

No. 855,541.

PATENTED JUNE 4, 1907.

B. C. STICKNEY.
TYPE WRITING MACHINE.
APPLICATION FILED MAR. 17, 1903.

3 SHEETS—SHEET 1.

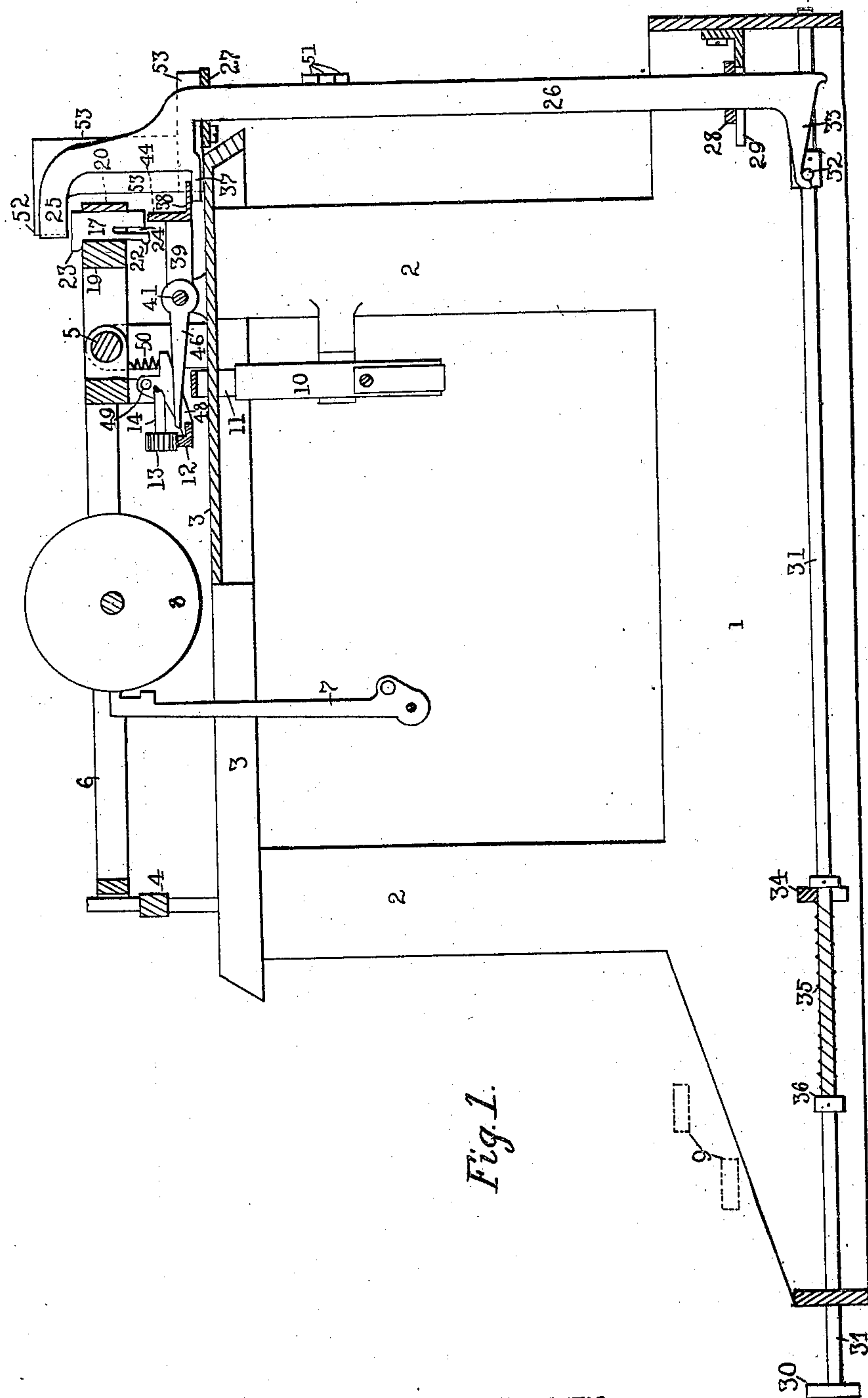


Fig. 1.

WITNESSES

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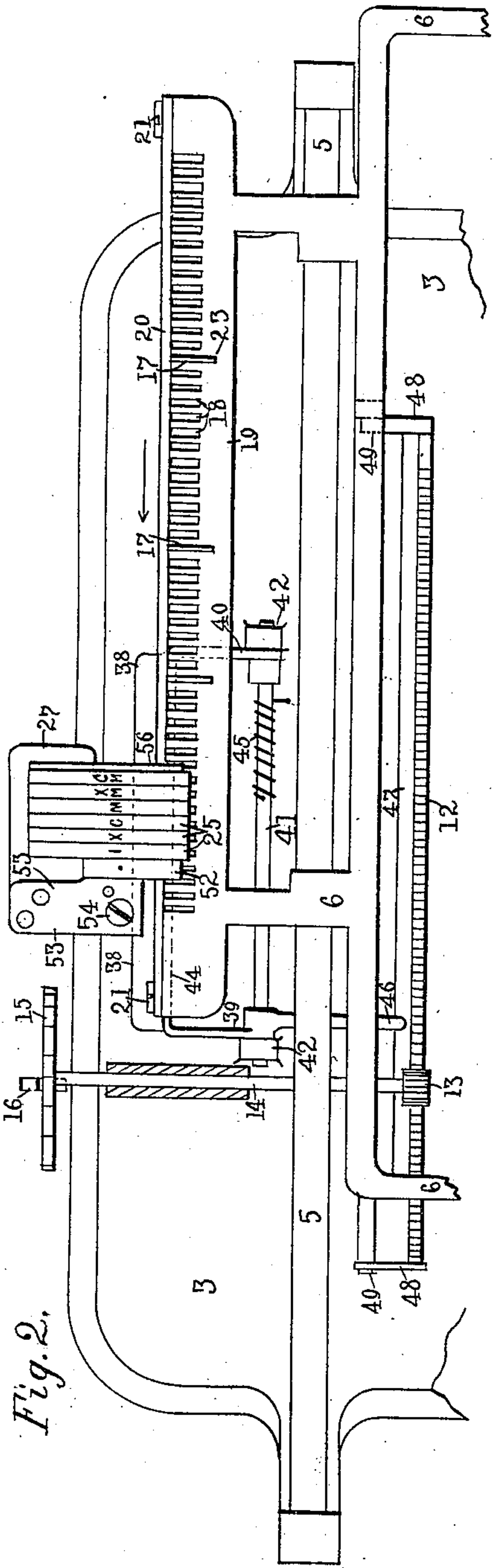
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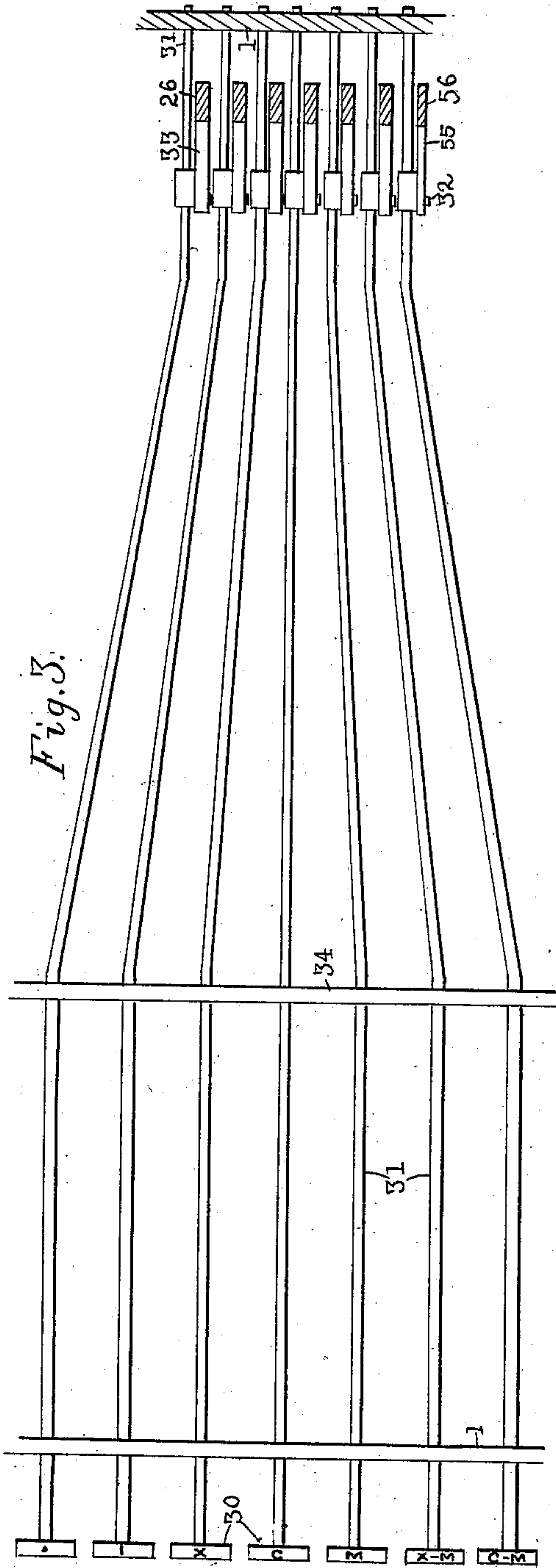
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3 SHEETS—SHEET 2.



WITNESSES

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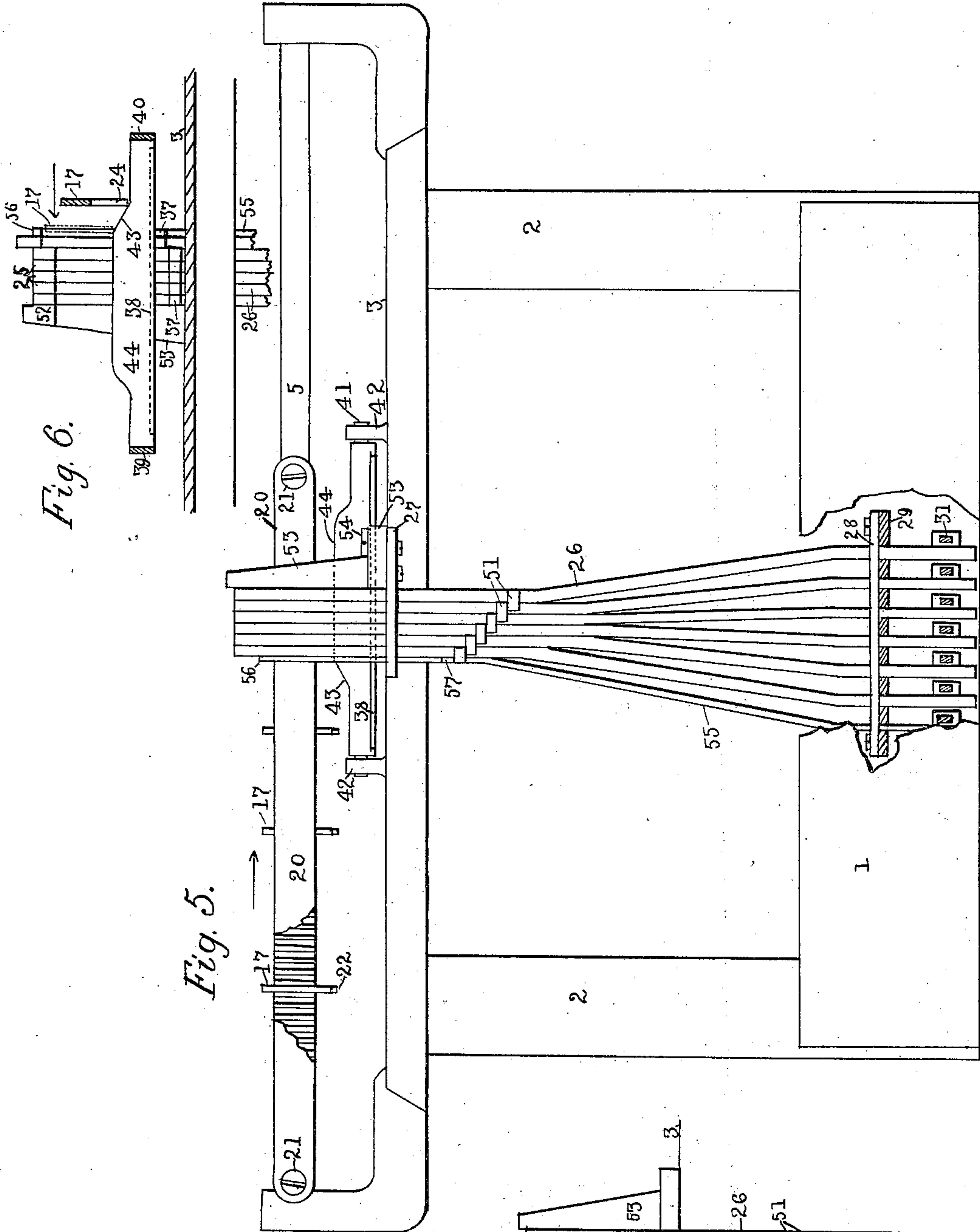
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3 SHEETS—SHEET 3.



WITNESSES

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TYPE-WRITING MACHINE.

No. 855,541.

Specification of Letters Patent.

Patented June 4, 1907.

Application filed March 17, 1903. Serial No. 148,158.

To all whom it may concern:

Be it known that I, BURNHAM C. STICKNEY, a citizen of the United States, and a 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 tabulating mechanism, and is adapted for use in typewriting machines, adding machines, etc.

Usually in machines of this character the denomination stops are normally in ineffective positions, and any stop may be projected by its key to effective position. In the construction herein described, the denomination stops are mounted to be normally in effective position, and key-operated devices are provided for moving one or more stops together out of effective position, whereby the first stop not so moved is enabled to co-act with the column stop for arresting the carriage at the desired point.

The column stops are herein described as being mounted in ineffective position, and means are provided for moving said column stops one at a time to effective position, for co-operation with the denomination stops.

Other features of improvement will be hereinafter more fully described and particularly pointed out in the concluding claims.

In the drawings forming part of this specification, Figure 1 is a longitudinal vertical section of a front strike writing machine, showing my improvements applied thereto. Fig. 2 is a plan of the upper rear portion of the machine. Fig. 3 is a plan of the denomination-stop key mechanism, the denomination-stop rods and a portion of the machine framing being shown in section. Fig. 4 is a rear view of the upper ends of the denomination-stop rods, showing the first three thereof as adjusted to ineffective position, enabling the column stop on the carriage to engage with the fourth. Fig. 5 is a rear elevation of the machine. Fig. 6 is a fragmentary sectional front view showing the upper ends of the denomination-stop rods, and the first stop as adjusted to ineffective position, permitting the column stop to engage the second.

In the several views like signs denote like parts.

The machine framing comprises a base 1, corner posts 2 and top plate 3. Front and

rear rails 4 and 5 support a carriage 6 above the top plate. Type bars 7 strike the front side of a platen 8 mounted in said carriage, the type bars being operated in any usual manner by keys 9. The carriage is propelled by a spring drum 10, connected thereto by the usual strap 11, and is controlled by any usual letter-feeding mechanism. For instance, a rack 12 may be mounted upon the carriage in mesh with a pinion 13 upon the forward end of a shaft 14, the latter carrying at its rear end an escapement wheel 15, whose movements are controlled by letter-feeding dogs 16, the latter being operated in the usual manner through the depression of the type-operating keys 9.

The column-stop portion of the tabulating mechanism includes a series of thin tappet-plates or column stops 17, insertible in any of a series of notches 18 cut in a bar 19 either cast integral with the carriage frame 6 or otherwise connected thereto. This rack is provided with a keeper-bar or plate 20, secured at its ends by screws 21 to the bar 19, and serving to confine the column stops within the notches. The latter are of suitable dimension to fit between said keeper and the inner ends of the notches, and at their lower ends are provided with latches 22, which take under the bar 19 so as to prevent the stops from jumping out of their seats, said latches however being of sufficient length to permit an upward movement of the column stops to effective position. Normally they are supported by lugs 23 formed upon their upper rear corners, which take over the upper corner of the bar 19. Notches 24 may be cut in the stops so as to render the latches 22 sufficiently yielding to permit the ready insertion and removal of the stops. The working portions of the stops project above the rack.

A series 25 of denomination stops overhangs the column-stop bar 19, just clearing the tops of the column stops 17 when the latter are in normal position. The stops 25 are formed or provided upon the tops of vertical bars 26, guided at their upper ends in a yoke 27, and at their lower end portions in a yoke 28 and rack 29, whereby the bars or rods are enabled to move freely up and down, but are prevented from moving in other directions. The stop rods 26 may be actuated by keys 30, mounted upon the forwardly

projecting ends of rods 31, preferably of rectangular cross-section, and working in suitable holes formed in the front and rear walls of the base. Near its rear end each key-rod carries a lateral pin 32, for engaging an inclined foot or cam 33 provided upon the lower tip of the denomination-stop rod 26, whereby as the key-rod is pushed back, the stop-rod is cammed up, to elevate the denomination stop above its effective position. Between their ends the key-rods may be guided by a rack 34; and coiled push-springs 35 upon the rods may work between said rack and collars 36 secured upon the rods. Preferably each denomination stop is of a thickness equal to the letter-spacing movement of the carriage; and as seen at Fig. 5, the stop-rods may fan out at their middle portions, so as to give separation to their lower portions; while the key-rods may also fan out between their end portions, as at Fig. 3, to permit the use of keys of sufficient size.

At a point just above the top plate 3, each stop rod 26 has a forwardly projecting lug 37, and these lugs take under a horizontal universal-bar 38, carried upon rock-arms 39, 40, projecting rearwardly from a horizontal rock-shaft 41 mounted upon lugs 42 upon the top plate. This universal-bar frame also includes a cam portion 43 (Figs. 5 and 6), and a straight horizontal rail portion 44. The purpose of the lugs 37 is to elevate the universal-bar, cam and rail, so that during the run of the paper-carriage 6 the column stops 17 thereon may in succession ride up over the elevated cam 43 and be maintained in their elevated working position by the rail 44, thereby to effect co-action of the column stops with the denomination stops.

The rock shaft 41 is provided with a returning-spring 45, which effects the return to normal position of the universal-bar frame, the denomination stops, and the column-stops, the latter being forced down by the denomination stops as they one by one arrest the carriage. The rock-shaft also has a forwardly-extending release-arm 46, projecting over a ledge portion 47 of the carriage-rack 12, so as to force the latter down out of engagement with the pinion 13, thereby releasing the carriage from the control of the letter-feeding mechanism. The rack for this purpose may be mounted upon rock-arms 48, pivoted at 49 upon the carriage frame, and provided with a returning spring 50.

In operation, any selected key 30 is pushed in, whereby the cam-pin 32 upon the key-rod is caused to act upon the cam 33, to drive up the stop-rod 36 and elevate the denomination stop 25 thereon to ineffective position, so as to enable the column stop subsequently to impinge against the succeeding denomination stop. By means of the lug 37, the universal-bar frame is swung up, to the elevated

position shown at Fig. 6, while by the downward movement of the release-arm 46 the carriage-rack 12 is swung downwardly upon its hinge clear of the pinion 13. Thereupon the carriage is drawn along rapidly by the driving spring 10, and the first of the column stops contacts with and rides up over the cam 43, which may have any desired inclination or form. The manner of contact of the column stop with said cam during the carriage movement is illustrated at Fig. 6, the carriage moving in the direction indicated by the arrow. The pin 32 upon the key-rod resists any tendency of the stop-rod 26 to yield downwardly under the impact of the column-stop upon the cam, it being perceived that the shock is transmitted through the universal-bar and lug 37 to said stop-rod; but nevertheless a distinct shock is felt by the finger of the operator, who should keep pressure upon the key until the shock is felt, to avoid mistakes in columnating. If desired, the cams and parts may be so mounted and arranged that the shock transmitted to the finger of the operator will be sufficient to cause him to release the key, while also serving to check materially the speed of the carriage, to avoid rebounding of the latter when arrested.

The column stop rides up on the cam 43 to the dotted line position at Fig. 6, and then rides along the rail 44 until it contacts with the first unadjusted denomination stop, whereby the arrest of the paper-carriage is effected. It will be perceived that if, at the time of the operation of the key, the column stop is directly over said rail 44, it will be lifted thereby to effective position.

Upon the relief of the key from pressure, the spring 35 returns the same to normal position, while the spring 45 returns the universal-bar frame and release-arm 46 to normal position, permitting the carriage-feeding rack 12 to be restored by the spring 50 to engagement with the escapement pinion 13. By the universal-bar 38, the return of the denomination-stop rod 26 to normal position is assured, and the denomination-stop 25 pushes down the column stop 23 until it escapes beneath the next denomination stop, whereupon the type-keys 9 may be operated to effect printing of the types and letter-feeding movements of the carriage. The denomination stops are thus normally in working position, or position for co-operation with the column stops, and keys are so connected to or associated with the former that depression of the keys moves the denomination stops out of working position. Next to the denomination stop which is so moved, is a second stop which is uncontrolled by the key effecting such movement, and this second stop receives the impact of the column stop. Thus any selected member of the set of denomination stops may co-operate with the column stop.

Each of the movable denomination stops is provided with a cross-lug 51, these lugs being upon the rear sides of the stop rods 26, the lug upon each rod projecting just beneath the lug upon the next rod. When therefore a rod is lifted, the next rod to the left at Figs. 4 and 5 is lifted with it, or in other words, a single denomination key 30 may move a plurality of denomination stops out of working position; and since the rod so moved by the action thereon of an adjacent rod, may itself move the succeeding rod, it will be seen that I have provided key-controlled means for moving any desired number of denomination stops together out of or into working position, whereby the column-stop may contact with the first denomination stop not so moved. The connections enable different keys to move different numbers of stops together out of working position. One key may move one stop, the next key may move two stops, the next three, and so on throughout the series of movable stops. Any key may of course be moved independently of any other key, and any stop may be moved independently of any of the stops of lower denomination, as at Fig. 4, in which the third stop from the left is moved independently of the three remaining stops to the right, said third stop however carrying with it the first and second stops. Thus any stop may be moved while the stop or stops to the right remain stationary, or else may be moved by the direct action thereon of the succeeding right-hand stop or stop-rod; each stop being actuable independently, but being so connected to the next stop as to be actuated therewith, together with one or more stops at the left. One key may therefore be said to be connected to one stop, the next key to two stops, including the first-mentioned stop, the next key to the first three stops, the next key to the first four stops, and so on throughout the series.

Referring to Fig. 2, it will be noted that the movable denomination stops are marked, beginning from the left, I, X, C, M, X-M, and C-M, to denote units, tens, hundreds, thousands, tens of thousands, and hundreds of thousands, respectively. The stop-rods are similarly designated at Fig. 3; but it will also be noted at this figure that the hundred-thousand stop-rod is connected to the ten-thousand key, the ten-thousand stop-rod to the thousand key, the thousand stop-rod to the hundred key, and so on, each key mentioned being connected to a stop of different denomination, that is, to the stop of next higher denomination. It will also be understood from the foregoing explanation that each of these keys is connected or operatively associated with all of the stops of higher denomination, and can move them all together out of working position, so as to enable the column-stop to contact with the first un-

moved denomination stop, which of course has the same denomination as the actuated key.

In addition to the described movable stops, the complete set of denomination stops includes a fixed stop 52, projecting forwardly in line with the other stops from a rigid bracket 53, secured by screw 54 upon the top plate 3. This stop preferably also serves as an abutment for supporting the movable stops against the impact of the carriage; and it will be understood that said stop is not movable out of working position. It is mounted a letter-space distance from the working face of the units stop, and itself serves, when all of the other stops are displaced, to arrest the carriage at the proper point for receiving the impression of the decimal-point type. It is therefore designated by the sign "." This stop is inoperable by any of the denomination keys, and is not operatively connected to any of the remaining stops. It may be termed the stop of lowest denomination in the series, although more or less stops may be used, and may be used for different denominations than those designated, within the scope of my invention. It will also be perceived that one denomination stop covers the working face of another throughout the set, and that the withdrawal of any stop or stops serves to expose the working face of the succeeding stop; the stops being preferably in contact with one another.

One of the leading features of my invention resides in the provision of means for adjusting either one or more of the denomination stops to ineffective position, and then enabling the co-operation with the first remaining denomination stop of the column-stop upon the carriage; this co-operation being effected by means which cause a relative projecting movement between the set of denomination stops as a whole and the column stop. Preferably the column-stop itself is projected so that it may collide with the first unadjusted denomination stop. As will be understood from Fig. 1, all of the denomination stops are normally out of co-operative relation with the column stops.

The right-hand terminal key at Fig. 3 (used for the denomination hundred thousand) is unconnected with any denomination stop. It is, however, mounted similarly to the other denomination keys, and similarly connected to a rod 55, whose function is principally to effect the necessary operation of the universal-bar 38. It may be similar in outline and operation to the denomination stop rods, but is illustrated as being thinner, because it is not used as a stop; and preferably it is provided with a hook 56 at its upper end, useful for insuring the return to normal position of the column stops, which, when this key is operated, collide

with the first in the series of denomination stops. This hook may, however, be omitted, if certain other means are employed for securing co-operation of the column-stops and denomination stops than those herein illustrated. The rod 55 is provided with a lug 57, so that it may be lifted by the lug 51 upon the first stop-rod. It will therefore be seen that means are common to all of the denomination keys, including the one unconnected to any stop, for enabling the co-operation of the column and denomination stops and releasing the carriage. Connections exist between all but one of the keys and all but one of the stops, the first key in the set being incapable of changing the relation of the denomination stops to one another, and the last stop in the series being incapable of movement to ineffective position.

It is noted that each succeeding stop member 26 is capable of actuating all of the preceding stop members together, but incapable of actuating any succeeding stop member; that a spring 45 common to said stop members is provided for returning them to normal position; that the lugs 57 have overlapping engagement from rod to rod, whereby each rod may move all the preceding rods while the keys belonging to the latter remain stationary, said rods being movable independently of the keys; that the endwise movable key-bearing rods 31 extend transversely of the stop rods 26 and forwardly therefrom; that while the column stops are mounted upon the carriage and the denomination stops upon the framework of the machine, the invention is not limited to this particular arrangement; that the column stops are movable one by one, by or through the actuation of any denomination key, into position for co-operation with the denomination stop of the same denomination as the key operated; that the column-stop bar 19 and the projecting device or cam 43 are relatively movable in the direction of the run of the carriage; that means are provided for effecting a relative movement in a transverse direction between said bar and said projecting device; and that the latch 22 upon the column stop is in the form of a yielding arm provided with a detent or enlargement.

Wide variations in arrangement and construction may be resorted to within the scope of my improvements; portions whereof may be used without others.

Having thus described my invention, I claim:

1. A tabulating mechanism including a series of denomination stops whereof the first may be actuated independently of the others, but is connected to the second to be actuated therewith; the second being actuable independently of the third, but being connected to the latter to be actuated therewith together with the first, and so on throughout

the series; said stops being normally in working position.

2. A tabulating mechanism including a series of denomination stops, a series of denomination keys, and connections from the keys to the stops; one key being connected to one stop, the next key to two stops, including the first-mentioned stop, the next key to the first three stops, the next to the first four stops, and so on throughout the series; said stops being normally in working position.

3. A tabulating mechanism including a series of independently movable denomination stops, a series of independently movable denomination keys, and a connection from each key to the stop of next higher denomination.

4. A tabulating mechanism including a series of independently movable denomination stops, a series of independently movable denomination keys, and connections from each key to all the stops of higher denominations; said stops being normally in working position.

5. The combination with a carriage and a stop normally out of working position, of a set of denomination stops mounted for co-operation with said stops; said denomination stops being normally in working position, and all except one thereof being movable out of working position.

6. The combination with a carriage and a stop, of a set of denomination stops mounted for co-operation with said stop; all of said denomination stops being normally in working position, and all except one thereof being independently movable; and a set of independently movable denomination keys connected to said movable stops.

7. The combination with a carriage and a stop, of a denomination stop normally in position for co-operation with said stop, a key for moving said denomination stop out of working position, and a permanent abutment mounted a letter-space distance from said denomination stop, for co-operation with the first-mentioned stop when the denomination stop is moved out of working position.

8. A tabulating mechanism including a carriage, a stop, a set of denomination stops mounted in position for engagement by said stop, and means for moving all except the last member of said set out of such position.

9. The combination with a carriage and a stop, of a set of denomination stops mounted in stop-engaging position, a series of denomination keys, and means for enabling one of said keys to move the first denomination stop out of engaging position, the next key to move the first two denomination stops, the next key to move the first three denomination stops, and so on; the last denomination stop in the set being inoperable by any of said keys.

10. A tabulating mechanism including a set of denomination stops whereof the first

may be actuated independently of the others, and means for connecting said stop to the second so that it may be actuated therewith; the second being actuable independently of the third, but being so connected to the latter as to be actuated therewith together with the first; and so on throughout the set with the exception of the last stop in the set, which is not operatively connected to any of the preceding stops.

11. A tabulating mechanism including a set of denomination stops, a series of denomination keys, and means whereby one key is connected to the first stop, the next key to the first two stops, the next key to the first three stops, and so on throughout the set of stops, with the exception of the last stop in the set, which is not operatively connected to any of said keys; all of said stops being mounted in working position.

12. A tabulating mechanism including a set of denomination stops, a series of denomination keys, and means connecting each key to the stop of the next denomination; one of the terminal stops in the set being unconnected with any of said keys.

13. A tabulating mechanism including a set of denomination stops, a series of independently movable denomination keys, and a connection from each key to the stop of next higher denomination; said stops being mounted in working position, the stop of the lowest denomination being unconnected to any of said keys, and the stops of all denominations except the lowest being independently movable by said keys.

14. A tabulating mechanism including a carriage, a stop, a set of denomination stops for co-operation with said stop, said denomination stops being so mounted that one covers the working face of another throughout the set, key-operated means for withdrawing any desired number of said denomination stops so as to expose the working face of any selected stop and permit it to co-operate with the first-mentioned stop, and means to return the denomination stops to normal positions after actuation.

15. A tabulating mechanism including a set of key-controlled denomination stops, one whereof is fixed and the others of which are independently adjustable; said stops being in contact with one another, and the fixed stop also serving as an abutment for the others.

16. A tabulating mechanism including a carriage, a stop, a set of denomination stops for co-operation with said stop, said denomination stops being so mounted that one contacts with and covers the working face of another throughout the set, and the last member of the set being fixed and serving as an abutment for the others, and key-controlled means connected to all of the denomi-

nation stops except said fixed stop, for withdrawing either one or more of them so as to expose the working face of any selected stop in the set and permit it to co-operate with the first-mentioned stop.

17. The combination with a carriage and a stop, of a series of denomination stops normally out of co-operative relation with said stop, means for adjusting any desired number of the denomination stops to ineffective position, and means for enabling the first-mentioned stop to co-operate with the first of the unadjusted denomination stops.

18. The combination with a carriage and a stop, of a series of independently adjustable denomination stops normally out of co-operative relation with said stop, independently movable denomination keys connected to means for moving said denomination stops out of effective position, and means for enabling the first-mentioned stop to co-operate with the first denomination stop not so moved.

19. The combination with a carriage and a stop, of a series of independently movable denomination stops normally out of co-operative relation with said stop, a series of denomination keys, connections between said keys and said stops such that by actuation of different keys different numbers of denomination stops may be moved together out of effective position, one key moving one stop, another key moving two stops, another key moving three stops, and so on, and means for enabling the first-mentioned stop to co-operate with a denomination stop not so moved out of effective position.

20. The combination with a carriage and a stop, of a series of denomination stops normally out of co-operative relation with said stop, one denomination stop covering the working face of another throughout the series, a series of independently movable denomination keys, means connected to one key for moving the first denomination stop to uncover the working face of the second, means controlled by the second key to cause the first two denomination stops to uncover the face of the third, means connected to the remaining keys for uncovering at will any of the remaining stops according to the particular key operated, and means for enabling the first-mentioned stop to co-operate with the denomination stop which is uncovered by the operation of any selected key.

21. The combination with a carriage and a stop, of a series of denomination stops, a series of denomination keys, means for enabling each key to move together to ineffective position all of the denomination stops in advance of the stop having the same denomination as the operated key, and means for enabling the first-mentioned stop to co-operate with the last-mentioned denomination stop,

all of said denomination stops being normally out of co-operative relation with said first-mentioned stop.

22. The combination with a carriage and a stop, of a series of denomination stops normally out of co-operative relation with said stop; a series of independently movable denomination keys; one key being connected to one denomination stop, the next key to the first two denomination stops, the next to the first three denomination stops, and so on throughout the series of keys; and means for enabling the first-mentioned stop to co-operate with the first of the unactuated denomination stops.

23. The combination with a carriage and a stop, of a set of denomination stops normally out of co-operative relation with said stop; said set including one stop which is permanently in effective position, and the others in the set being movable to ineffective positions; one denomination stop covering the working face of another throughout the set; means for moving one or more of the movable denomination stops to ineffective positions so as to uncover the working face of any selected stop; and means for enabling the first-mentioned stop to co-operate with the uncovered stop.

24. The combination with a carriage and a stop, of a set of denomination stops normally out of co-operative relation with said stop; a set of denomination keys whereof one is unconnected with any denomination stop; means for connecting the remaining keys to the denomination stops so as to move one or more of the latter to ineffective position; and means movable by said unconnected key for enabling the first-mentioned stop to co-operate with the first of the denomination stops; and means movable by the other keys for enabling said first-mentioned stop to co-operate with the remaining denomination stops, whereof the last is unconnected with any of said keys.

25. The combination with a carriage and a stop, of a series of independently adjustable denomination stops normally out of co-operative relation with said stop, independently movable denomination keys connected to means for moving said denomination stops out of effective position, and means common to said keys for enabling the first-mentioned stop to co-operate with the first denomination stop not so moved.

26. The combination with a carriage and a stop, of a series of denomination stops normally out of co-operative relation with said stop, a series of denomination keys, means for enabling each key to move to ineffective position simultaneously all of the denomination stops which are in advance of the stop having the same denomination as the operated key, and means common to the keys for enabling the first-mentioned stop to co-operate

with the last-mentioned denomination stop.

27. The combination with a carriage and a stop, of a series of denomination stops normally out of co-operative relation with said stop; a series of denomination keys; one key being connected to one denomination stop, the next key to the first two denomination stops, the next to the first three denomination stops, and so on throughout the series of keys, the connections enabling the keys to move the stops to ineffective positions; and means common to the keys for enabling the first-mentioned stop to co-operate with the denomination stops.

28. The combination with a carriage and a stop, of a set of denomination stops normally out of co-operative relation with said stop; a series of denomination keys; means for enabling said keys to move all except one of said denomination stops to ineffective positions; and means common to said keys for enabling the first-mentioned stop to co-operate with any denomination stop.

29. The combination with a carriage and a stop, of a set of denomination stops normally out of co-operative relation with said stop; a series of denomination keys, each key being disconnected from the stop of the same denomination; means for enabling any key to move all stops of higher denomination to ineffective position; the stop of lowest denomination being disconnected from any of said keys; and means common to said keys for securing co-operative relation between the first-mentioned stop and the denomination stops.

30. The combination with a carriage and a stop, of a plurality of denomination stops normally out of co-operative relation with said stop; a key unconnected with said stops; keys for moving any desired number of members of said plurality out of effective position; and means common to all of said keys for enabling the first-mentioned stop to co-operate with the several denomination stops.

31. The combination with a carriage and a stop, of a series of independently adjustable denomination stops normally out of co-operative relation with said stop, denomination keys connected to means for moving said denomination stops out of effective position, an additional denomination key unconnected to any denomination stop, and means common to all of the denomination keys for enabling the first-mentioned stop to co-operate with the several denomination stops.

32. The combination with a carriage and a stop, of a series of denomination stops normally out of co-operative relation with said stop, a series of denomination keys, connections between all but one of said keys and all but one of said stops such that one key may move one stop to ineffective position, the next key may move two stops similarly, and

so on, the first key being incapable of moving any stop to ineffective position, and the last stop being permanently in effective position, and means common to all of said keys for enabling the first-mentioned stop to co-operate with the several denomination stops.

33. The combination with a carriage and a stop, of a set of denomination stops normally out of co-operative relation with said stop, one denomination stop covering the working face of another throughout the set, a set of denomination keys movable independently of one another, and the first key in the set being incapable of changing the relation of the denomination stops to one another, means for enabling the next key to cause the first denomination stop to uncover the working face of the second, means for enabling the successive remaining keys to uncover similarly the successive remaining stops, the last stop in the series being incapable of movement to an ineffective position by the operation of any denomination key, and means common to all of the keys for enabling the first-mentioned stop to co-operate with the several denomination stops.

34. The combination with a carriage and a stop, of a set of denomination stops normally out of co-operative relation with said stop; a set of denomination keys; means operatively connecting each key to the stop of the next denomination, with the exception of one key, which is unprovided with a stop; the stop at the end of the set remote from said excepted key being unprovided with a key; and means common to all of said keys for enabling the first-mentioned stop to co-operate with the stop having the same denomination as the key which is actuated.

35. The combination with a carriage and a stop, of a series of independently movable denomination stops normally out of co-operative relation with said stop; a series of denomination keys; means for enabling each key except the key of highest denomination to move all the stops of higher denomination than the operated key to ineffective position; the key of highest denomination being incapable of moving any stop to ineffective position, and the stop of lowest denomination being unprovided with means for moving it to ineffective position by the operation of any of said keys; and means common to all of the keys for enabling the first-mentioned stop to co-operate with the stop of the same denomination as the key actuated.

36. The combination with a carriage and a stop, of a series of independently movable denomination stop members, means being provided upon the second stop member for actuating the first stop member, means upon the third for actuating the second, and so on throughout the series, each succeeding stop member being capable of actuating all of the preceding stop members together, but inca-

pable of actuating any succeeding stop member.

37. The combination with a carriage and a stop, of a series of independently movable denomination keys, a stop member operable by each key, means being provided upon the second stop member for actuating the first stop member, means upon the third for actuating the second, and so on throughout the series, and a spring common to said stop members for returning them to normal position.

38. The combination with a carriage and a stop, of a series of independently movable rods having stops formed upon their ends for co-operation with said stop, lugs upon said rods having overlapping engagement from rod to rod, so that some of the rods can move others, and keys for moving the rods.

39. The combination with a carriage and a stop, of a series of independently movable denomination keys, stop members operable by the keys, and means upon each stop member for actuating all of the preceding stop members together while their keys remain stationary, the stop members being movable independently of the keys.

40. The combination with a carriage and a stop normally out of working position, of a series of independently movable rods having stops provided upon their ends for co-operation with said stop and normally in working position, and a series of endwise movable key-bearing rods extending transversely of said stop rods and having camming engagement therewith.

41. The combination with a carriage and a stop, of a series of independently movable rods having stops provided upon their ends for co-operation with said stop, inter-engaging lugs upon said rods, a series of endwise movable key-bearing rods extending forwardly from said stop rods and having camming engagement therewith such that the stop rods may move independently of the key rods, and returning springs for the key rods.

42. The combination of a series of denomination stops, means for adjusting either one or more of the denomination stops to ineffective position, a carriage, a stop, and means for moving the last mentioned stop into position for co-operation with the first of the unadjusted denomination stops.

43. The combination with a carriage of a stop thereon, a plurality of stops mounted upon the framework of the machine, a key for moving one member of said plurality out of effective position, and means for projecting said carriage stop into position to co-operate with the next member of said plurality.

44. The combination of a series of independently movable denomination stops, a series of denomination keys, connections between said keys and said stops such that by actuation of different keys different numbers of denomination stops may be moved to-

gether out of effective position, one key moving one stop, another key moving two stops, and so on, a carriage, a stop, and means for projecting the last-mentioned stop into effective position.

45. The combination with a carriage of a stop thereon, a series of denomination stops, a series of denomination keys, means for enabling each key to move together to ineffective position all of the denomination stops in advance of the stop having the same denomination as the operated key, and means controlled by said keys for projecting said carriage stop to effective position.

46. The combination with a carriage and a stop thereon, of a series of members carrying denomination stops and having interengaging lugs, and means common to said denomination stop members for projecting said carriage stop into effective position.

47. The combination of a series of denomination stops; a series of denomination keys; means for enabling each of said keys to operate the stop of next denomination; a carriage; and a stop movable by any of said keys into position for co-operation with the denomination stop of the same denomination as the key operated.

48. The combination with a carriage of a stop mounted thereon; a series of independently movable denomination stops mounted in position for stopping the carriage; a series of independently movable denomination keys; means for enabling each key to move all the stops of higher denomination to ineffective position; and means controllable by any of said keys for projecting said carriage stop into position for co-operation with the first unmoved denomination stop.

49. The combination with a carriage of a stop thereon; a set of denomination stops; a set of denomination keys whereof one is unconnected with any denomination stop; means for enabling the remaining keys to move one or more of the denomination stops to ineffective position; and means movable by any of the keys for projecting said carriage stop to effective position.

50. The combination of a series of denomination stops; a series of denomination keys; connections between all but one of said keys and all but one of said stops, the first key being incapable of moving any stop, and the last stop being uncontrolled by any key; a carriage; a stop, and means controlled by all of said keys for projecting the last mentioned stop.

51. The combination of a carriage; a stop; a key connected to means for projecting said stop; a series of denomination stops; and key-operated means for moving any desired number of said denomination stops to ineffective position.

52. The combination of a carriage; a stop

thereon; a series of independently movable rods having stops thereon for co-operation with said carriage stop; lugs upon said rods having overlapping engagement from rod to rod; keys for moving said rods; and a bar movable by any of said rods and effective to project said carriage stop.

53. The combination of a series of denomination stops, means for adjusting any desired number of the denomination stops to ineffective position, a power-driven carriage under the control of letter-spacing mechanism, a stop upon the carriage, and means for both releasing the carriage and projecting the last-mentioned stop to effective position.

54. The combination of a series of denomination stops, a power-driven carriage under the control of letter-spacing mechanism, a co-operating stop, and key-controlled means for adjusting any desired number of said denomination stops, releasing the carriage, and effecting a relative projecting movement between said co-operating stop and said series of denomination stops.

55. The combination of a power-driven carriage under the control of letter-spacing mechanism, a series of independently adjustable denomination stops, a series of denomination keys, means controlled by said keys for moving either one or a plurality of the denomination stops out of effective position, a stop, and means also controlled by said keys for releasing the carriage and effecting a relative projecting movement between the last-mentioned stop and the series of denomination stops.

56. The combination of a power-driven carriage under the control of letter-spacing mechanism, a stop upon the carriage, a series of denomination stops, a series of denomination keys, means for enabling each key to move together to ineffective position all of the denomination stops that are in advance of the stop having the same denomination as the operated key, and means controlled by said keys for releasing the carriage and projecting said carriage stop to effective position.

57. The combination of a power-driven carriage under the control of letter-spacing mechanism; a stop upon the carriage; a set of denomination stops; key-controlled means for adjusting all but one of said denomination stops to ineffective positions; releasing the carriage, and projecting said carriage stop to effective position.

58. The combination of a series of denomination stops; a series of denomination keys; movement-transmitting members between all but one of said keys and all but one of said stops, the first key being incapable of moving any stop, and the last stop being uncontrolled by any key; a power-driven carriage under the control of letter-spacing

mechanism; a stop, and means controlled by all of said keys for projecting the last mentioned stop and releasing the carriage.

59. The combination of a series of independently movable denomination stops, a series of denomination keys, connections between said keys and said stops such that by actuation of different keys either one or a plurality of denomination stops may be moved out of effective position, a carriage, means thereon for supporting a series of column stops, and means for projecting said column stops to effective position.

60. The combination of a series of independently movable denomination stops, a series of denomination keys, means for enabling said keys to actuate either one or a plurality of denomination stops, one key moving one stop, the next moving two stops, and so on throughout the series, and said stops being moved by said keys to ineffective position, a power-driven carriage, means thereon for supporting a series of column stops, and means controlled by said keys for projecting the column stops to effective position and releasing the carriage.

61. The combination with a carriage of a bar, a series of column stops carried by said bar, a device for projecting said stops, said bar and said projecting device being relatively movable in the direction of the run of the carriage, means for effecting a relative movement in a transverse direction between said bar and said projecting device, and a stop for co-operation with the column stops to arrest the carriage.

62. The combination with a carriage of stops co-operating to arrest the carriage, and a cam mounted for co-operation with one of said stops for projecting the same to a position for co-operation with the other of said stops, said cam and the stop which it projects being relatively movable in the direction of the run of the carriage.

63. The combination with a carriage of a series of stops, a cam, said stops and said cam being relatively movable in the direction of the run of the carriage, a key for effecting relative transverse movement between said cam and said series of stops, and a stop for co-operation with said stops to arrest the carriage; said cam being effective to project said column stops to effective position.

64. The combination with a carriage of a bar, a series of column stops mounted upon said bar and independently movable thereon, a device for projecting said stops singly to effective position, said projecting device and said bar being relatively movable in the direction of the run of the carriage, and a co-operating stop for arresting the carriage.

65. The combination of a carriage, a series of independently movable column stops, a projector for said column stops, said projector and said stops being relatively movable

in the direction of the run of the carriage, means for moving said projector to effective position, and a co-operating stop for arresting the carriage; said projector when in working position being effective to move said column stops singly to effective position.

66. The combination with a carriage of a bar, a series of seats upon said bar, a series of column stops movably mounted upon said seats, a cam, said bar and said cam being relatively movable in the direction of the run of the carriage, a key for moving said cam transversely to a position where it is effective to project said column stops singly, and a co-operating stop for arresting the carriage.

67. The combination with a carriage of a bar thereon, a series of column stops upon the bar, a cam mounted in the path of the column stops and operative when engaged by said stops to project them to effective position, and a co-operating stop for arresting the carriage.

68. The combination with a carriage of a bar thereon, a series of seats upon the bar, a series of column stops movably mounted upon the seats, a cam mounted upon the framing of the machine, means for moving said cam into the path of said column stops, said cam being effective when engaged by said stops to move them singly in their seats to effective position, and a co-operating stop for arresting the carriage.

69. The combination with a carriage of a series of column stops, a column-stop projector, said stops and said projector being relatively movable in the direction of the run of the carriage, a series of independently adjustable denomination stops, keys for adjusting said denomination stops, and means controlled by said keys for moving said projector to effective position.

70. The combination with a carriage of a series of column stops, a cam, said stops and said cam being relatively movable in the direction of the run of the carriage, a series of denomination stops, means for adjusting said denomination stops, and means controlled by said adjusting means for moving said cam into the path of said column stops so that during the movement of the carriage the column stops may singly engage said cam and be forced thereby into effective position.

71. The combination with a carriage of a bar thereon, a series of column stops upon said bar, a cam mounted upon the framework of the machine, a series of independently movable denomination stops also mounted upon the framework, a series of keys connected to said column stops, and means for enabling said keys to move said cam into the path of the column stops; said cam being so constructed as to force the column stops singly to effective position during the carriage movement.

72. The combination with a power-driven

carriage normally under the control of letter-spacing mechanism, of a series of column stops, a column-stop projector, a series of denomination stops, means for adjusting
 5 said denomination stops, and means controlled by said adjusting means for releasing the carriage and moving said column-stop projector to effective position; said projector being effective to move the column stops
 10 singly to effective position during the carriage movements.

73. The combination with a power-driven carriage normally under the control of letter-spacing mechanism, of a series of column
 15 stops mounted upon the carriage, a cam and a series of independently movable denomination stops mounted upon the framework of the machine, a series of keys for adjusting said denomination stops, and means controlled by said keys for releasing the carriage
 20 and moving said cam into the path of the column stops; said cam being effective to force the column stops singly to effective position during the carriage movements.

74. The combination with a carriage, of a series of column stops mounted upon the carriage, a cam and a series of independently movable denomination stops mounted upon
 25 the framework of the machine, said denomination stops being normally in effective position, a series of keys for adjusting said denomination stops to ineffective position, and means controlled by said keys for moving
 30 said cam into the path of the column stops; said cam being effective to force the column stops singly to effective position during the carriage movements.

75. The combination with a power-driven carriage normally under the control of letter-
 40 feeding mechanism, of a series of column stops mounted upon the carriage, a cam and a series of independently movable denomination stops mounted upon the framework of the machine, said denomination stops being
 45 normally in effective position, and means controlled by said keys for releasing the carriage and moving said cam into the path of the column stops; said cam being effective to force the column stops singly to effective
 50 position during the carriage movements.

76. The combination with a carriage of a series of column stops, a cam, said stops and said cam being relatively movable in the direction of the run of the carriage, a series of
 55 denomination stops, key-operated means for moving said denomination stops to inopera-

tive position, means for moving the cam into the path of the column stops so that during the movement of the carriage the column stops may singly engage said cam and be
 60 forced thereby into effective position, and means for returning said denomination stops to normal position together with said cam, the construction and arrangement being such that the projected column stop is also re-
 65 turned to normal position by said returning means.

77. The combination with a carriage of a series of column stops thereon, a cam member mounted for co-operation with said stops,
 70 a series of denomination stops each having a part in position to actuate said cam member so as to enable it to effect the projection of the column stops, and means for actuating said denomination stops.

78. The combination with a power-driven carriage normally under the control of letter-
 80 feeding mechanism, of a series of column stops mounted on the carriage, a cam member mounted upon the framework for co-operation with said stops, a series of denomination stops also mounted upon the framework and normally in effective position, keys for moving said denomination stops to ineffective
 85 position, a part upon each of said denomination stops in position to actuate said cam member so as to enable it to effect the projection of the column stops, and a carriage-releasing arm rigid with said cam member.

79. The combination with a carriage of a
 90 rack thereon, and a detachable column stop mounted for a sliding movement in said rack, and having a yielding arm provided with a detent, and means for moving said stop in its seat.

80. The combination with a carriage of a
 95 bar thereon, a series of detachable column stops independently movable upon said bar, and a cam for effecting movements of said stops, and a series of denomination stops
 100 upon the framework.

81. The combination of a series of column stops, a series of denomination stops, a series of denomination keys, and means operable
 105 by said keys for moving said column stops one by one into position for co-operation with the stop of the same denomination as the key operated.

BURNHAM C. STICKNEY

Witnesses:

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LIDA ROSS.