A. G. F. KUROWSKI.

TYPE-WRITING MACHINE.

APPLICATION FILED MAY 3, 1912.

1,090,219.

Patented Mar. 17, 1914.

2 SHEETS—SHEET 1.

FIG. 1.

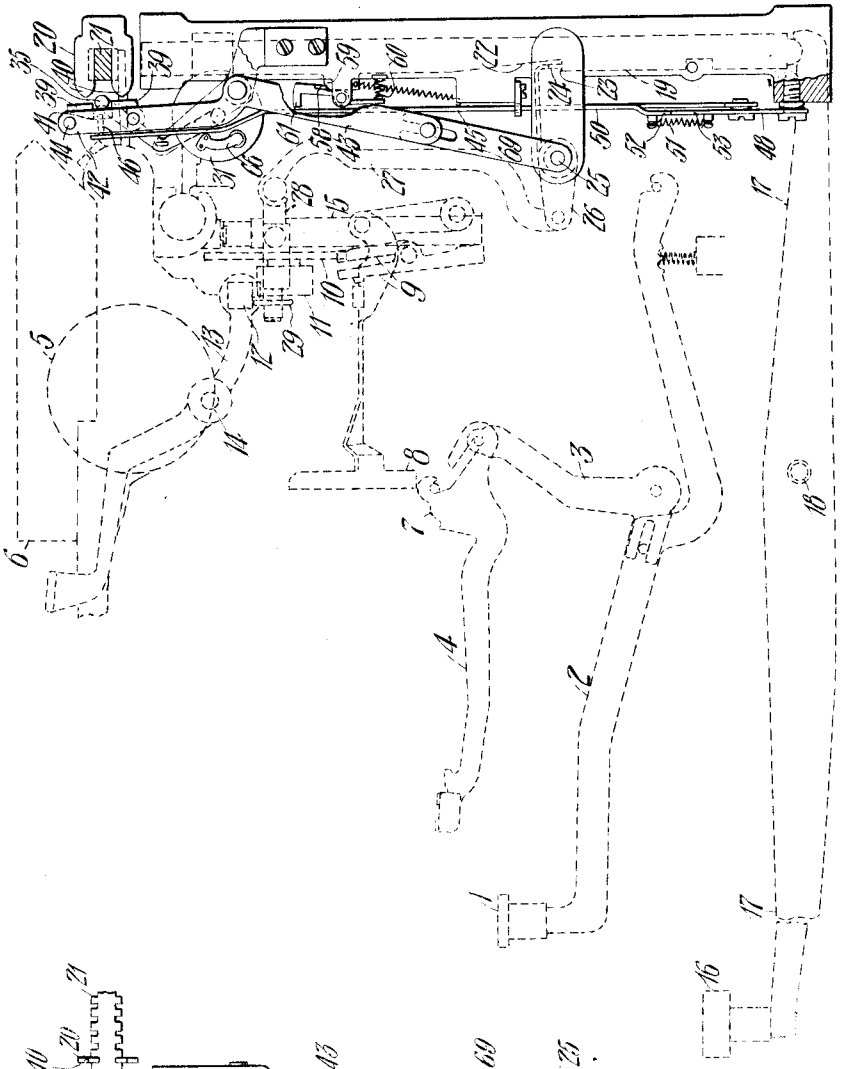
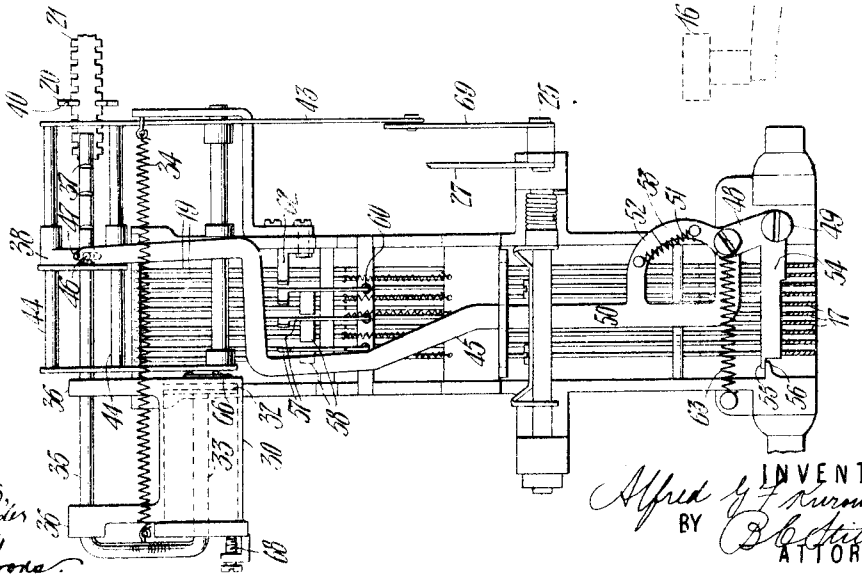


FIG. 2.



WITNESSES,

INVENTOR

BY

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2 SHEETS—SHEET 2.

FIG. 5.

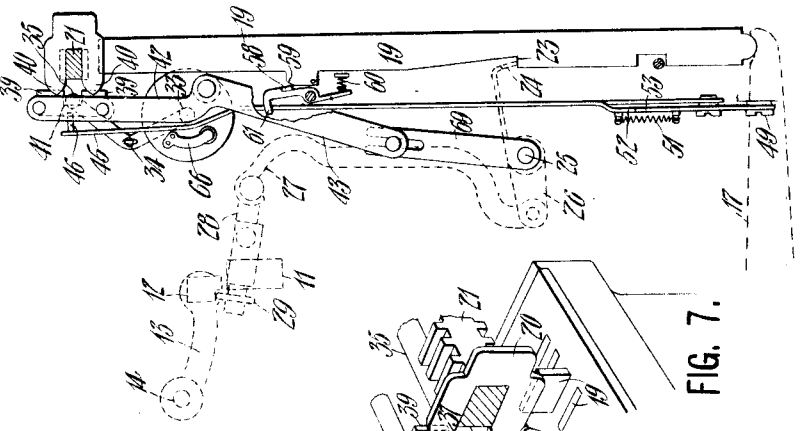


FIG. 7.

FIG. 4.

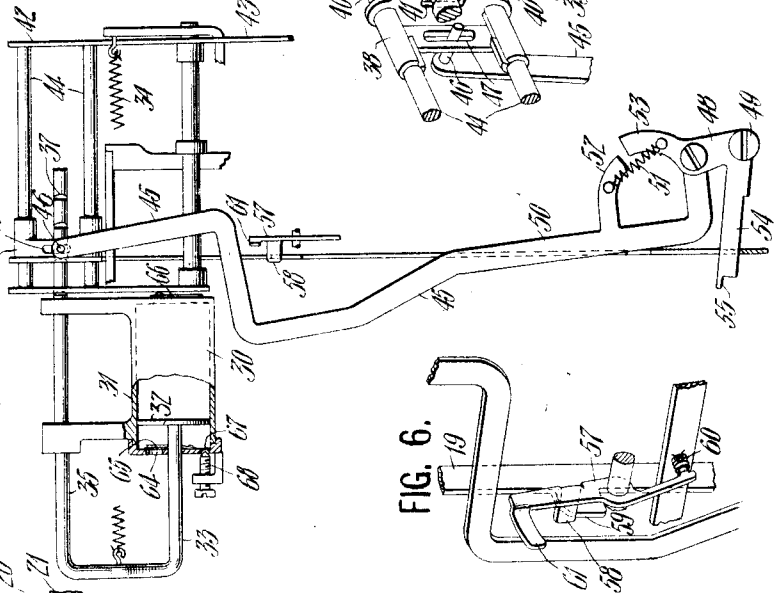
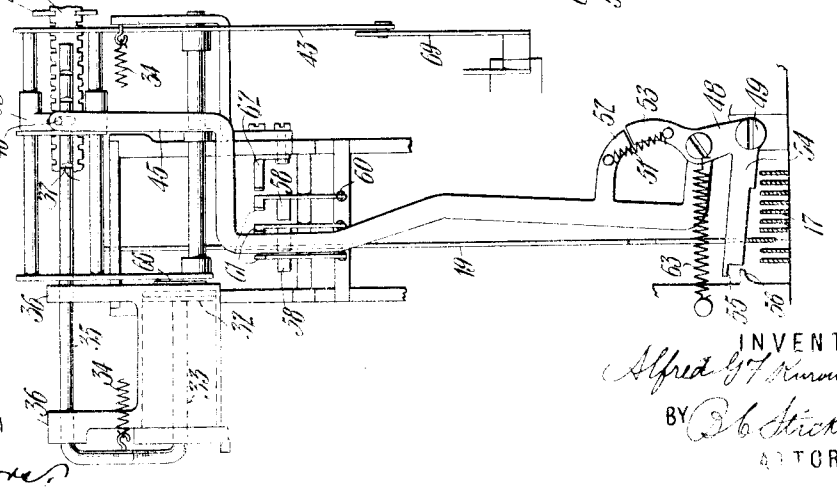


FIG. 6.

FIG. 3.



WITNESSES

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ALFRED G. F. KUROWSKI, OF NEW YORK, N. Y., ASSIGNOR TO UNDERWOOD TYPEWRITER COMPANY, OF NEW YORK, N. Y., A CORPORATION OF DELAWARE.

TYPE-WRITING MACHINE.

1,090,219. Specification of Letters Patent. Patented Mar. 17, 1914.

Application filed May 3, 1912. Serial No. 694,818.

To all whom it may concern:

Be it known that I, ALFRED G. F. KUROWSKI, a citizen of the United States, residing in Brooklyn borough, in the county of Kings, city and State of New York, have invented certain new and useful Improvements in Type-Writing Machines, of which the following is a specification.

This invention relates to a new and improved shock-absorber for gradually bringing the typewriter carriage to rest after it has been released from the escapement mechanism and permitted to run forward, as in tabulating or column selecting.

In the typewriting operation of decimal tabulating or column selecting, it is common in many types of machines, as for example the Underwood, to disconnect the locking escapement mechanism from the carriage, so as to allow the carriage to spring forward freely under the traction of its spring. It is evident if the movement of the carriage is uncontrolled when the stopping point is reached that it will be brought up with a bang, jarring and racking the machine and wearing out the parts. This feature has been eliminated in the past by the use of what is known as a governor which comes into play at the instant the escapement mechanism is disconnected from the carriage, and enables the carriage to move at a safe, uniform and relatively slow speed.

It is the purpose then of this invention to save time and still eliminate the shock incident to a jump movement of the typewriter carriage by providing a pneumatic cushion or buffer device acting to enable a rapid initial movement of the carriage and yet effectively and gradually retarding the final movement in a yielding manner, so as to obtain a quick run and an easy stop.

In the carrying out of this invention the tabulating keys actuate bars or plungers to move them up into the path of stops carried by the carriage, at the same time releasing the carriage from its retaining escapement mechanism, so that it runs forward under the tension of its spring. The movement of the carriage, however, is controlled by a shock-absorber shown in the form of a pneumatic dash pot and normally disconnected therefrom. The shock-absorber is joined to the carriage by a connector which is moved into the path of the carriage stop by a shifter actuated concomitantly with the actuation of the tabulating keys. The connector, however, before being thrown into the path of the carriage stop, is moved to one of the several positions by an adjuster, so as to advance the instant of connection of the shock-absorbing means with the carriage for shorter movements of the carriage, so as to have substantially the same effect for different movements of the carriage. The position of the adjuster, and thus of the connector, is determined by a plurality of limit stops which are thrown into the path of the adjuster at the actuation of the tabulating keys, and determine the extent of movement of the adjuster according to the tabulating key struck. The adjuster, limit stops and the shifter all depend for their movement on the actuation of the tabulating keys.

Other features and advantages will hereinafter appear.

Figure 1 is a diagrammatic sectional view taken from front to rear of the machine. Fig. 2 is a vertical section taken from right to left and looking toward the rear of the machine. Fig. 3 is a view similar to Fig. 2, showing one of the tabulator key levers actuated to move the adjuster and the connector. Fig. 4 is a diagrammatic view partly in section, showing the connector carried along to nearly the limit of its position by its connection with the carriage, so that the effect of the shock-absorber is utilized in retarding the final movement of the carriage. Fig. 5 is a vertical detail section, showing the rack raised from the pinion of the escapement mechanism, and showing the connector in engagement with one of the stops carried by the carriage, so that the movement of the carriage will be transmitted to the traveling element of the shock-absorbing means. Fig. 6 is a fragmentary perspective view, showing the action of one of the limit stops with respect to the adjuster. Fig. 7 is a fragmentary perspective view, showing the connector in engagement with one of the position stops on the carriage.

Referring more particularly to the separate parts of this invention as embodied in the form shown in the drawings, 1 indicates typewriting keys which are mounted on key levers 2 connected through the intermediary of bell cranks 3 to type bars 4, so as to swing the latter against the front side of a platen 5 mounted on a carriage 6. Each of the type bars 4 is provided with a heel 7, which cams against a universal bar 8, so as to rock a pair of connected pawls 9 to admit of the step-by-step rotation of an escapement wheel 10 having a pinion 11 joined therewith to admit of the step-by-step movement of the carriage 6, which is provided with a rack 12 engaging the pinion 11 and hung by arms 13 pivotally mounted on the carriage 6, as at 14. The carriage 6 is drawn in the letter feeding direction when the escapement mechanism just described is actuated, by a spring barrel indicated at 15.

For the purpose of obtaining a movement of the carriage 6 other than a step-by-step movement, as for example a tabulating movement, there may be provided tabulating keys 16 mounted on key levers 17, which are pivotally mounted intermediate their ends, as at 18, and adapted to raise plungers 19 resting in sockets provided at their rear ends. The plungers 19 are forced upwardly at the actuation of the keys 16 into the path of carriage stops 20 adjustably mounted on a rack 21 carried by the carriage 6 in any suitable manner. All of the plunger bars 19 are provided with a cut-out portion 22 forming a shelf 23, so that when any one of the plunger bars 19 is forced upwardly by the actuation of its tabulating key, it will rock a universal arm 24 engaging all of the shelves 23. The universal arm 24 is connected to a rock shaft 25 having an arm 26 connected by a link 27 to a lever 28. The lever 28 has at its forward end a bearing roller 29, which rests on the under side of the rack 12 at a smooth portion thereof, so as to be capable of lifting the rack 12 out of mesh with the pinion 11. It will be seen that this frees the carriage from the escapement mechanism so that it is free to run forward under the traction of its spring barrel 15 until otherwise stopped, as by one of the plungers 19 coming into the path of one of the stops 20. If the movement of the carriage were of any considerable extent, this abrupt stopping would jar the machine considerably. In order to do away with this jar, there is provided a shock-absorbing means, indicated at 30, which, however, is normally disconnected from the carriage under ordinary conditions. The shock-absorbing means is shown in the form of a dash-pot or buffer having a cylinder 31 with a piston 32 adapted to reciprocate therein and connected to a goose-neck piston rod 33. The piston and piston rod are normally held in the position shown in Fig. 3 by a spring 34. The upper reach of the goose-neck piston rod 33, indicated at 35, is guided in suitable slideways 36, so as to extend alongside of the rack 21 and is provided at its end with a plurality of notches 37, of which there may be any suitable number, in this instance four being shown.

For the purpose of joining the carriage with the shock-absorbing means 30 so that the speed of movement of the carriage will be controlled by the shock-absorbing means there is provided a connector 38 having projections 39 movable into the path of projections 40 on the stops 20. The connector 38 is also provided with a cut-out portion 41, whereby it may be located circumjacent the upper reach 35 of the piston rod 33, and so that a portion thereof can engage in one of the notches 37 so as to connect the carriage with the piston-rod 33. The connector 38, however, is normally out of junction with the stops 20 and the notches 37 of the piston rod 33, that is to say, occupying a position such as that shown in Fig. 1. In order to shift the connector to the position shown in Fig. 5, it is mounted on a shifter 42, which is shown in the form of a swinging frame 43 having a pair of rails 44 passing through suitable bearings of the connector 38, so that the connector is adjustable along the shifter 42 to vary its position relative to the carriage 6 and relative to the piston rod 33. The swinging frame 43 is rocked by a forked lever 69 secured to the rock shaft 25. The purpose of moving the connector along the shifter is to vary the point of joinder of the connector with the upper reach 35, and thus vary the instant of movement of the piston with the carriage, so that the distance the carriage travels while connected with the piston is substantially constant regardless of which tabulator key has been operated. The connector 38 is shifted with respect to the piston rod reach 35, so as to vary the point of connection to correspond with different magnitudes of movement of the carriage. To accomplish this purpose, there is provided an adjuster 45 which is provided with a pin 46 passing in a slot 47 in the connector 38, so that the adjuster can shift the connector along the rails 44 of the shifter 42 into opposition with different ones of the notches 37. The adjuster 45 is shown to comprise a bell crank lever 48 pivoted at 49, and having pivoted to one arm thereof a lever 50. The purpose of this arrangement is to form the adjuster in two parts capable of a relative movement, but normally held to move in unison by means of a spring 51 which tends to hold abutments 52 and 53 in engagement with each other, so as to form a unified structure. One arm 54 of the adjuster, or specifically of the bell crank lever 48, overlies all of the key levers 17 so as to be actuated when any one of these key levers

is raised at its rearward end, as indicated in Fig. 3. It will be noted that this arm 54 is provided with a series of steps, one of which 55 forms a stop engaging a lug 56 on the frame of the machine, to limit a downward movement of the arm, and the others of which enable the different key levers 17 having the same throw to shift the adjuster 45 different amounts.

In order to determine the extent of movement of the connector 38 by the adjuster 45, there are provided a series of limit stops 57, certain of which are shown in the form of levers pivotally mounted intermediate their ends, each having a follower 58 overlying a plurality of plungers 19. The plungers 19 are provided with cam projections 59 to actuate the followers 58 when the plungers are raised, so as to swing the upper ends of the followers forward against the tension of springs 60, so that projecting dogs 61 thereon will move into the path of the lever 50 of the adjuster 45, stopping its further movement. The bell crank lever 48, however, may still move on, while the lever 50 is held stationary, as the spring 51 will give sufficiently to allow for this relative movement. One of the stops 57, indicated at 62, is fixed, as it determines the final movement of the adjuster 45. The adjuster, after it has determined the position of the connector 38, and after the shock-absorbing piston 32 has been returned by the spring 34, may itself be returned to a normal position by a spring 63.

It will be noted that the dash-pot cylinder 31 is provided with an opening 64, which is closed by a valve 65 when the piston moves in a shock-absorbing direction, but will open when the piston returns under the traction of the spring 34, so as to enable a quick action. The opposite end of the cylinder 31 may also be provided with a valve closed opening 66, so as to add to the action of the dash-pot by enabling a vacuum to be created back of the piston 32. This piston 32, however, is not so tightly mounted but what some air may pass, so that the movement of the carriage will not be entirely stopped. During the shock-absorbing movement of the piston 32, air will pass out of a small opening 67, the effective magnitude of which, however, is determined by an adjustable screw valve 68, which can be manipulated to vary the shock-absorbing effect of the dash-pot.

In the ordinary operation of typewriting, keys 1 are struck so as to cause the type bars 4 to strike the work-sheet on the platen 5, and so as to obtain a step-by-step letter feeding movement of the carriage 6. If it is desired to have the carriage run forward, as in tabulating, one of the keys 16 is struck, so that a plunger bar 19 is raised. The first movement of the key 16 and its associated plunger bar 19 swings the corresponding stop 57 into the path of movement of the adjuster 45, and determines the extent of movement of the lever 50 thereof. After this has been accomplished, the next portion of the movement of the key 16 swings the adjuster 45 as a unit until it comes in engagement with the stop 57, which has been swung to a projecting position. This determines the position of the connector 38 relative to the carriage 6 and the upper reach 35 of the piston rod 33. The continued movement of the key 16 and the associated plunger bar 19 causes the shaft 25 to be rocked by the associated universal arm 24. This acts first to rock the swinging frame 43 of the shifter 42, so as to bring the projections 39 of the connector 38 into the path of the projections 40 on the active stop 20. The latter part of the rocking of the shaft 25 raises the bearing roller 29 and lifts the rack 12 from the pinion 11. The carriage then is free to move independently of the escapement mechanism, but the movement of the connector 38 into the path of the stop 20 also brought the connector into one of the notches 37 so that the instant the active stop 20 comes into engagement with the connector 38, the travel of the carriage 6 will be controlled by the shock-absorbing means 30, the latter part of the movement thereof will be gradually retarded, and when the stop 20 comes into engagement with the projected plunger 19, the shock will be insignificant. As soon as the tabulating key is released, the rock shaft 25 will return the connector 38, through the intermediary of the shifter 42, to its normal disconnected position, and will also depress the roller 29, enabling the rack 12 to come in mesh with the pinion 11. This enables the carriage to be once more under the control of the escapement mechanism, and also enables the springs 34 and 63 to return the shock-absorbing piston and the adjuster, respectively, to their normal positions. If it should be desired to vary the effect of the shock-absorbing means, the screw valve 68 can be adjusted to vary the size of the opening 67.

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. The combination with a typewriter carriage, of a fluid cushion normally disconnected from said carriage, a tabulating mechanism for said carriage acting to connect said cushion to said carriage, and means for varying the connection of the cushion to correspond with the magnitude of movement of the carriage.

2. The combination with a carriage, of tabulating mechanism for said carriage, shock-absorbing means for said carriage,

and graduated means actuated by said tabulating mechanism to connect different points of said shock-absorbing means with said carriage.

3. The combination with a carriage, of mechanism to effect forward runs of said carriage, shock-absorbing means, a connector for joining said carriage with said shock-absorbing means, and an adjuster for determining the period of connection by said connector of said carriage with said shock-absorbing means.

4. The combination with a carriage, of mechanism to cause said carriage to run forward, shock-absorbing means, a connector for joining said carriage with said shock-absorbing means, and an adjuster for determining the period of connection by said connector of said carriage with said shock-absorbing means; said adjuster being operated by said mechanism.

5. The combination with a carriage, of mechanism to cause said carriage to run forward, shock-absorbing means, a connector for joining said carriage with said shock-absorbing means, a shifter for manipulating said connector to and from its connecting position, and an adjuster for determining the period of connection by said connector of said carriage with said shock-absorbing means.

6. The combination with a carriage, of mechanism to cause said carriage to run forward, shock-absorbing means, a connector for joining said carriage with said shock-absorbing means, a shifter for manipulating said connector to and from its connecting position, and an adjuster for determining the period of connection by said connector of said carriage with said shock-absorbing means; said shifter and said adjuster being operated by said mechanism.

7. The combination with a carriage, of mechanism to effect forward runs of said carriage, shock-absorbing means, a connector for joining said carriage with said shock-absorbing means, and an adjuster for determining the period of connection by said connector of said carriage with said shock-absorbing means; said adjuster having relatively movable parts yieldingly held to move in unison.

8. The combination with a carriage, of mechanism to effect forward runs of said carriage, shock-absorbing means, a connector for joining said carriage with said shock-absorbing means, an adjuster for determining the period of connection by said connector of said carriage with said shock-absorbing means, and limit stops for determining the position of said adjuster.

9. The combination with a carriage, of tabulating keys, plungers operated by said tabulating keys for determining the extent of movement of said carriage, shock-absorbing means normally disconnected from said carriage, a connector for joining said shock-absorbing means with said carriage, an adjuster operated by said keys to determine the initial point of joinder by said connector of said shock-absorbing means with said carriage, and limit stops operated by said plungers to move into the path of said adjuster to determine the initial position of said connector.

10. The combination with a carriage, of tabulating keys, plungers operated by said tabulating keys for determining the extent of movement of said carriage, shock-absorbing means normally disconnected from said carriage, a connector for joining said shock-absorbing means with said carriage, an adjuster operated by said keys to determine the initial point of joinder by said connector of said shock-absorbing means with said carriage, and limit stops operated by said plungers to move into the path of said adjuster to determine the initial position of said connector, each of said limit stops being operable by any one of a plurality of said plungers.

11. The combination with a carriage, of a shock-absorbing means for said carriage, a connector for joining said shock-absorbing means with said carriage, a plurality of keys for determining the movement of said carriage, plungers operated by said keys, an adjuster for determining the initial point of said connector, and a series of stops, each overlapping a plurality of said plungers and movable by said plungers into the path of said adjuster, so as to determine the initial position of said connector.

12. The combination with a carriage, of keys for determining the movement of said carriage, stops carried by said carriage shock-absorbing means for said carriage normally disconnected therefrom, and a connector movable at the actuation of one of said keys into the path of one of said stops to join said shock-absorbing means with said carriage.

13. The combination with a carriage, of stops carried by said carriage, shock-absorbing means for said carriage normally disconnected therefrom, keys for determining the movement of said carriage, plungers operated by said keys, a connector for joining said carriage with said shock-absorbing means, and means actuated by all of said plungers for shifting said connector into the path of said stops so as to enable said shock-absorbing means to control the movement of said carriage.

14. The combination with a carriage, of shock-absorbing means for said carriage, keys for determining the movement of said carriage, an adjuster for determining the period of connection of said carriage with said shock-absorbing means, said adjuster com-

prising a pivotally mounted bell crank lever overlying said keys so as to be operated thereby, a lever pivotally connected to said bell crank lever, and a spring yieldingly holding said second-mentioned lever to move with said first-mentioned lever.

15. The combination with a carriage, of shock-absorbing means for said carriage, a connector for joining said shock-absorbing means with said carriage, an adjuster for determining the initial position of said connector, and automatic means for returning said adjuster to a normal position.

16. The combination with a carriage, of shock-absorbing means for said carriage, an adjuster for determining the period of connection of said shock-absorbing means with said carriage, jump movement mechanism for said carriage having cams thereon, and a series of stops operable by said cams to move into the path of said adjuster to determine the stopping position thereof.

17. The combination with a carriage, of mechanism to effect a forward run of said carriage, a shock-absorbing device having a stationary support, a connector for automatically joining said carriage with said shock-absorbing device when the carriage is a predetermined distance from its stopping position, and a shifter for manipulating said connector to and from its connecting position.

18. The combination with a carriage, of mechanism to effect a forward run of said carriage, a shock-absorbing device having a stationary mounting, a connector for automatically joining said carriage with said shock-absorbing device when the carriage is a predetermined distance from its stopping position, a shifter for manipulating said connector to and from its connecting position, and means for operating said shifter from said mechanism.

19. The combination with a carriage and stops selectively operable to stop the carriage at different points, of shock-absorbing means for said carriage comprising a stationary element and an element automatically connected to move with said carriage when the carriage is at a fixed distance from its stopping point, means to automatically vary the point of said connection to correspond to the position of the selected stop, and means for automatically returning said movable element independently of said carriage.

20. The combination with a carriage movable to different stop positions, of shock-absorbing means for said carriage comprising a stationary element and an element connected to move a fixed distance with said cariage, means to automatically vary the point at which the carriage is connected to the movable element to correspond to the stop position of the carriage, and a spring for returning said element independently of said carriage.

21. The combination with a typewriter carriage, of a shock absorber therefor, mechanism controlling the movement of the carriage, a key for actuating said controlling mechanism to permit the carriage to run forward, means operated by the said key to determine the distance through which the carriage moves forward, and mechanism cooperating with said means to determine the extent of movement of the carriage with the shock absorber.

22. In a typewriting machine, the combination with a traveling carriage, of stops thereon, a shock absorber and a connector movable into the path of said stops to connect the shock absorber with the stops.

23. In a typewriting machine, the combination with a traveling carriage, of stops selectively operable to stop the carriage at different points, a coöperating stop device on the carriage, and a shock absorber comprising a cylinder, a piston movable therein in the direction of the carriage travel, a piston rod, means on said rod in the path of said stop device to actuate the shock absorber, and mechanism to automatically vary the position of means to correspond to the selectively operated stops.

24. In a typewriting machine, the combination with a traveling carriage, of a buffer or shock absorber having a stationary mounting, and means on the carriage to connect the same with the shock absorber at a predetermined point in the carriage travel.

25. In a typewriting machine, the combination with a traveling carriage, of means to stop the carriage at different points in its travel, a shock absorber, and mechanism to connect the carriage and shock absorber during a substantially uniform extent of the carriage travel regardless of the stop position of the carriage.

26. In a typewriting machine, the combination with a traveling carriage, of selective means for stopping the carriage at different points, a buffer device, and means to automatically connect the carriage with the buffer device at points a predetermined distance ahead of the stopping points of the carriage.

27. In a typewriting machine, the combination with a traveling carriage, of a series of stops for the carriage, a buffer device, and means to connect the buffer device with the carriage at different points corresponding to the positions of said stops.

28. In a typewriting machine, the combination with a traveling carriage, of a series of stops, a counter stop on the carriage, selective devices for projecting said stops into the path of the counter stop, a shock absorber, a connector between the shock absorber and the said counter stop,

and means operated by said devices to shift said connector to positions corresponding with the positions of the projected stops.

29. In a typewriting machine, the combination with a traveling carriage, of a stationary cylinder, a piston movable therein in the direction of the carriage travel, a piston rod connected to said piston, a stop on the carriage, a stationary stop, means to project the stationary stop into the path of the stop on the carriage, and a connector on the piston rod in the path of said first-named stop.

30. In a typewriting machine, the combination of a traveling carriage, a series of stops, a counter stop on the carriage, keys for selectively projecting said stops into the path of the counter stop, a stationary cylinder, a piston movable therein in the direction of the carriage travel, a piston rod connected to the piston, a connector, means operated by said keys to shift the connector to different positions on the piston rod corresponding to the positions of the operated stops, and means to move said connector into the path of said counter stop.

31. In a typewriting machine, the combination with a traveling carriage, of a row of decimal tabulator stops, keys to selectively operate said stops, a counter stop on the carriage, a shock absorber, a connector, and means operated by said keys to shift the connector in the direction of the carriage travel through distances corresponding to the distances between the tabulator stops.

32. In a typewriting machine, the combination with a series of tabulator stops, of keys to project said stops, a traveling carriage, a counter stop thereon, a shock absorber, a connector between the shock absorber and the carriage, an arm operated by the keys to shift said connector, and stops selectively operated by said keys into the path of said arm to limit the movement thereof, and thereby cause said connector to be shifted through distances corresponding to the position of the projected stop.

33. The combination with a traveling carriage, a rack thereon and a stop adjustable along said rack, or a buffer having a stationary mounting, and means extending into the path of the said stop and forming a connection between the buffer and stop to stop the carriage at a position determined by the adjustment of said stop.

34. The combination with a traveling carriage and column stops thereon, of a buffer, a connector to actuate the buffer, and key-actuated means to move the connector into the path of movement of said stops.

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Witnesses:

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