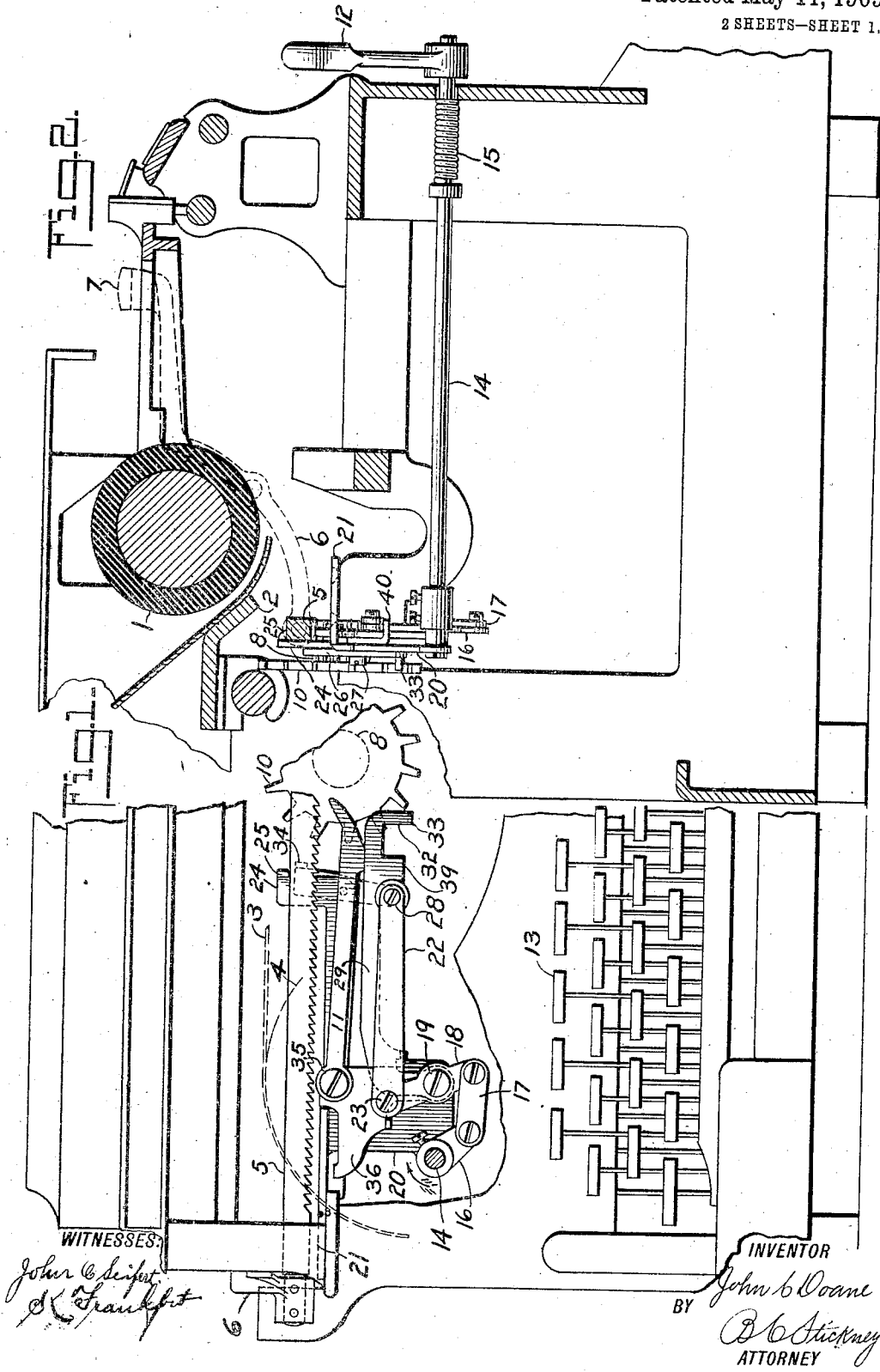


921,598.

J. C. DOANE.
TYPE WRITING MACHINE.
APPLICATION FILED MAR. 11, 1908.

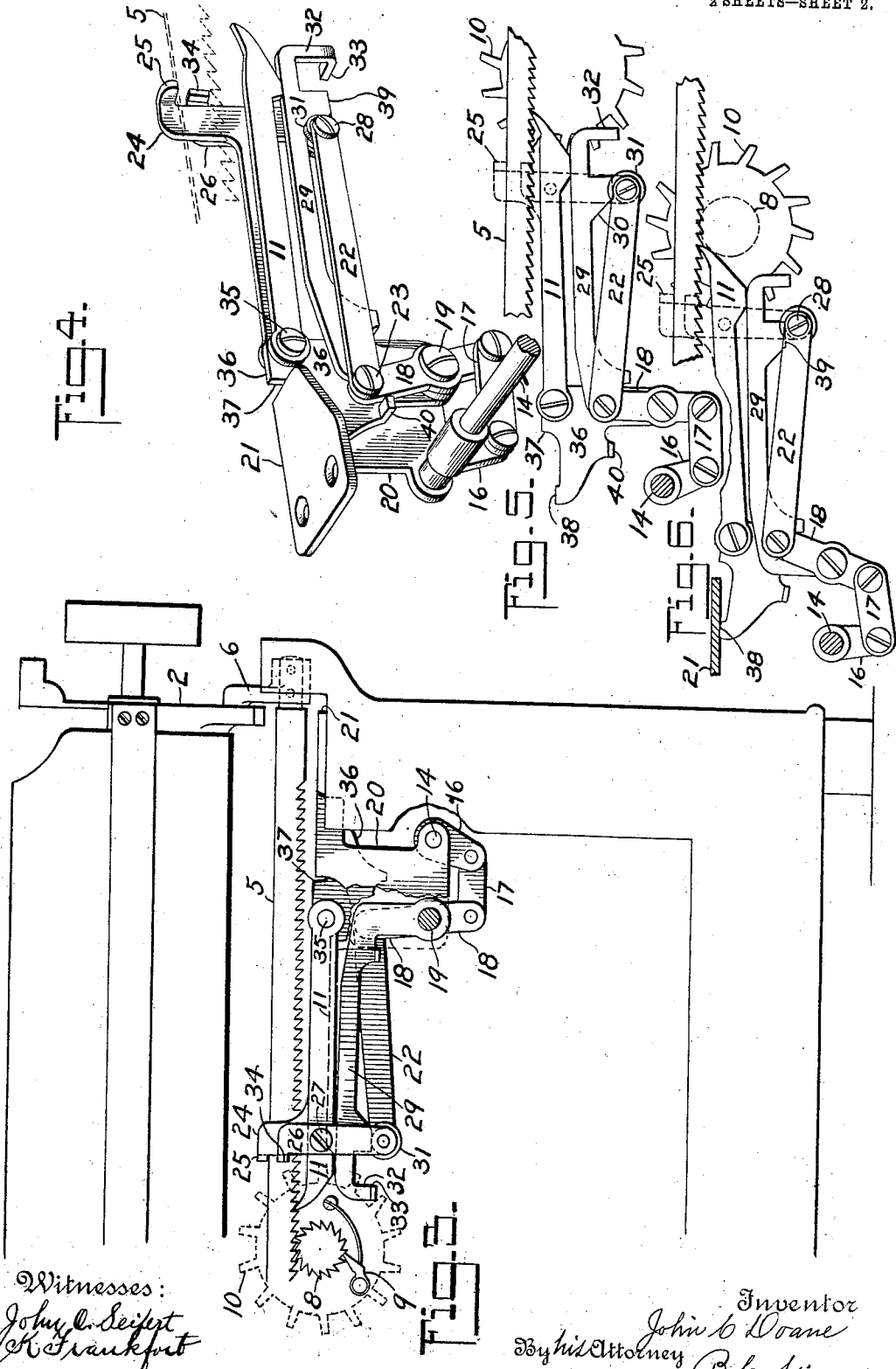
Patented May 11, 1909.
2 SHEETS—SHEET 1.



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2 SHEETS—SHEET 2.



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UNITED STATES PATENT OFFICE.

JOHN C. DOANE, OF HARTFORD, CONNECTICUT, ASSIGNOR TO UNDERWOOD TYPEWRITER COMPANY, OF NEW YORK, N. Y., A CORPORATION OF NEW JERSEY.

TYPE-WRITING MACHINE.

No. 921,598.

Specification of Letters Patent.

Patented May 11, 1909.

Application filed March 11, 1908. Serial No. 420,336.

To all whom it may concern:

Be it known that I, JOHN C. DOANE, a citizen of the United States; residing in Hartford, in the county of Hartford and State of Connecticut, have invented certain new and useful Improvements in Type-Writing Machines, of which the following is a specification.

This invention relates to the mechanism in typewriting machines by which the power-driven carriage is moved or spaced backwardly a single space by manipulating a finger-piece usually mounted on the machine frame near the keyboard. This operation is usually performed by means of a pawl, which is normally disengaged from the rack of the usual mechanism which controls the letter-feeding movements of the carriage; and by means of said finger-piece the pawl is moved into engagement with the rack and caused to set the latter back a step.

It sometimes happens, that when the finger-piece is given a sharp blow, the carriage is set so rapidly in backward motion that it jumps back two or more spaces; whereas it is desired that the carriage shall move back only a single space in all cases. This objection is experienced more especially in those machines in which the rack is liftable to clear it from the remainder of the escapement mechanism. Such a rack is very easily jarred up, and is quite liable to ride back over the tip of the back-spacing pawl, thereby tending to render the back-spacing mechanism impracticable.

One of the principal objects of my invention is to overcome this difficulty, and to arrest the rack and carriage positively, even though a quick movement is given to the back-spacing key or finger-piece.

In carrying out my invention, I contrive to arrest the back-spacing pawl positively at the completion of said driving movement, and at the same time to lock said pawl positively in engagement with the rack by means of a locking device which is supported upon the rack itself, whereby the rack is entirely prevented from jumping away from or riding back over the tooth of the pawl. The preferred means for effecting this result comprises a cam operated by said finger-piece to raise the pawl into engagement with the rack and hold it there positively, until the pawl

and rack are arrested by the stop, said cam having a support upon the rack itself. Said support is loosely mounted upon the framework to permit it to rise and fall with the rack, when the latter is manipulated both to release the carriage and afterward to drop into mesh with the pinion.

My invention is illustrated as applied to the well-known Underwood typewriting machine, in which the carriage rack meshes with a pinion, and the latter by means of a pawl drives an escapement wheel. When the carriage is set back by the back-spacing mechanism, the rack turns said pinion backwardly, and there is more or less tendency for the escapement wheel to turn back with the pinion, whereby the action of the back-spacing mechanism is rendered uncertain.

One of the objects of my invention is to overcome this difficulty, which is done by means of a back-check connected to said finger-piece and moved thereby against a tooth of the escapement wheel.

Other features and advantages will hereinafter appear.

In the accompanying drawings, Figure 1 is a front view showing sufficient of an "Underwood" front strike typewriting machine to illustrate my improvements; the parts being shown in normal positions. Fig. 2 is a sectional elevation taken from front to rear of the machine. Fig. 3 is a rear elevation illustrating the back-spacing pawl in engagement with the rack. Fig. 4 is a front perspective of the back-spacing mechanism in normal position. Fig. 5 is a front elevation showing the pawl elevated into engagement with the rack. Fig. 6 is a view similar to Fig. 5, but showing the completion of the back-spacing movement.

The platen 1 is mounted upon a carriage 2 connected by a strap 3 with a spring-barrel 4. Upon the carriage is provided a rack 5 hinged by means of arms 6 upon the carriage, one of the arms being extended at 7 to form a release key, whereby the rack may be lifted to release the carriage from the control of its escapement mechanism. A small pinion 8 is normally in mesh with the rack to be driven thereby, and by means of a pawl 9 drives an escapement wheel 10 of relatively large diameter; the pawl 9 permitting the pinion and rack to run backward inde-

pendently of the escapement wheel 10 during the return of the carriage to begin a new line.

The back-spacing of the carriage is effected by means of a pawl 11 which normally stands below the rack 5. The pawl is lifted and driven by means of a finger-piece or key 12 arranged at the front of the machine over the key-board 13, and fixed upon the forward end of a rock shaft 14, which is provided with a returning spring 15.

When the key 12 is operated, the shaft and the arm 16 on the rear end thereof are swung in the direction of the arrow, Fig. 1, to cause a link 17 to vibrate a lever 18 from the Fig. 1 to the Fig. 6 position. The lever 18 turns upon a stud 19, which projects from a bracket 20 having a flange 21, whereby it is secured upon the side of the machine frame. Said movement of the lever 18 drives toward the right a link 22, one end thereof pivoted at 23 to the top of said lever, and the other end thereof performing various functions now to be described. The right hand end of said link 22 is loosely connected to and supported upon a rider 24, which has a lug 25 to catch over the top of the rack bar 5, and rides freely thereon during the longitudinal movements of the bar. By means of the support afforded by said rider, said link is enabled to move the pawl 11 up into engagement with the rack and hold it there. The upward movement of the pawl is effected during the first part of the motion of the link; and the driving movement of the pawl is effected during the last part of the link movement. Said link 22 has a loose connection to the rider 24 in the form of a hanger 26 pivoted at 27 upon said rider, and at its lower end having a stud 28, which serves as a pivot for the link.

The pawl 11 is supported by a rest 29 in the form of an arm pivoted upon the stud 19 and formed with a cam 30 to be engaged by a grooved roll 31 upon said link stud 28; to enable the link 22 as it moves toward the right, Fig. 5, to lift said rest 29 and the pawl 11.

The rest is formed with an extension 32 having a tooth 33 to engage one of the teeth of the escapement wheel 10 and check the backward movement of the latter. The tooth 33 is normally below the escapement wheel, as at Fig. 1, so as not to interfere with the movements thereof.

While the link is elevating the rest 29 and the pawl 11, the hanger 26 swings idly about its pivot 27, until a lug 34 on the hanger is arrested by contact with the side edge of the rider 24, so that during the remainder of the movement of the link 22, said hanger and rider move together as if made in one piece. The rider is pivoted upon the same screw 35 that pivots the pawl 11 to a rocker 36, the latter also pivoted upon the stud 19 and having stops 37 and 38 to limit its vibration; the

stop 37 determining the normal position of the rocker.

During the final portion of the movement of the link 22 to the right from Fig. 5 to Fig. 6 position, the grooved roll 31 rides along a dwell 39 forming the terminal portion of the cam 30, thereby supporting the pawl in the rack; and at the same time said link acting through the hanger 26, drags the rest 24 to the right and rocks the rocker 36, thereby driving the pawl 11 and hence moving the rack 5 backwardly together with the carriage 2, a distance in excess of the pitch of the rack teeth, to allow for back lash of the various parts of the escapement mechanism, but not sufficient to permit the carriage to come to rest finally at more than a single space back of its original position.

The pawl is arrested by means of the stop 38 on the rocker 36, said stop contacting with the underside of the flange 21 of bracket 20, as at Fig. 6. At the time that the pawl is arrested, it is locked up positively into engagement with the rack by means of the dwell portion 39 of the cam; or in other words the rack and pawl are confined between the rider lug 25 and the link stud 28, so that there can be no possible separation of the rack from the pawl, and hence the rack cannot jump backwardly over the pawl, but is positively brought to rest by the stop 38.

Upon releasing the finger-piece 12, the spring 15 returns to normal positions the rock-shaft, the link 22 and the remaining parts; the lever 18 acting upon a lug 40 to return the rocker 36 to normal position, Fig. 4.

When the rack 5 is lifted by the key 7, the rider 24 rises idly with it, together with the other members of the linkage.

Variations may be resorted to within the scope of the invention, and portions of the improvements may be used without others.

Having thus described my invention, I claim:

1. In a typewriting machine, the combination with a power-driven carriage and an escapement mechanism including a rack; of a back-spacing mechanism including a pawl, a finger-piece, a cam operable by the finger-piece to cam the pawl into engagement with the rack and hold it there during the backward movement of the rack, and means also operated by said finger-piece to drive the pawl backwardly after its movement into engagement with the rack.

2. In a typewriting machine, the combination with a power-driven carriage and an escapement mechanism including a rack, of a back-spacing mechanism including a pawl, a movable rest upon which said pawl may slide, a finger-piece, means operable by the finger-piece to cam the rest toward the rack to carry the pawl into engagement with the rack, and means subsequently operated by

said finger-piece to drive the pawl backwardly to back space the carriage; a dwell being provided to enable said finger-piece to lock said rest in effective position during the backward movement of the pawl.

3. In a typewriting machine, the combination with a power-driven carriage and an escapement mechanism including a rack, of a back-spacing mechanism including a pawl, a finger-piece connected thereto to drive the rack backwardly, and a movable device also operated by the finger-piece to lock the pawl in engagement with the rack during the rack-driving operation.

4. In a typewriting machine, the combination with a power-driven carriage and an escapement mechanism including a rack, of a back-spacing mechanism including a pawl, a finger-piece connected thereto to drive the rack backwardly, a stop to arrest the driving movement of the pawl, and means also operated by the finger-piece to effect locking of the pawl with the rack at the rack-arresting operation.

5. In a typewriting machine, the combination with a power-driven carriage and an escapement mechanism including a rack, of a back-spacing mechanism including a pawl, a finger-piece, a cam operable by the finger-piece to cam the pawl into engagement with the rack and hold it there during the backward movement of the rack, means also operated by said finger-piece to drive the pawl backwardly after its movement into engagement with the rack, and a stop to arrest the driving movement of the pawl and to cooperate with said camming means to lock the carriage against overthrow.

6. In a typewriting machine, the combination with a power-driven carriage and an escapement mechanism including a rack, of a back-spacing mechanism including a pawl, a rest upon which said pawl may slide, a finger-piece, a cam operable by the finger-piece to move the rest toward the rack to carry the pawl into engagement with the rack, means subsequently operated by said finger-piece to drive the pawl backwardly to back space the carriage, and a stop to arrest the driving movement of the pawl; a dwell being provided to enable said finger-piece to hold said rest in effective position during the backward movement of the pawl, and to cooperate with said stop to prevent overthrow of the rack.

7. In a typewriting machine, the combination with a power-driven carriage and an escapement mechanism including a rack, of a back-spacing mechanism including a pawl, a rocking-arm to which said pawl is pivoted, stops to limit the throw of said arm, a lever controlled by a finger-piece, a link pivoted on said lever and extending along said pawl, and having means to lift the pawl into engagement with the rack and hold it there,

and means for enabling said lever to rock said arm to drive the rack back.

8. In a typewriting machine, the combination with a power-driven carriage and an escapement mechanism including a rack, of a back-spacing mechanism including a pawl, a rocking-arm to which said pawl is pivoted, stops to limit the throw of said arm, a lever controlled by a finger-piece, means for enabling said lever to lock said pawl in engagement with the rack at the backward movement of the latter, and means for also enabling the lever to rock said arm to drive the rack back.

9. In a typewriting machine, the combination with a releasable carriage rack bar, of a back-spacing pawl, a finger-piece to drive the pawl, a stop for the pawl, and means having a bearing on said rack bar for locking the pawl in engagement with the rack to prevent overthrow of the rack when the pawl is arrested by said stop.

10. In a typewriting machine, the combination with a releasable carriage rack bar, of a back spacing pawl, a finger-piece to drive the pawl, a stop for the pawl, and means connected to said finger-piece and having a support upon said rack bar for camming said pawl into engagement with the rack and holding it there when it is arrested by said stop.

11. In a typewriting machine, the combination with a releasable carriage rack bar, of a back-spacing pawl, a stop for said pawl, a lever operated by a finger-piece, a pawl-driving link pivoted to said lever and extending along the rack and having a support upon the rack, and a cam operated by said link to lock said pawl in engagement with the rack when the pawl is arrested by the stop.

12. In a typewriting machine, the combination of a releasable carriage rack bar, a back-spacing pawl, a stop for said pawl, a pawl-driving link connected at one end to a finger-piece and having at the other end a support upon the rack, and means operated by said link at its rack-supported end to lock said pawl in engagement with the rack when the pawl is arrested by the stop.

13. In a typewriting machine, the combination of a releasable carriage rack bar, a back-spacing pawl, a stop for said pawl, and a pawl-lock supported upon the rack to lock the pawl in engagement with the rack when the pawl is arrested by the stop.

14. In a typewriting machine, the combination with a releasable carriage rack bar, of a back-spacing pawl, a stop for said pawl, and a pawl-driver supported upon the rack and having means to cam the pawl into engagement with the rack and lock it there when the pawl is arrested by the stop.

15. In a typewriting machine, the combination of a carriage rack bar, a back-spacing pawl, a stop for said pawl, a rocker on

which said pawl is pivoted, a rider pivoted at one end on said rocker and at its other end supported upon said rack, and a pawl-driver loosely connected to said rider and having means to lock the pawl in engagement with the rack.

16. In a typewriting machine, the combination of a carriage rack bar, a back-spacing pawl, a stop for said pawl, a rocker on which said pawl is pivoted, a rider pivoted at one end on said rocker and at its other end supported upon said rack, a link driven by a finger-piece and loosely connected to said rider, and a cam to cooperate with said link and rider to lock the pawl in engagement with the rack when arrested by said stop; means being provided to enable said link to rock said rocker by means of said rider and thereby drive said pawl.

17. In a typewriting machine, the combination of a carriage rack bar, a back-spacing pawl, a rocker on which said pawl is pivoted, a rider pivoted at one end on said rocker and at its other end supported upon said rack, a link driven by a finger-piece and loosely connected to said rider, and a cam to cooperate with said link and rider to lock the pawl in engagement with the rack when arrested by said stop; means being provided to enable said link to rock said rocker by means of said rider and thereby drive said pawl, said rocker having a stop to arrest the back-spacing movement of said pawl.

18. In a typewriting machine, the combination of a carriage rack bar, a back-spacing pawl, a rocker on which said pawl is pivoted, a rider pivoted at one end on said rocker and at its other end supported upon said rack bar, a lever driven by a finger-piece, a link pivoted upon said lever and loosely connected to said rider, a cam being provided between said link and pawl to enable the link to lift and hold the pawl in engagement with the rack; means being provided to enable said link to cause said rider to operate the rocker after the pawl is lifted into mesh with the rack, and said rocker provided with a stop to arrest the back-spacing movement of the pawl.

19. In a typewriting machine, the combination of a carriage rack bar, a back-spacing pawl, a rocker on which said pawl is pivoted, a rider pivoted at one end on said rocker and at its other end supported upon said rack bar, a lever driven by a finger-piece, a link pivoted upon said lever and loosely connected to said rider, a pivoted rest for said pawl, said rest provided with a cam engageable by a bearing on said link to enable the link to lift and hold the pawl in engagement with the rack, means being provided to enable said link to cause said rider to operate the rocker after the pawl is lifted into mesh with the rack, and said rocker provided with a

stop to arrest the back-spacing movement of the pawl. 65

20. In a typewriting machine, the combination with a power-driven rack and an escapement mechanism therefor, including a pinion to mesh with the rack, and an escapement wheel connected by a pawl to the pinion, of a back-spacing pawl caused by a finger-piece to engage the rack, and a back-check moved by said finger-piece to engage said escapement wheel. 70

21. In a back-spacing mechanism for typewriting machines, the combination of a back-spacing pawl to engage the carriage rack, a lock to engage the escapement wheel, and means for synchronously moving the pawl and lock into action. 75

22. In a back-spacing mechanism for typewriting machines, the combination of a pawl to back space the carriage, means to lock the escapement, and means for driving the pawl independently of the said lock, to back space the carriage while the lock is in action. 80

23. In a back-spacing mechanism for typewriting machines, the combination of a rocker, a pawl mounted thereon, a swinging rest for the pawl, a lifter for said rest, and means to move the rocker after the movement of said rest. 85

24. In a back-spacing mechanism for typewriting machines, the combination of a rocker, a pawl mounted thereon, a swinging rest for the pawl, a lifter for said rest, means to move the rocker after the movement of said rest, and an escapement-wheel lock carried by the swinging rest. 90

25. In a back-spacing mechanism for typewriting machines, the combination of a pawl, a rest therefor, means for lifting the rest to cause the pawl to engage the rack, and means for driving the pawl while the rest remains stationary. 95

26. In a typewriting machine, the combination with a power-driven carriage and an escapement mechanism including a rack, a pinion, and a pawl-driven escapement wheel connected to said pinion, of a back-spacing mechanism including a pawl, a finger-piece, means operable by the finger-piece to cam the pawl into engagement with the rack and hold it there during the backward movement of the rack, and means also operated by said finger-piece to drive the pawl backwardly after its movement into engagement with the rack, and to lock said escapement wheel against backward movement. 100

27. In a typewriting machine, the combination with a power-driven carriage and an escapement mechanism including a rack, a pinion, and a pawl-driven escapement wheel connected to said pinion, of a back-spacing mechanism including a pawl, a finger-piece connected thereto to drive the rack 105

backwardly, and means also operated by the finger-piece to lock the pawl in engagement with the rack during the rack-driving operation, and to lock the escapement wheel against backward movement.

28. In a typewriting machine, the combination with a power-driven carriage and an escapement mechanism including a rack, a pinion, and a pawl-driven escapement wheel connected to said pinion, of a back-spacing mechanism including a pawl, a rest upon which said pawl may slide, a finger-piece, means operable by the finger-piece to move the rest toward the rack to engage the pawl with the rack, a back-check upon said rest to engage a tooth of the escapement wheel, means operated by the finger-piece to drive the pawl backwardly to back space the carriage, and a pawl stop.

29. In a typewriting machine, the combination with a power-driven carriage and an escapement mechanism including a rack, a pinion, and a pawl-driven escapement wheel connected to said pinion, of a back-spacing mechanism including a pawl, a rocking-arm to which said pawl is pivoted, stops to limit the throw of said arm, a lever controlled by a finger-piece, a link pivoted on said lever and extending along said pawl, and having means to lift the pawl into engagement with the rack and hold it there, and means for enabling said lever to rock said arm to drive the rack back; means also being provided for enabling said link to check the escapement wheel against backward motion.

30. In a typewriting machine, the combination with a power-driven carriage and

an escapement mechanism including a rack, a pinion, and a pawl-driven escapement wheel connected to said pinion, of a back-spacing mechanism including a back-spacing pawl, a rocker or member on which said pawl is pivoted, a rider supported upon the rack bar, a lever or part driven by a finger-piece, a link pivoted upon said lever and loosely connected to said rider, a movable rest for said pawl, a cam to enable the link to lift and hold the pawl into engagement with the rack and to drive the pawl endwise, a stop for the pawl, and means connected to the rest to check the escapement wheel against backward movement.

31. In a typewriting machine, the combination with a power-driven carriage and an escapement mechanism including a rack mounted for a releasing movement, of a back-spacing mechanism partly supported upon said rack and having means dependent upon such support to lock the rack against overthrow.

32. In a typewriting machine, the combination with a power-driven carriage and an escapement mechanism including a rack mounted for a releasing movement, of a back-spacing mechanism partly upon the framework of the machine and partly upon the rack, and including a pawl, a stop therefor, and means to lock the pawl and rack together when the pawl is arrested by the stop.

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