement and disengagement of said stepping dog.

11. In the carriage escapement of a typewriting machine, the combination with a rack, of a movably mounted holding dog, operating means connected with said holding dog, a stepping dog consisting of a floating bar or link, a second link pivoted to the framework and to said stepping dog so that said stepping dog and said second link together constitute a knee-joint, a pivoted guide for the free end of said stepping dog, a spring acting on said guide to move said stepping dog to engaging position, and means whereby said holding dog, when operated, moves said guide to withdraw said stepping dog from said rack, said guide being free to be moved against the tension of its spring when said rack is moved backward.

12. In the carriage escapement of a typewriting machine, the combination with a rack, of a stepping dog consisting of a floating bar or link, a second link pivoted to the framework and to said dog so that said dog and second link together constitute a knee-joint, spring means for moving said dog into engagement with said rack but adapted to yield when said rack is moved backward, a holding dog, means for operat-

ing said holding dog, and means whereby said holding dog when moved into engagement with said rack moves said stepping dog out of engagement.

13. In a typewriting machine, the combination of a power driven carriage, and escapement mechanism therefor comprising a feed rack, a coöperative feed or stepping dog, and means for controlling the letter-space movement of said feed dog, said controlling means comprising a pivoted device on which the stepping dog pulls and which is approximately dead centered at the termination of the letter feed movement of the stepping dog.

14. In a typewriting machine, the combination of a power driven carriage, and escapement mechanism therefor comprising a feed rack, a coöperative feed or stepping dog, and means for controlling the letter-space movement of said feed dog, said controlling means comprising a pivoted link on which the stepping dog pulls and which is approximately dead centered at the termination of the letter feed movement of the stepping dog.

15. In a typewriting machine, the combination with a power driven carriage, of an escapement comprising a rack and a movable dog, and a pivoted link so connected with said dog and with the stationary framework as to be brought by the pressure of said rack on said dog to a position approaching a dead center position, to lessen the shock and noise due to the operation of said escapement.

16. In a typewriting machine, the combination of a power driven carriage, an escapement rack, a holding dog normally out of engagement with said rack, a stepping dog normally in engagement with said rack, a link arranged to be moved to or toward a dead center position by the pressure of a tooth of said rack against said stepping dog, and means for engaging and disengaging said dogs with and from said rack alternately, said dogs being mounted for motion in the plane of movement of said rack and said holding dog moving in a line at an oblique angle to the path of movement of the coöperating rack tooth, whereby said rack tends to force said dog out of engagement.

Signed at Bridgeport, in the county of Fairfield and State of Connecticut, this 25th day of February, A. D. 1910.

JOHN T. SCHAAFF.

Witnesses:

JOHN F. DOWLING,
GEO. C. WRIGHT.