

1,054,998.

WITNESSES

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TYPE-WRITING MACHINE.

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Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, BURNHAM C. STICKNEY, a citizen of the United States, and resident of the city of Elizabeth, county of Union, and State of New Jersey, have invented certain new and useful Improvements in Type-Writing Machines, of which the following is a specification.

This invention relates to writing machines, and particularly to the mechanism for controlling the letter-feeding movements of the paper or other carriage; and its principal object is to enable the carriage to feed accurately at high speed, and to avoid liability of blurring of the type impressions.

My invention consists in certain features of construction and combinations of devices, which will be hereinafter fully described and particularly pointed out in the concluding claims.

In the drawings forming part of this specification, Figure 1 is a rear view of a portion of a type-writing machine, showing a carriage-feeding mechanism and part of a carriage, and illustrating a connection from the type-operating keys or levers to the carriage-feeding mechanism: the parts being in normal position. Fig. 2 is sectional view taken at about the line *x-x* of Fig. 1. Fig. 3 is a view of a modification. Figs. 4, 5 and 6 illustrate successive stages in the action of the feeding mechanism. Fig. 7 is a diagrammatic representation of a conventional system of typewriter type-actions.

My invention may be applied to any variety of paper or other carriage 1, propelled by means of a spring-barrel 2 and strap 3 or otherwise, and having an escapement or feeding rack 4, which may be either straight, as illustrated, or curved, as a wheel. The rack tooth or teeth may be of any suitable construction.

In engagement with the rack is a dog 5, which extends along the rack and is provided with a tooth 6 for engaging the rack teeth, and is pivoted upon gudgeons 7, which are supported one at each side of the rack upon the upstanding arms 8 of a bracket 9; said dog having upwardly extending ears 10, one at each side of the rack, which are slotted at 11 for engaging said gudgeons; said slots permitting limited play of the dog longitudinally of the rack. One ear is prolonged to form an upwardly ex-

tending arm 12, into the upper end whereof 55 hooks a draw-spring 13, the other end of which is attached at 14 to a fixture. Said spring extends longitudinally of the rack, and tends to draw the dog in the opposite direction from that in which the carriage 60 and rack are propelled by the superior spring 2; and preferably the relation of spring 13, arm 12 and dog 5 are such that the same spring also tends to press the tooth 6 into engagement with the rack teeth, the 65 body 5 and the arm 12 of the dog forming a bell-crank for this purpose. If desired, the upward movement of the dog may be limited by an overlying stop 15, supported upon a fixture 16 rising from the usual top 70 plate 17 of the typewriter, so that when the rack 4 is lifted it may become disengaged from the dog, thereby releasing the carriage.

Upon an extension 18 of the dog, over which lies said stop 15, is formed at its 75 tip a series of fine teeth 19, for engagement with a set of fine ratchet-teeth 20; all of said fine teeth extending in a direction transverse to the carriage rack 4, and the function of the ratchet teeth 20 being 80 to pull the dog down out of engagement with the rack teeth. The teeth 20 are formed upon an operating ratchet member or pawl 21 which is pivoted at 22 upon an arm 23, the latter being mounted at 24 upon 85 a hanger 25 and provided with a shoulder 27 and stop 28. The arm and pawl are operated in this instance by means of a universal-bar 29 extending transversely above upwardly movable keys or key-levers 90 30 forming parts of the printing devices, *i. e.*, the devices which operate the types or type bars; said universal bar being connected by a link 31 to a pin 32 on said arm 23, and the link being slotted at 33 where it en- 95 gages said pin, so as to permit some lost motion of the keys before the feed mechanism is operated. A draw spring 34 is attached at 35 to the ratchet member 21 between its ends, and extends diagonally to a 100 point of connection with a fixture 36, in a manner to pull down the pawl and the arm 23 after actuation, and also to press the ratchet teeth 20 toward the dog tooth or teeth 19; a stop 37 for the ratchet pawl 21 105 being provided however upon the top plate, to prevent said pawl from following the dog during the backward movement of the

latter along the rack under the influence of spring 13. The usual universal-bar spring may also be provided.

In operation, the key-levers 30 move up during the actuation of the keys for carrying the types to the printing point; and through the universal bar 29 and link 31 the arm 23 and ratchet member 21 are lifted at the last part of the stroke of each key. The ratchet teeth 20 slip up over the dog teeth 19, and at the printing moment the parts are in the Fig. 4 position, the dog 5 not being moved during the printing stroke. Upon the return stroke of the key, type and universal bar, the spring 34 pulls down the pawl, together with the dog, in opposition to the tension of the spring 13; whereby the escapement member or tooth 6 is disengaged from the cooperating escapement or rack 4, as at Fig. 5. Upon the escapement of the dog from the rack, it is instantly snapped back along the rack by the spring 13, as far as permitted by the length of the slot 11, whereby the dog teeth 19 are withdrawn from the ratchet 20, and the dog is released, so that the ratchet may finish its return stroke independently of the dog, and the latter is pressed back into reengagement with the rack 4 independently of the ratchet 20; the key-operated parts returning to normal position, and the carriage advancing under the tension of spring 2, carrying with it the dog 5 in opposition to the tension of spring 13, until the dog and carriage are arrested by the contact of the gudgeons 7 with the rear ends of the slots 11, the parts being again brought to the Fig. 1 position.

It will be seen that the dog is normally disconnected from the keys, in the sense that the keys do not affect the dog during their printing strokes, and that the period during which the dog is connected to the keys is very brief, and only sufficient to enable the dog to be disengaged from the rack; all of the subsequent operations of the dog being automatic, viz., its release from the control of the keys, its reengagement with the rack, and its return to normal position, whereby at the completion of the carriage movement, the dog is in position for re-actuation during the return-stroke of the next-operated key. By making these movements of the dog independent of the key movements, the advantage is secured of speed and certainty of operation; while by having only one rack-releasing dog-movement instead of two as in the usual construction, ease and speed of operation are insured. The dog may be provided with only one tooth 19, and a single clutch tooth may be used in place of the clutching ratchet 20; but I prefer to use the fine teeth as illustrated, because of the variations in the extent of movement of the universal-bar 29 given by the different keys; these variations

in some machines being very great. It will be seen that no matter how little or how much the pawl 21 is elevated during the key stroke, it is always at the completion of the printing stroke in engagement with the dog tooth or teeth 19, and since the teeth 20 are fine, only a short portion of the return movement of the universal-bar is used in freeing the dog tooth 6 from the rack; so that the carriage is promptly released and enabled to complete its feeding movement in time to receive the next type impression at the correct point, even at the highest speed of operation. To this end of course the tooth 6 should be formed and mounted to dip into the rack to a slight extent only, so that it can be disengaged by a short stroke. It will be perceived further, that the machine is fully adapted for slow operation, since the dog 6 holds the rack positively during the printing stroke, so that no blurring of the type impressions can occur.

At Fig. 3 the pawl or dog 5 is mounted upon an idle link 38, pivoted at 39 to ear 40 rising from the top plate 17; said link being provided with ears 41 and 42, adapted to contact with stops 43 and 44; the link permitting play of the dog longitudinally of the rack, and the stops being adjustable for limiting the extent of the play. It will thus be seen that the dog-disengaging means 20 is movable transversely of the rack and is releasable from the dog by the movement of the latter longitudinally of the rack by the spring 13; that at Fig. 4 the dog-disengaging means 20 is beginning its return stroke, and that the dog is held in engagement therewith by the rack—i. e., if the rack were pressed back at said figure, the dog would be moved by spring 13 out of engagement with the ratchet 20, so that the latter could not affect it; that the play of the dog along the rack is less than the extent of the feeding movement of the rack, that is, less than the distance between adjoining teeth 5; that the dog is self-releasing from the ratchet 20 and is self-setting to position for reengagement thereby, as distinguished from ordinary escapement mechanisms, in which both the rack-releasing and the rack-reengaging movements of the dog or dogs are controlled by the universal bar, the latter being key-controlled; that the arm 12 extends transversely of the rack 4; that the key-controlled reciprocatory member 20 is movable idly with relation to the dog during one stroke, and connectible with the dog during the other stroke, and that the dog is restored to its normal position independently of said reciprocatory member; that the means which releases the dog from said member 20 is so constructed as to be rendered effective by the rack-disengaging movement of the dog; and that the dog is released from the rack by means of a pawl-and-ratchet

mechanism, which may be made in a great variety of forms.

By the term "pawl-and-ratchet mechanism" I mean to include any equivalent clutching mechanism one member whereof is movable idle with relation to the dog during one stroke, which may be of variable extent, and always automatically connects with the dog at the initial portion of the other stroke.

Very many variations other than those above alluded to may be made within the scope of my invention in the construction, arrangement, and details of operation of the parts; and portions of my improvements may be used without others.

Having thus described my invention, I claim:

1. The combination with a power-driven carriage of an escapement rack, a single dog engageable with and disengageable from the rack and also capable of limited movement longitudinally thereof, and dog-disengaging means movable transversely of the rack and releasable from the dog by the movement of the latter longitudinally of the rack; the dog being movable to initial position by the action of said rack thereon.

2. The combination with a power-driven carriage of an escapement rack, a single dog, means for disengaging the dog from the rack, and means for causing the dog to snap back upon disengaging from the rack; the dog being releasable from said disengaging means by reason of such snapping movement, and being movable to initial position by the action of said rack thereon.

3. The combination with a power-driven carriage of an escapement rack, a single loose or yielding dog, means for disengaging the dog from the rack, and means operating automatically upon the escape of the rack from the dog, for releasing the latter from the control of said disengaging means.

4. The combination with a power-driven carriage of an escapement rack, a single loose or yielding dog, and dog-disengaging means with which the dog is held in engagement by the rack; the dog being releasable from said disengaging means.

5. The combination with a power-driven carriage of an escapement rack, a single loose or yielding dog, dog-disengaging means, and a spring for withdrawing the dog from the control of said disengaging means; the dog being movable by the rack into position for actuation by said disengaging means.

6. The combination with a power-driven carriage of an escapement rack, a single dog which is spring-pressed both into engagement with said rack and also in a direction contrary to that of the feed of said rack; and means for disengaging the dog from the rack; said dog itself being releasable from

said disengaging means by a backward movement along the rack, and being movable to initial position by the action of the rack.

7. The combination with a power-driven carriage of an escapement rack, a single dog having a play longitudinally of the rack for a distance less than the extent of feeding movement of the rack, said dog being spring-pressed both into engagement with said rack and also in a backward direction; and dog-disengaging means with which the dog is held in connection by the rack pressure upon the dog; said dog being releasable from said disengaging means by a backward movement along the rack, and being movable to initial position by the action of the rack.

8. The combination with a power-driven carriage of an escapement rack, a single dog pivotally mounted at its rear end and extending along the rack and having a tooth for engagement with the rack, means for pressing said tooth into the rack and pressing the dog in a backward direction, and means movable transversely of the rack for disengaging said dog from the rack; said dog being releasable from said disengaging means by reason of its backward movement when it escapes from the rack, and being movable to initial position by the action of the rack.

9. The combination with a power-driven carriage, of an escapement rack, a pivotally mounted yielding or loose dog which is spring-pressed both into engagement with said rack and also in a backward direction longitudinally of the rack; and an actuating member mounted for engagement with said dog to disengage the latter from the rack; said dog being mounted for backward movement along the rack and being released from the control of said actuating member by means of such backward movement, and means being provided for restoring the control of the actuating member over the dog.

10. The combination with a power-driven carriage, of an escapement rack, a single dog, a ratchet member mounted for engagement with the dog to disengage the latter from the rack, and dog-releasing means, comprising means for causing the dog to snap back for a limited distance along the rack upon escapement from the latter; the dog being movable to initial position by the action of the rack thereon.

11. The combination with a power-driven carriage of an escapement rack, a single dog, and means for forcing the dog out of engagement with the rack; said dog being spring-released from said forcing means, and set by the rack to position for reengagement by said forcing means.

12. The combination with a power-driven carriage of an escapement rack, a dog, and a ratchet member mounted for engagement

with the dog to force the latter out of engagement with the rack; said dog being spring-released from said ratchet member, and returned by the rack to normal advanced position.

13. The combination with a power-driven carriage of an escapement rack, a dog pivotally mounted at its rear end and extending along the rack and having a tooth for engagement with the rack, said dog being capable of limited play along the rack, a ratchet member for disengaging the dog from the rack, a spring which presses said tooth into engagement with the rack and also forces the dog away from said ratchet member and back along the rack when disengaged from the latter.

14. The combination with a power-driven carriage of an escapement rack, a dog pivotally mounted and extending along the rack and having a tooth for engagement with the rack, said dog being capable of a limited backward movement along the rack; means, including a ratchet member, for disengaging the dog from the rack; and means for yieldingly pressing said dog both into engagement with the rack and in a backward direction; so as to disengage the dog from the ratchet member when the latter disengages the dog from the rack.

15. The combination with a power-driven carriage of an escapement rack, a dog pivotally mounted and extending along the rack and having a tooth for engagement with the rack; a slot being provided at the pivot of the dog for permitting backward play of the dog along the rack; a ratchet member for disengaging the dog from the rack, and a spring for pressing said dog both into engagement with the rack and in a backward direction so as to disengage the dog from the ratchet member when the latter disengages the dog from the rack.

16. The combination with a power-driven carriage, of an escapement rack, a dog pivotally mounted and extending along the rack and having a tooth for engagement with the rack, and being capable of limited backward play along the rack; a ratchet member for disengaging the dog from the rack; a spring; and an arm upon said dog to which said spring is connected; said arm extending transversely of the rack and in such a direction that the pressure of the spring thereon both forces the dog into engagement with the rack and upon release of the dog from the rack forces the dog away from said ratchet member back along the rack.

17. In a typewriting machine, the combination with a power-driven carriage of an escapement rack, a dog therefor, a key-controlled reciprocatory member which moves idly with relation to said dog during one stroke, means for connecting said member with said dog during the other stroke for dis-

engaging the dog from the rack, and means for restoring the dog to its normal position independently of said reciprocatory member.

18. In a typewriting machine, the combination with a power-driven carriage of an escapement rack, a dog therefor, a key-controlled reciprocatory member which moves idly with relation to said dog during the printing stroke of the key, means for connecting said member with said dog during the return stroke of the key, to disengage the dog from the rack, and means for restoring the dog to its normal position.

19. In a typewriting machine, the combination with a power-driven carriage, of an escapement rack, a loose or yielding dog, a clutch for disengaging the dog from the rack, and means dependent upon such disengagement for effecting disengagement of the dog from the clutch.

20. In a typewriting machine, the combination with a power-driven carriage of an escapement rack, a loose or yielding dog, and a ratchet member to control the rack-releasing movement of said dog.

21. In a typewriting machine, the combination with a carriage of a rack and an escapement mechanism therefor including a dog, a ratchet member for operating said dog, and means for releasing the dog from the control of the ratchet member.

22. In a typewriting machine, the combination with a carriage of means for propelling the same, a rack, and an escapement mechanism comprising a dog, a ratchet member for operating the dog, means for releasing the dog from the control of the ratchet member, and a returning spring for the dog; said releasing means being so constructed as to be rendered effective by the rack-disengaging movement of the dog.

23. In a typewriting machine, the combination with a power-driven carriage of an escapement rack, a pivotally mounted dog which is spring-pressed both into engagement with said rack and also in a backward direction longitudinally of the rack; and a ratchet member for disengaging the dog from the rack; said dog being mounted for backward movement along the rack, and being releasable from the control of said ratchet member by reason of such backward movement.

24. In a typewriting machine, the combination with a power-driven carriage and an escapement rack, of a dog, and a ratchet member for forcing the dog out of engagement with the rack; said dog being spring-released from said ratchet member, and advanced by the rack to normal position.

25. The combination with a power-driven carriage of an escapement rack, a dog pivotally mounted and extending along the rack and having a tooth for engagement with the rack, and being capable of limited

backward play along the rack; means for yieldingly pressing said dog both into engagement with the rack, and in a backward direction; and a ratchet member for disengaging the dog from the rack; the dog being releasable from the control of said ratchet member by reason of its backward movement at its escape from the rack.

26. In a typewriting machine, the combination with a power-driven carriage of an escapement rack, a dog pivotally mounted and extending along the rack and having a tooth for engagement with the rack, and being capable of limited backward play along the rack; means for yieldingly pressing said dog both into engagement with the rack and in a backward direction; an extension upon said dog beyond said tooth; and a key-controlled ratchet mounted for engagement with a tooth which is provided upon said extension; the dog being releasable from the control of said ratchet by reason of its backward movement at its escape from the rack.

27. In a typewriting machine, the combination with a power-driven carriage of an escapement rack, a dog pivotally mounted and extending along the rack and having a tooth for engagement with the rack, and being capable of limited backward play along the rack; means for yieldingly pressing said dog both into engagement with the rack and in a backward direction; a key-operated arm; a ratchet pivoted upon said arm; a spring for pressing said ratchet toward said dog; a stop for limiting the movement of the ratchet under the tension of said spring; and a tooth upon the dog for engagement by said ratchet; the dog being releasable from the control of said ratchet by reason of its backward movement at its escape from the rack.

28. In a typewriting machine, the combination with a carriage of a rack, an escapement mechanism therefor including a dog, type-operating keys, a ratchet member for operating said dog, said ratchet member being connected by a lost-motion construction to said keys, and means for releasing the dog from the control of the ratchet member.

29. In a typewriting machine, the combination with a power-driven carriage of an escapement rack, a single dog, means for disengaging the dog from the rack, means for operating automatically upon the escape of the rack from the dog, for releasing the latter from the control of said disengaging means, and means for releasing the rack and carriage from the control of the dog; the dog being movable to initial position by the action of said rack thereon.

30. The combination of a carriage, a power-driven rack, a single yielding dog, and dog-disengaging means from which the

dog is spring-released upon disengagement of the dog from the rack.

31. The combination with the carriage and power-driven means for propelling the same, of a rack, and a loose yielding single dog which holds the rack and is caused to release the rack by the action of the key, so that the rack is free to move, and automatically reengages the rack by means of a spring to prevent the same from moving more than one space.

32. The combination with a spring-propelled carriage having an escapement rack, of a loose or yielding dog and a ratchet member for the dog, the dog escaping from the rack and immediately from the ratchet member, and arresting the rack independently of the ratchet member.

33. In a typewriting machine having a rack, the combination of a dog having a tooth 6 to engage the rack, and a slot 11 to engage a pivot, and an arm 12 connected to a spring 13, and a stop 15 for the dog, and means to pull the dog out of the rack and release the dog from the pulling means.

34. In a typewriting machine, the combination with a universal bar, of a key-operated ratchet member 21 having a spring 34, and a dog first operable by and then releasable from said member 21 to feed the carriage, so that the dog may return to normal position in advance of the return stroke of the ratchet member.

35. In a typewriting machine, the combination with a carriage and a reciprocating universal bar operated by the keys, of a carriage-feeding device which remains stationary during one stroke of the universal bar, and means to enable the universal bar at any portion of its other stroke to effect the complete operation of the carriage-feeding device.

36. In a typewriting machine, the combination with a carriage escapement rack 4 and an escapement dog 5 having a ratchet tooth 6, a dog spring 13 and teeth 19, of a dog-operating ratchet member having a returning spring 34, and pivoted upon an operating arm 23 provided with a stop 28.

37. In a typewriting machine, the combination of a dog 5, means for regulating both the forward and backward strokes thereof, a carriage rack-engageable thereby, means for disengaging the dog from the carriage, and a spring to automatically release the dog from the disengaging means upon being released from the rack.

38. In a typewriting machine, the combination with a power-driven rack, of a feeding dog loosely mounted on a pivot, a spring tending to move said dog bodily backward along the rack and also up into engagement with the rack, the dog being loosely mounted to permit unlimited bodily movement

backward along the rack, and means to disengage the dog from the rack.

39. In a typewriting machine, the combination with a power-driven carriage rack, of a key-operated universal bar, a clutching-mechanism operated by said universal bar, and a feeding mechanism operated by said clutching-mechanism, and including a part which releases the clutching mechanism when the feeding mechanism is released from the rack.

40. In a typewriting machine, the combination of an escapement member; a universal bar; means connecting said universal bar normally with said escapement member; and means for automatically disconnecting said connecting means.

41. In a typewriting machine, the combination of an escapement member; a universal bar; means for actuating said universal bar; means for normally connecting said universal bar with said escapement member; and means for disconnecting said connecting means while the universal bar is being returned to normal position.

42. In a typewriting machine, the combination of an escapement member; a universal bar; a clutch normally operative; means connecting said universal bar with said clutch; means connecting said escapement member with said clutch; and means for operating said clutch to disconnect said universal bar from said escapement member.

43. In a typewriting machine, the combination of an escapement rack or member; a single escapement dog; a universal bar; a clutch; means connecting said universal bar with said clutch; means connecting said escapement dog with said clutch; means for operating said clutch to disconnect said universal bar from said escapement dog; and means for operating said clutch to cause it to reconnect said universal bar with said escapement dog.

44. In a typewriting machine, the combination of an escapement rack or member; a single escapement dog; a universal bar; a clutch; means connecting said universal bar with said clutch, means connecting said escapement dog with said clutch; and means for operating said clutch to alternately connect and disconnect said universal bar and said escapement dog.

45. In a typewriting machine, the combination of an escapement rack or member; a single escapement dog; a universal bar; means for causing said universal bar and said escapement dog to move in unison; and means for automatically disconnecting said universal bar from said escapement dog.

46. In a typewriting machine, the combination of a carriage; escapement mechanism comprising a stepping or feed dog and a rack member with which said feed dog is normally engaged; printing devices which

operate said escapement mechanism; and means for causing the feeding of the carriage in letter-space direction during the return of said printing devices.

47. In a typewriting machine, the combination of a carriage, escapement members comprising a feed member; printing devices; a universal bar operative by said printing devices; means normally connecting said universal bar positively with said feed member; and means for disconnecting said universal bar from said feed member during the return movement of said printing devices.

48. In a typewriting machine, the combination of a carriage; an escapement device; printing devices; a universal bar; means normally connecting said universal bar with said escapement device; and means for disconnecting said universal bar from the escapement device at the beginning of the return movement of the printing devices, thus permitting the carriage to feed at the beginning of the return movement of said printing devices and before the latter have returned to normal position.

49. In a typewriting machine, the combination of printing devices; an escapement member; a universal bar; and means adapted to connect said universal bar and said escapement member normally and during movement of a printing device in one direction and to disconnect the connected parts during movement in the opposite direction.

50. In a typewriting machine, the combination of an escapement rack or member; an escapement dog; a universal bar; and means adapted to connect said escapement dog with said universal bar normally and during the first half of its movement and which is adapted to disconnect the connected dog by further movement of said universal bar, so that said dog is thereafter free to move independently.

51. In a typewriting machine, the combination of an escapement member; a universal bar; and a clutch which is adapted to connect said universal bar and said escapement member during movement of the universal bar in one direction and to disconnect the connected part at the reversal of the direction of movement of the universal bar.

52. In a typewriting machine, the combination of a carriage, escapement mechanism comprising a stepping or feed dog and a rack member with which said feed dog is normally engaged; printing devices for operating said escapement mechanism; and means for causing the feeding of the carriage in letter space direction during the return of any of said printing devices.

53. In a typewriting machine, the combination of a carriage; escapement members comprising a feed member; printing devices; means connecting said printing de-

vices positively with said feeding escapement member, and means for disconnecting said printing devices during their return movement from said feeding escapement member.

54. In a typewriting machine, the combination of a carriage; escapement members comprising a feeding member; printing devices; means connecting said printing devices positively with said feeding member; and means for disconnecting said printing devices at the beginning of their return movement from said feeding member.

55. In a typewriting machine, the combination of a power-driven carriage, an escapement device therefor; printing devices; a universal bar operable by said printing devices; a positive connection between said universal bar and said escapement device; and means for breaking said connection during the operation of the printing devices.

56. In a typewriting machine, the combination of a power-driven carriage; an escapement device therefor; printing devices; and a universal bar operable by each of said printing devices and adapted to be intermittently connected positively with said escapement device during the operation of the machine.

57. In a typewriting machine, the combination of escapement members; a universal bar; means normally connecting said universal bar with certain of said escapement members; and means for automatically disconnecting said connecting means.

58. In a typewriting machine, the combination of escapement members; a universal bar; a normally operative clutch; means connecting said universal bar with said clutch; means connecting certain of said escapement members with said clutch; and means for operating said clutch to disconnect said universal bar from said last named escapement member.

59. In a typewriting machine, the combination of escapement members; a universal bar; a clutch; means connecting said universal bar with said clutch; means connecting certain of said escapement members with said clutch; means for operating said clutch to disconnect said universal bar from said last named escapement members; and means for operating said clutch to cause it to reconnect said universal bar with said escapement members.

60. In a typewriting machine, the combination of escapement members; a universal bar; a clutch; means connecting said universal bar with said clutch; means connecting certain of said escapement members with said clutch; and means for operating said clutch to alternately connect and disconnect said universal bar and said last named escapement member.

61. In a typewriting machine, the combi-

nation of escapement members; a universal bar; means for causing said universal bar and certain of said escapement members to move in unison; and means for automatically disconnecting said universal bar from said last named escapement member.

62. In a typewriting machine, the combination of escapement members; a universal bar; and means adapted to connect certain of said escapement members with said universal bar normally and during the first half of their movement and which is adapted to disconnect the connected parts by the reversal of the direction of movement of said parts so that said parts are thereafter free to move independently.

63. In a typewriting machine, the combination of escapement members; a universal bar; and a clutch which is adapted to connect said universal bar and certain of said escapement members normally and during movement of the parts in one direction and to disconnect the connected parts by the reversal of the direction of movement.

64. In a typewriting machine, the combination of a carriage, a spring constantly tending to draw said carriage in one direction, a single escapement rack, a single dog controlling the motion of said rack under the impulse of said spring, and means for moving said dog out of and into engagement with said rack once only at each operation of said escapement.

65. In a typewriting machine, the combination of a carriage, a single escapement rack, a single dog controlling said rack, means for withdrawing said dog from engagement with said rack, and means for automatically restoring said dog to engaging position independently of said withdrawing means when said dog moves out of engagement with the rack.

66. In a typewriting machine, the combination of a carriage, an escapement rack; a single dog for controlling said rack, operating devices for moving said dog out of engagement with said rack, said operating devices including a hook, and means for unhooking said hook and thus disconnecting said dog from said operating devices when said dog is moved out of engagement with said rack.

67. In a typewriting machine, the combination of a motor-driven carriage, a single escapement rack, a single dog controlling said rack, a carrier on which said dog is movably mounted, a spring tending to move said dog in opposition to the carriage motor, means for withdrawing said dog from said rack, and a snap-off connection between said dog and said withdrawing means, said snap-off connection being operated by said spring.

68. In a typewriting machine, the combination of a carriage, an escapement rack, a dog for controlling said rack, printing keys,

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a universal bar operated by said printing keys, a spring put under tension by the operation of said universal bar, and a snap-off connection with said dog whereby said spring withdraws said dog from said rack during the return stroke of said universal bar.

69. In a typewriting machine, the combination of printing keys, a carriage, a single escapement rack, a single dog controlling said rack, means for withdrawing said dog

from engagement with said rack on the up stroke of a key, and means for automatically restoring said dog to engaging position independently of said withdrawing means when said dog moves out of engagement with said rack.

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Witnesses:

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Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."