

No. 617,798.

Patented Jan. 17, 1899.

W. G. BABCOCK.

TYPE WRITER.

(Application filed May 27, 1898.)

(No Model.)

Fig. 2.

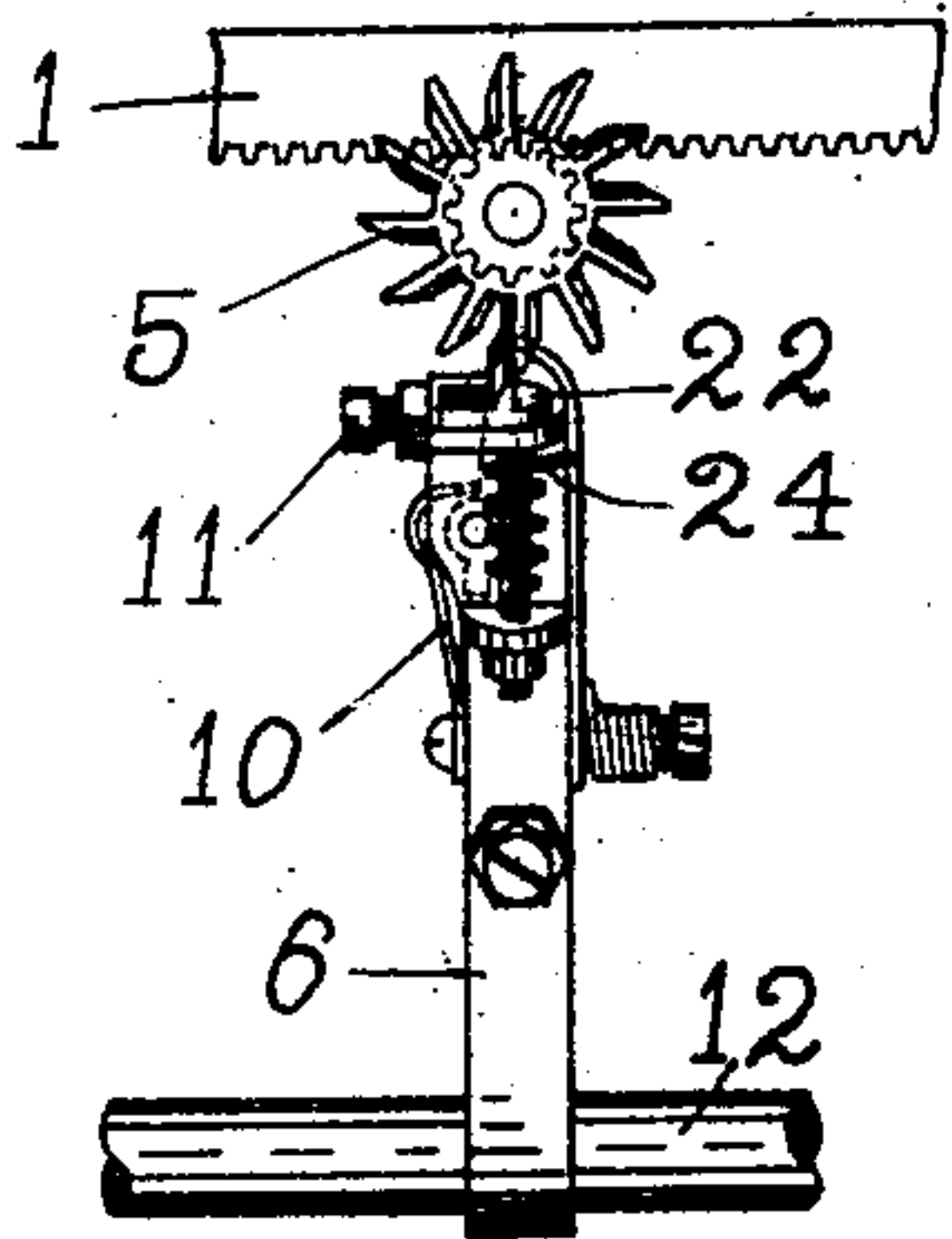


Fig. 1.

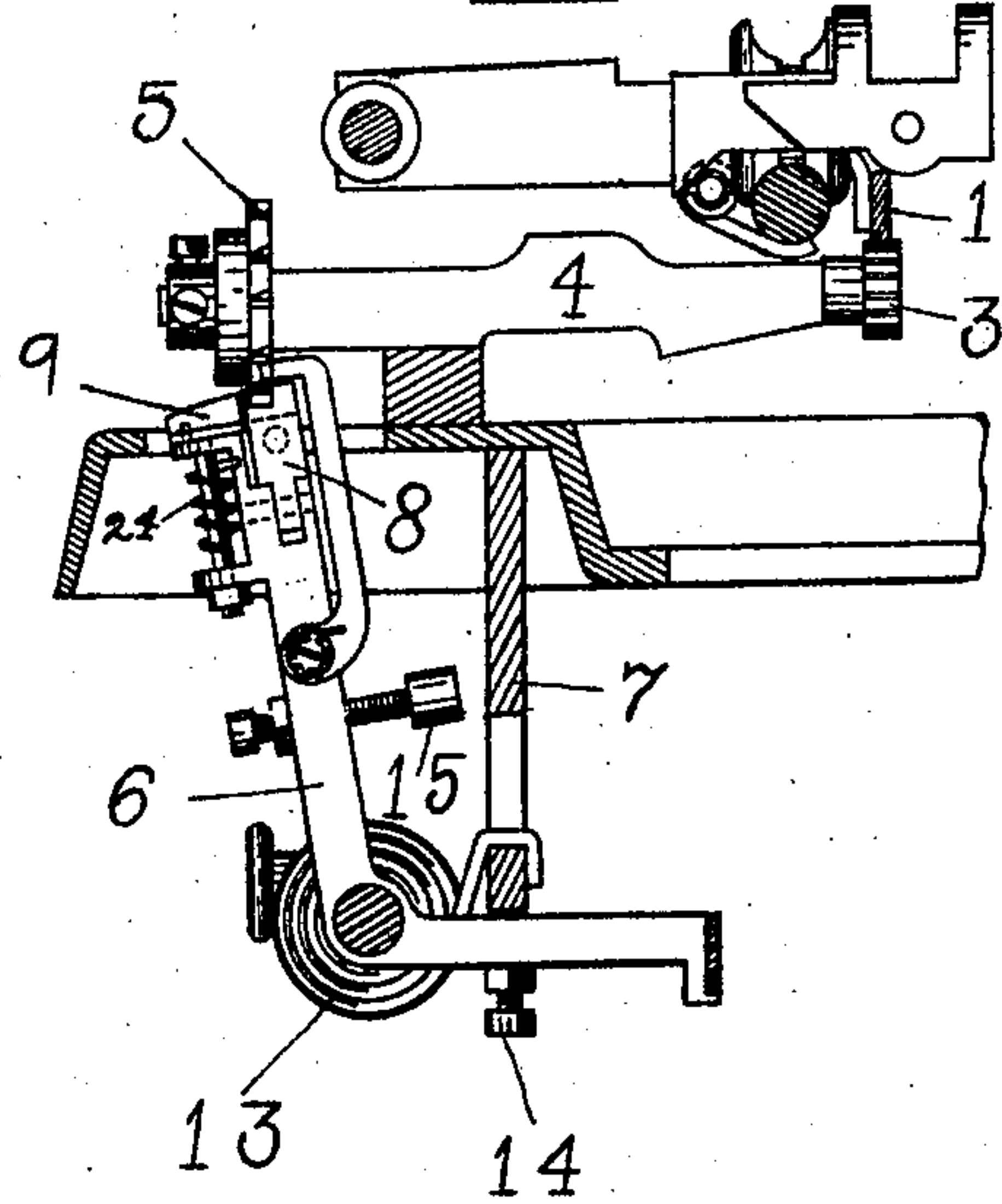


Fig. 3.

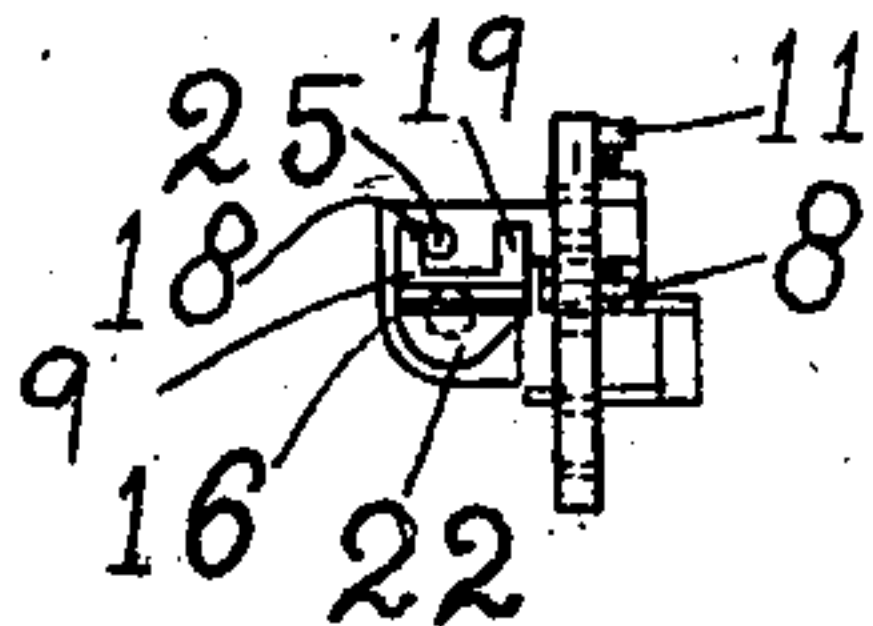


Fig. 4.

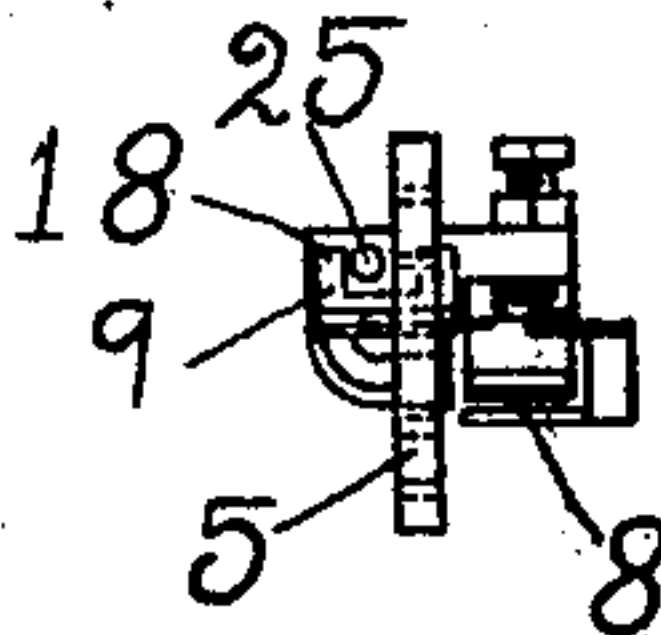


Fig. 5.

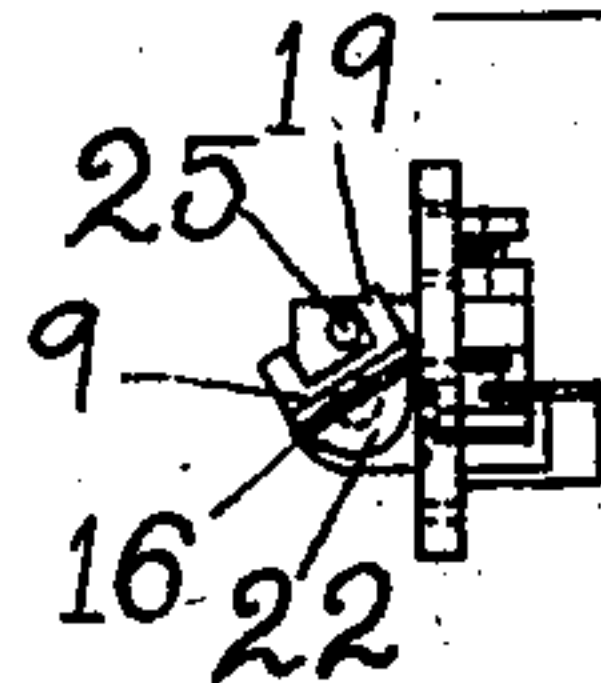


Fig. 6.

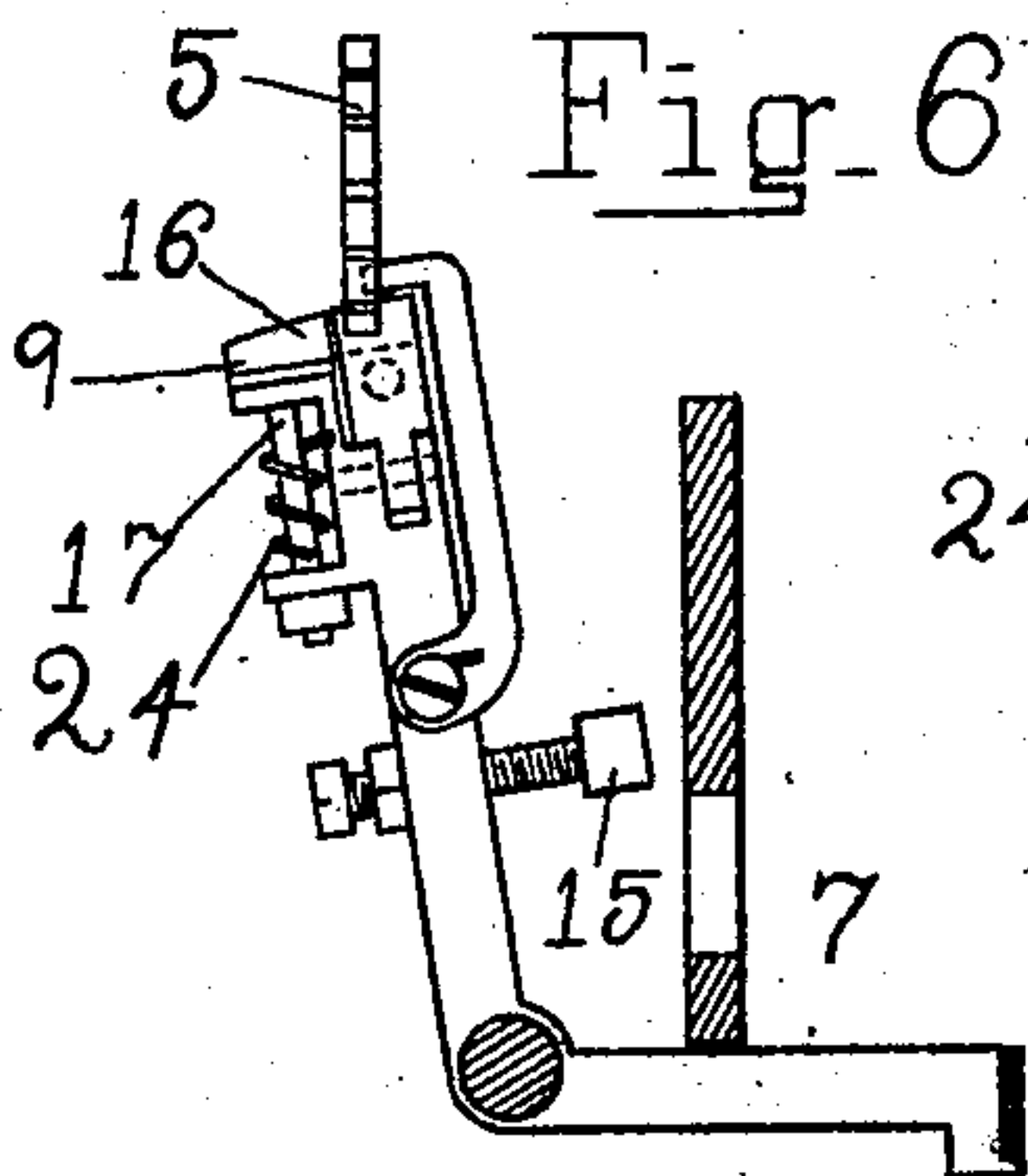


Fig. 7.

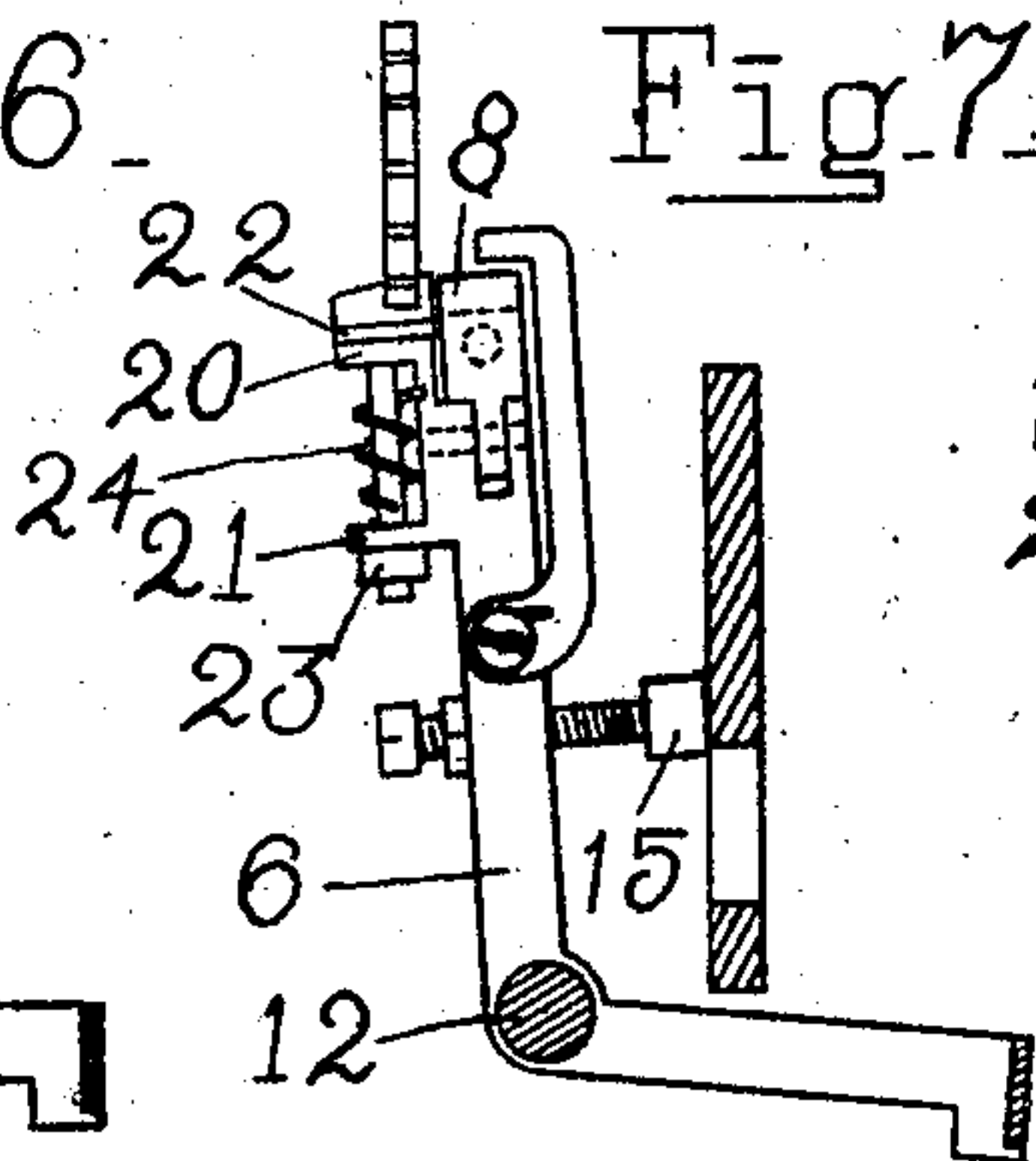
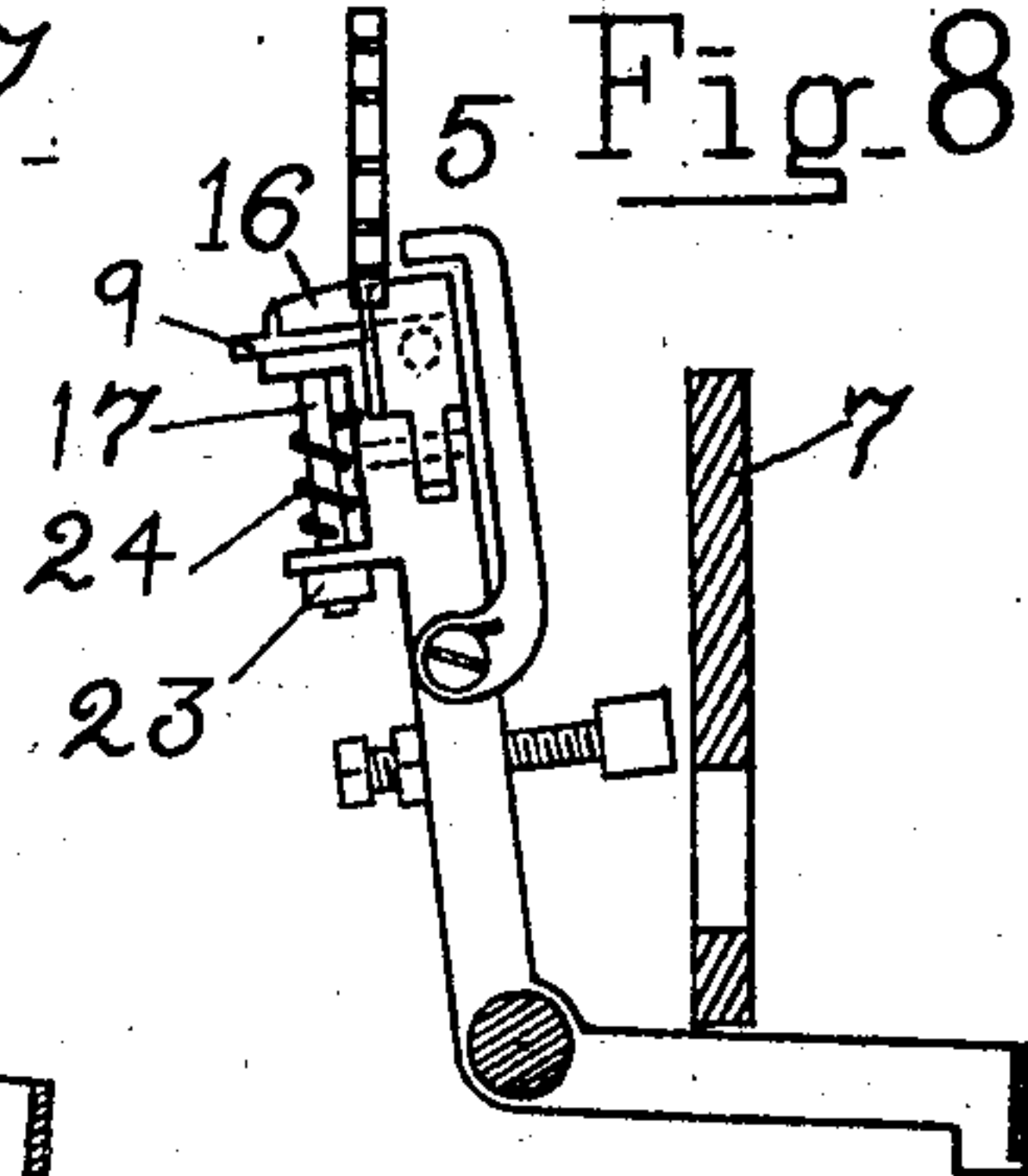


Fig. 8.



WITNESSES

Edward J. O'Connor  
Charles H. Bell

INVENTOR

William G. Babcock  
By Frederick W. Hillard  
ATTORNEY



# UNITED STATES PATENT OFFICE.

WILLIAM GRAHAM BABCOCK, OF NEW YORK, N. Y., ASSIGNOR TO FREDERIC W. HILLARD, OF SAME PLACE.

## TYPE-WRITER.

SPECIFICATION forming part of Letters Patent No. 617,798, dated January 17, 1899.

Application filed May 27, 1898. Serial No. 681,919. (No model.)

*To all whom it may concern:*

Be it known that I, WILLIAM GRAHAM BABCOCK, a resident of New York, in the borough of Brooklyn, county of Kings, and State of New York, have invented certain new and useful Improvements in Type-Writers, of which the following is a specification.

My invention is an improvement in the escapement mechanism of type-writing machines; and it consists in a device for increasing the speed of the carriage and for reducing the force necessary to operate the escapement.

In the accompanying drawings, which form a part of this specification, I have shown my invention applied to a Remington type-writer of the general style shown and described in United States Patents to George B. Webb, No. 599,428, dated February 22, 1898, and to Louis P. Diss, No. 599,417, dated February 22, 1898; but a workman skilled in type-writer construction will readily adapt the invention to each of the various styles of type-writing machines known to the art. I have shown an escapement-wheel cooperating with my improved device; but any other style of rack is equally adapted to cooperate therewith—as, for instance, a straight rack. I use the terms “rack” and “escapement-wheel” interchangeably herein, the former being generic and the latter specific and included within the genus “rack.” In the claims where I employ the term “rack” I intend to include within the meaning of that term escapement-wheels and all known styles of racks. In the machine which I show the paper is mounted upon and feeds with the carriage; but of course my invention is applicable to other carriages—as, for example, those which support and feed the printing mechanism.

In the drawings only such parts are shown as are necessary to illustrate my invention.

Figure 1 is a vertical cross-section of the rear part of the type-writer, taken through the escapement mechanism. Fig. 2 is a view of a portion of the escapement mechanism seen from the rear of the machine at right angles to Fig. 1. Figs. 3, 4, and 5 are positional top views of certain parts of the escapement. Figs. 6, 7, and 8 are positional side

views corresponding, respectively, to Figs. 3, 4, and 5.

The feed-rack 1 is mounted on the carriage 2 and engages with pinion 3. The pinion is fastened to the inner end of a shaft journaled in bracket 4, and the escape-wheel 5 is mounted on the outer end of the shaft. Escape-wheel 5 is referred to broadly in the accompanying claims by the term “rack.” The dog-rocker 6 is pivoted on dependent bracket 7. The dog-rocker is provided with two pivoted dogs 8 and 9, which alternately engage and disengage with the escapement-wheel, so as to permit the escapement-wheel to rotate step by step under the impulse of the mainspring (not shown) and thus feed the carriage. Dog 8 engages with the escapement-wheel during the normal unused condition of the machine. This dog is of the usual style and spring-pressed in the usual manner by spring 10. So long as dog 8 is engaged with the escapement-wheel it is drawn to the limit of its forward movement in contact with screw 11.

Dog 9 is normally out of engagement with the escapement-wheel. Upon depression of any type-key (not shown) for printing the dog-rocker is rotated on its axis 12 and the dogs are moved inward, so that dog 8 is disengaged from the escapement-wheel and dog 9 simultaneously engaged therewith. Dog 8 is then spaced backward by spring 10 away from screw 11 and into position for reengagement with the next succeeding tooth of the escapement-wheel as soon as the type-key is released. All of the above parts (excepting dog 9) are of the usual style and operate in the usual manner, and there is the usual open space between the adjacent edges of the two dogs.

In the above description I have stated that dog 8 is spaced forward by the mainspring into contact with screw 11 and backward by spring 10 into position for reengagement with a succeeding tooth. By the “forward spacing” of the dog I mean the direction in which it is moved by the mainspring or other carriage-propelling power, and by its “backward spacing” I mean its movement in the direction opposite to that in which it is spaced by the mainspring. The same definitions will also



apply to the swiveling or spacing of dog 9 on the dog-rocker, which swiveling will be hereinafter fully described.

From the above definitions it will be seen that I apply the terms "forward" and "backward" to the movements of the dogs upon their pivots. The dog-rocker also has the usual inward and outward movement on the machine by rotation on its axis 12, as above described. Normally or in the unused condition of the machine the dog-rocker is moved by spring 13 to the limit of its outward movement with stop-screw 14 in contact with bracket 7 and dog 8 engaged with the escapement-wheel. The escapement members are then in engagement. When a type-key is depressed, the dog-rocker is moved to the limit of its inward movement, so that buffer-stop 15 contacts with bracket 7, dog 8 is disengaged from the escapement-wheel, and dog 9 engaged therewith. The escapement members are then disengaged.

The terms "engaging" and "disengaging" members of the escapement as used herein are intended to include an escapement wherein one of the two members has two elements, as, say, the two dogs in the drawings. The term "engagement" designates the normal engagement of the members when the machine is at rest, and the term "disengagement" designates the relation of the members opposite thereto. To illustrate, the members are engaged in Fig. 1 and they are disengaged in Fig. 7.

My invention comprises dog 9 and the parts connected thereto and operative therewith. These will now be fully described and their mode of operation clearly pointed out. Dog 9 consists of the rack-engaging part 16 and the pivotal shaft 17. It also comprises the banking-stops 18 and 19, which limit its movement in either direction on the dog-rocker. The rack-engaging part 16, the shaft 17, and the banking-stops 18 and 19 are all formed in one piece. The dog is journaled on the dog-rocker in bearings 20 and 21, which are cast integral with the dog-rocker and are bored out to receive shaft 17. The dog is provided with a flange 22, between the rack-engaging part 16 and the shaft 17, which rests on top of journal 20 and supports the dog thereon. A collar 23 is secured on shaft 17 below journal 21 by a pin or in any other suitable manner to prevent the dog from accidentally being lifted up out of its proper position on the dog-rocker. The shaft 17 is encircled by spiral spring 24. This spring is fastened at its lower end to the shaft by passing through a small hole drilled in the shaft to receive it or in any other suitable manner, and its upper end rests against the outer edge of the dog-rocker. (See Fig. 2.) The spring is so tensioned that it tends to swivel the dog or rotate it in its journals to the limit of its backward movement with the banking-stop 18 in contact with the banking-pin 25, which pin is inserted in the top of journal 20 to en-

gage with banking-stops 18 and 19 to limit the forward and backward movement of dog 9 on the dog-rocker.

The operation of the parts is as follows: Dog 8 normally engages with the escapement-wheel, as is shown in Figs. 1, 2, 3, and 6. Dog 9 is at the limit of its backward movement on the rocker in position to engage with the tooth of the escapement-wheel that is occupied by dog 8. Upon the depression of a type-key the rocker is rotated on its axis 12, so that dog 8 is moved inward until disengaged from the escapement-wheel, and simultaneously dog 9 is engaged therewith. The pull of the mainspring is then immediately transmitted through the carriage 2, rack 1, pinion 3, and escapement-wheel 5 to dog 9 and tends to swivel the dog on its axis 17 to the limit of its forward movement on the rocker, with banking-stop 19 in contact with pin 25. If the dog-rocker is vibrated so far inward that any part of the tooth of the escapement-wheel is in line with the center of the pivot-shaft 17, the pull of the mainspring cannot swivel dog 9 forward, being opposed and prevented from doing so by shaft 17; but whenever the escapement-wheel is engaged with any part of dog 9 wholly inside of the center line of shaft 17 it tends to swivel the dog forward on the dog-rocker, so that banking-stop 18 will be disengaged from its contact with pin 25 and banking-stop 19 engaged therewith, as shown in Fig. 5. When banking-stop 18 and pin 25 are in contact, the dog is at the limit of its backward movement on the rocker, and when banking-stop 19 and pin 25 are in contact the dog is at the limit of its forward movement on the rocker. During the disengaging movement of dog 9 from the escapement-wheel as the escapement-wheel approaches nearer and nearer to the inner edge of the dog the mainspring exerts a constantly-increasing pressure to move the dog to the limit of its forward movement. This is so because the leverage from the center line of shaft 17 to the point of contact with the escapement-wheel is constantly increasing, with a resultant increase of the leverage acted on by the mainspring to move the dog. The spring 24 exerts a constant light pressure to maintain dog 9 at the limit of its backward movement on the rocker, with banking-stop 18 in contact with banking-pin 25, and consequently the escapement-wheel has to engage with the dog at some little distance inside of the pivotal line of shaft 17 before the mainspring can exert sufficient pressure to overcome the tension of spring 24 and move banking-stop 19 into engagement with pin 25.

In order to obtain the best results as to speed of the carriage-feed and lightness of action of the escapement, the distance between the outer edge of dog 8 and the center line of shaft 17 should be slightly greater than the width of the teeth of the escapement-wheel and buffer-stop 15 should be so adjusted that the dog-rocker cannot be moved



inward far enough to quite bring the outer edge of the escapement-wheel to the center line of shaft 17. If the parts are made and adjusted as above indicated, the carriage will start forward slightly during the downstroke of the type-keys, the banking-stop 18 starting slightly away from pin 25, as shown in Fig. 4, during the printing stroke, and as soon as the key is released dog 9 will be spaced to the limit of its forward movement, the pressure of the mainspring overcoming the light backward pressure of spring 24. The carriage moves forward with the escapement-wheel while dog 9 is being disengaged until the dog is wholly disengaged, and then it is free to finish its letter-space-feeding movement and is brought to rest by the contacting of dog 8 with stop-screw 11 in the usual manner. It is also apparent that during the disengagement of dog 9 from the escapement-wheel the inclined face which the dog presents to the escapement-wheel acts as a camming-surface, whereby the pull of the mainspring is utilized, in conjunction with the spring 13, to restore the dog-rocker to its normal position or, in other words, to reengage the escapement members.

Attention is called to the fact that if the outer edge of dog 8 and the center line of shaft 17 are too far apart relatively to the width of the escapement-wheel there will be so much feed of the carriage prior to the printing that there is apt to be a blur in the print. The distances chosen should preferably be such that while the liability of blurring is not too great the mainspring may be brought into action at all parts of the feeding movement that dog 9 is engaged with the escapement-wheel, so as to space dog 9 forward and to cam the spacing-rocker backward, as above described. With the assistance of my invention, if preferred and if the parts are properly balanced and the distances properly adjusted, the spring 13 may be discarded altogether and the mainspring alone utilized to reengage the escapement members after the printing.

Attention is also called to the fact that, while increasing the distance between the outer edge of dog 8 and the center line of pivot-shaft 17 increases the liability to blur the print, it also increases the speed of the carriage-feed. Hence these distances may be differently adjusted to suit the preferences of different operators. Another method of increasing the speed of the carriage-feed consists in so adjusting the two dogs relatively to one another that each dog may perform any desired portion of that feed. I have provided adjusting-screw 11 for this purpose. This screw may be so adjusted that at the end of the printing stroke at the instant of printing the carriage will be in the same position that it was in at the beginning of the printing stroke, or it may be so adjusted that at the end of the printing stroke the carriage may have fed one-fourth, or one-half, or any other desired portion of its letter-space feed;

but if the screw 11 is set so that the carriage is free to feed through any great part of the letter-space prior to the printing, then, while the speed of the escapement and of the carriage is increased, the danger of blurring the print is also proportionally increased, as above described.

Another feature to which I wish to call attention is that the carriage may be spaced backward by the aid of dog 9 as well as forward. As is customary, dog 8 is disengaged from the escapement-wheel at about the middle or, later, in the printing stroke of the type-keys. Under these circumstances one of two things must happen—either the carriage will be fed forward, carrying the escapement-wheel and dog 9 with it, until banking-stop 19 contacts with pin 25, and then during the remainder of the printing stroke the carriage will be cammed backward, the escapement-wheel traveling backward along the inclined face of dog 9, presented to it, or else the printing stroke must be so quick that the carriage will have very little time to space forward. Therefore if the legato or improper printing stroke is used the carriage will first feed forward and then backward, but will be in the proper position at the instant of printing, whereas if the staccato or proper printing stroke is used the carriage will be in the proper position at the instant of printing and will be instantly partially released and the mainspring will be utilized to aid in restoring all the moving parts to their normal positions. The action of the mainspring or other carriage-propelling power also imparts a repulsive effect to the type-key, which greatly assists the operator in lifting his finger after the printing stroke.

The feature of swiveling a dog while it is in engagement with the rack and of thereby causing it to present an inclined face to the rack, whereby the means employed to effect the swiveling (as, say, the carriage-propelling power) is utilized to disengage the dog from the rack and to feed the escapement and the carriage and also to retract them and to impart an impulse to the key to lift it, &c., I believe to be broadly new. Heretofore fixed dogs have been in use in type-writer escapements having two faces—viz., a face in a plane at right angles to the direction of the escapement feed and a beveled edge. With that style of dog the rack and carriage are held stationary during the printing by the engagement of the rack with the plane face of the dog, and after the printing the carriage and the escapement are partially released for their feeding movement by the engagement of the rack with the beveled edge during the disengagement of the dog from the rack. This has resulted in a light-running and speedy escapement; but in using the same the difficulty is encountered that the beveled dog, being fixed on its holder and immovable thereon, is apt to butt against the sides of the rack-teeth in fast work. This is because



the carriage does not always have time to feed through the whole of the letter-space after the release of one key and before the blow on another. My herein-described improvement obviates this difficulty by giving to the normally-disengaged dog an independent swiveling movement on the dog-rocker, whereby the dog spaces backward as soon as it is wholly disengaged from the rack. Hence in my escapement the carriage feeds forward and simultaneously the dog swivels backward while they are disengaged from each other, and consequently the dog is brought into position for reengagement with the next tooth of the rack more rapidly than it is possible to position the fixed beveled-edge dogs heretofore in use.

I have shown the rack-engaging face of dog 9 in a plane which cuts directly across the center line of pivot-shaft 17. In case the dog is made in this manner it is advisable to bevel the edges of the teeth of the escapement-wheel for the reason that after dog 9 is disengaged from the wheel while it is swiveling backward it closes in or narrows down the distance between itself and dog 8, and consequently unless the edges of the teeth are beveled the dog in swiveling backward throws down onto the teeth. If it is not desirable to bevel the edges of the rack-teeth which engage with the dog, the difficulty above mentioned can be readily overcome by forming the rack-engaging face of the dog off from the center line of the pivot to right of that line on flange 22 in Fig. 2.

In this specification and in the claims I use the terms "feeding movement of the escapement" and "feeding movement of the carriage." By "feeding movement of the carriage" I refer to the step-by-step advancement of the carriage for letter-spacing. The "feeding movement of the escapement" also refers to the step-by-step advancement of feeding member of the escapement in letter-spacing. In the escapement of course only one of the members is fed, and therefore the term "feeding movement of the escapement" does not signify necessarily any advancement of the escapement as a whole, but only the advancement of such parts or that member of the escapement which advances in conjunction with the carriage to effect the letter-space feed for printing.

I also believe the invention of pivoting a dog on its holder and providing it with a limited movement thereon and positioning it so that its free end faces the rack and providing means to move the holder so that the dog can be moved bodily toward and into engagement with the rack, first the free end and then the pivoted end, to be broadly new. The construction is such that one and the same dog performs the function of a detaining-dog in holding the carriage during the printing and the functions of a camming-dog in retracting the carriage prior to the printing and in reengaging the escapement members after

the printing and the function of the spacing-dog in permitting feed of the carriage by yielding on its axis to the pull of the mainspring.

The action of the mainspring or other carriage-propelling power hereinbefore referred to for restoring or starting back to their normal positions all of the moving parts connected with and operated from the keys is fully described and broadly claimed in United States patent to F. W. Hillard, No. 580,281, dated April 6, 1897, and the action of said propelling power in retracting the carriage and reversing the escapement-feed is fully described and broadly claimed in patent to said Hillard, No. 554,874, dated February 18, 1896. I therefore do not claim these features broadly herein, but I claim them specifically in combination with my above-described carriage-controlling obliquely-swiveling feeding-dog.

I intend that buffer-stop 15 shall be so adjusted as to perform the function of a "repulser," as described by said Hillard in his Patent No. 577,982, dated March 2, 1897. In order to accomplish this result, the buffer-stop should be so adjusted as to contact with bracket 7 slightly before the type-key is fully depressed. Its result is then to prevent any further vibration of the dog-rocker 6, so that in order to fully depress the key the key-lever has to be flexed and, then, owing to its resiliency, the key-lever becomes a repulser and tends to lift the key and to restore the printing member or type-bar (which is connected with the key in the usual manner) to its normal position.

Having thus described my invention and without limiting myself to the details shown, what I claim, and desire to secure by Letters Patent, is—

1. In a type-writer escapement, the combination of a rack, and an escapement mechanism therefor having a movable dog adapted to alternately engage and disengage with the rack, said dog being so disposed as to present its rack-engaging face in one plane for engagement with the rack, and having a limited swiveling movement, and means whereby when it is engaged with the rack it is caused to swivel and thereby present its said face to the rack in another plane, which said other plane is oblique to the direction of the feeding movement of the escapement, substantially as described.

2. In a type-writer escapement, the combination of a rack, and an escapement mechanism therefor having a normally-disengaged movable dog adapted to alternately engage and disengage with the rack, said dog being so disposed as to present its rack-engaging face in one plane for engagement with the rack, and having a limited swiveling movement, and means whereby when it is engaged with rack it is caused to swivel and thereby present its said face to the rack in another plane, which said other plane is oblique to the direction of the feeding movement of the escapement and permits of a partial feed of



the escapement while the dog is being disengaged from the rack, substantially as described.

3. In a type-writer escapement, the combination of a rack, an escapement mechanism therefor having a normally-disengaged movable dog adapted to alternately engage and disengage with the rack, said dog being so disposed as to present its rack-engaging face in one plane for engagement with the rack, and having a limited swiveling movement, means whereby the dog when it is engaged with the rack is caused to swivel and thereby present its said face to the rack in another plane, which said other plane is oblique to the direction of the feeding movement of the escapement and means tending to prevent the swiveling of the dog whereby the said swiveling means operates to disengage said dog from the rack, substantially as described.

4. In a type-writer escapement, the combination of a rack, an escapement mechanism therefor having a movable dog adapted to alternately engage and disengage with the rack, said dog being normally disengaged and so disposed as to present its rack-engaging face in one plane for engagement with the rack, and having a limited swiveling movement, a key for engaging said dog with the rack, and means whereby when the dog is engaged with the rack it is caused to swivel and thereby present its said face to the rack in another plane, which said other plane is oblique to the direction of the feeding movement of the escapement so that the escapement may be fed in a reverse direction by a further depression of the key after the dog has been swiveled, substantially as described.

5. In a type-writer escapement, the combination of a rack, an escapement mechanism therefor having a movable dog adapted to alternately engage and disengage with the rack, said dog being normally disengaged and so disposed as to present its rack-engaging face in one plane for engagement with the rack, and having a limited swiveling movement, a key for engaging said dog with the rack, means whereby when the dog is engaged with the rack it is caused to swivel and thereby present its said face to the rack in another plane, which said other plane is oblique to the direction of the feeding movement of the escapement and means tending to prevent the swiveling of the dog whereby after the dog has been swiveled the force of the swiveling means is transmitted through the escapement to the key and operates to lift the key, substantially as described.

6. In a type-writing machine, the combination of a power-driven carriage, and an escapement to control the feed thereof comprising a rack and escapement mechanism therefor having a pivoted, spring-pressed dog which is normally out of engagement with the rack but is adapted to engage therewith, said dog being so disposed as to normally present its engaging face to the rack in a plane substan-

tially at right angles to the direction of the feeding movement of the escapement, and having a limited swiveling movement, whereby when it is engaged with the rack the carriage-propelling power causes it to swivel on its axis and thereby present its said face to the rack in a plane oblique to the direction of the feeding movement of the escapement, substantially as described.

7. In a type-writer escapement, the combination of a rack, and an escapement mechanism therefor having a swiveling dog adapted to alternately engage and disengage with the rack, said dog being provided with a limited movement and positioned with its swiveling end facing the rack, means for moving the dog bodily toward and into engagement with the rack, first its swiveling end and then its pivotal part, whereby the pivotal part controls the rack when the rack and the dog are fully engaged, and the swiveling end permits a feeding movement of the escapement while the rack and the dog are being disengaged from each other, substantially as described.

8. In a type-writing machine, the combination of a power-driven carriage, and an escapement to control the feed thereof comprising a rack which feeds in conjunction with the carriage, and an escapement mechanism therefor having a pivoted, spring-pressed dog that is normally out of engagement with the rack but is adapted to engage therewith, said dog being positioned with its spring-pressed end facing the rack, means for moving the dog bodily toward and into engagement with the rack, first its spring-pressed end and then its pivotal part, whereby the pivotal part controls the carriage when the rack and the dog are fully engaged, and the spring-pressed end yields to the force of the carriage-propelling power and thereby permits a feeding movement of the carriage while the rack and the dog are being disengaged from each other, substantially as described.

9. In a type-writer escapement, the combination of two engaging members, one of which comprises an element that normally engages with the other member and a normally-disengaged element, and a carriage-controlling obliquely-swiveling feeding-face on the normally-disengaged element, substantially as described.

10. In a type-writer escapement, the combination of two engaging members, one of which comprises an element that normally engages with the other member and a normally-disengaged element, and a carriage-controlling obliquely-swiveling feeding-face on the normally-disengaged element, which swiveling face is wider than the normally-engaged part of the other member, substantially as described.

11. In a type-writer escapement, the combination of two engaging members, one of which comprises an element that normally engages with the other member, a normally-disengaged element with a carriage-controlling obliquely-



swiveling feeding-face adjacent to the normally-engaged element, and an open space between the two said elements, said swiveling face and open space together being wider than the width to which the normally-engaging element enters into the other member.

12. In a type-writer escapement, the combination of two engaging members, one of which comprises an element that normally engages with the other member and that is provided with a carriage-holding face parallel with the holding face or faces with which it engages in the other member, a normally-disengaged element, and a carriage-controlling obliquely-swiveling feeding-face on the normally-disengaged element, substantially as described.

13. In a type-writer escapement, the combination of two engaging members, one of which comprises an element that normally engages with the other member, and that is provided with a carriage-holding face parallel with the holding face or faces with which it engages in the other member, a normally-disengaged element, and a carriage-controlling obliquely-swiveling feeding-face on the normally-disengaged element, which swiveling face is wider than the normally-engaged part of the other member, substantially as described.

14. In a type-writer escapement, the combination of two engaging members, one of which comprises an element that normally engages with the other member and that is provided with a carriage-holding face parallel with the holding face or faces with which it engages in the other member, a normally-disengaged element with a carriage-controlling obliquely-swiveling feeding-face adjacent to the normally-engaged element, and an open space between the two said elements, said swiveling face and open space together being wider than the width to which the normally-engaging element enters into the other member.

15. In a type-writer escapement, the combination of two engaging members which can be disengaged and reengaged, one of which comprises an element that is normally out of engagement with the other member but is adapted to engage therewith, and is provided with an engaging face parallel with the corresponding engaging face or faces of the other member, means for engaging said element with the other member, and means for swiveling the engaging face of said element into an oblique position relatively to the said face or faces of the other member, the construction and operation being such that said element holds the escapement under control while it is fully engaged with the other member, but permits a gradual feeding movement of the escapement during the disengagement of said element from the other member, substantially as described.

16. In a type-writing machine, the combination of an escapement, a key to operate the escapement, a printing member, a connection between the key and the printing member whereby the printing member is operated by

the key to effect the printing, a carriage that is spaced under control of the escapement, a carriage-controlling obliquely-swiveling feeding element for releasing the carriage during the disengagement of said element from the other member of the escapement, means for advancing the carriage when so released, and a connection between the carriage-advancing means and the printing member, through the escapement and the key, whereby the printing member is started toward normal position by aid of the carriage-advancing means, substantially as described.

17. In a type-writing machine, the combination of an escapement, a key to operate the escapement, a repulser for the key, a carriage that is spaced under control of the escapement, a carriage-controlling obliquely-swiveling feeding element for releasing the carriage during the disengagement of said element from the other member of the escapement, means for advancing the carriage when so released, and a connection between the carriage-advancing means and the key, through the escapement, when the key is depressed, whereby the key is started back to its raised position by aid of the carriage-advancing means and the repulser, substantially as described.

18. In a type-writing machine, the combination of an escapement, a key to operate the escapement, a repulser for the key, a type-bar, a connection between the key and the type-bar whereby the type-bar is operated by the stroke of the key to effect the printing, a carriage that is spaced under control of the escapement, a normally-disengaged carriage-controlling obliquely-swiveling feeding-dog for releasing the carriage during the disengagement of said dog from the rack member of the escapement, a carriage-mainspring for advancing the carriage when so released, and a connection between the carriage-mainspring and the key and the type-bar, through the escapement, when the key is depressed, whereby the key is raised and the type-bar started back to normal position by aid of the carriage-mainspring and the repulser, substantially as described.

19. In a type-writer escapement, the combination of two engaging members, one of which comprises an element that normally engages with the other member and a normally-disengaged element, a carriage-controlling obliquely-swiveling feeding-face on the normally-disengaged element, and means for adjusting the portion of the escapement-feed performed under control of each of said elements, substantially as described.

20. In a type-writer escapement, the combination of a dog-rocker, a pivoted dog mounted thereon with a limited movement, an impulse-spring which spaces the dog backward on the rocker, means for vibrating the rocker and for thereby engaging the dog with the rack member of the escapement, first the free end and then the pivotal end of the dog, whereby



when the dog is fully engaged with the rack the said impulse-spring resists the carriage-propelling power and holds the dog in its backward position, but the carriage-propelling power overcomes the impulse-spring and spaces the dog forward while the dog is being disengaged from the rack member, substantially as described.

21. In a type-writer the combination with a spaced member and an escapement comprising two members, the one member having a rack and the other member having a moving part which is engaged with and disengaged from the rack, of means for moving the spaced member in one direction and the moving part in the escapement mechanism in the one direction, which means are antagonistic during the engagement of the said rack and part, the means for moving the spaced member acting upon the moving member of the escapement mechanism, and tending to move it with a force varying at different periods of the said engagement, substantially as described.

22. In a type-writer the combination with a carriage and an escapement therefor comprising a rack and a dog which is engaged with and disengaged from the rack, of a carriage-propelling spring which acts upon the dog when the rack is in engagement therewith, and tends to move it with a force varying at different periods of the engagement, and an impulse-spring acting upon the dog in opposition to the carriage-spring, substantially as described.

23. In a type-writer escapement, the combination of two engaging members, one of which can be spaced step by step, and one of which is provided with a moving part that engages

with and is disengaged from the other member, means for feeding the spaced member in one direction, means for spacing the said moving part in one direction, which means are antagonistic during the engagement of the said moving part and other member, the means for feeding the spaced member acting upon the moving part and tending to move it with a force varying at different periods of the said engagement, substantially as described.

24. In a type-writer escapement the combination with a spaced member and an escapement mechanism having a swiveled dog therein which is engaged with and disengaged from the spaced member, of a mainspring for the spaced member, and an impulse-spring holding the swiveled dog rearwardly against the tension of the mainspring when the dog and spaced member are in full engagement, substantially as described.

25. In a type-writer escapement the combination with a spaced member and an escapement mechanism having a swiveled dog therein, which is engaged with and disengaged from the spaced member, of a mainspring for the spaced member and an impulse-spring acting when the dog and spaced member are in engagement upon the dog to oppose and neutralize the mainspring, dependent upon the point of engagement between the dog and the spaced member, substantially as described.

Signed by me in New York city this 26th day of May, 1898.

WILLIAM GRAHAM BABCOCK.

Witnesses:

HAMILTON SENIOR,  
GEORGE H. GILMAN.