

C. GABRIELSON.
 TABULATING MECHANISM FOR TYPE WRITING MACHINES.
 APPLICATION FILED JULY 6, 1910.

Patented Apr. 8, 1913.

4 SHEETS-SHEET 1.

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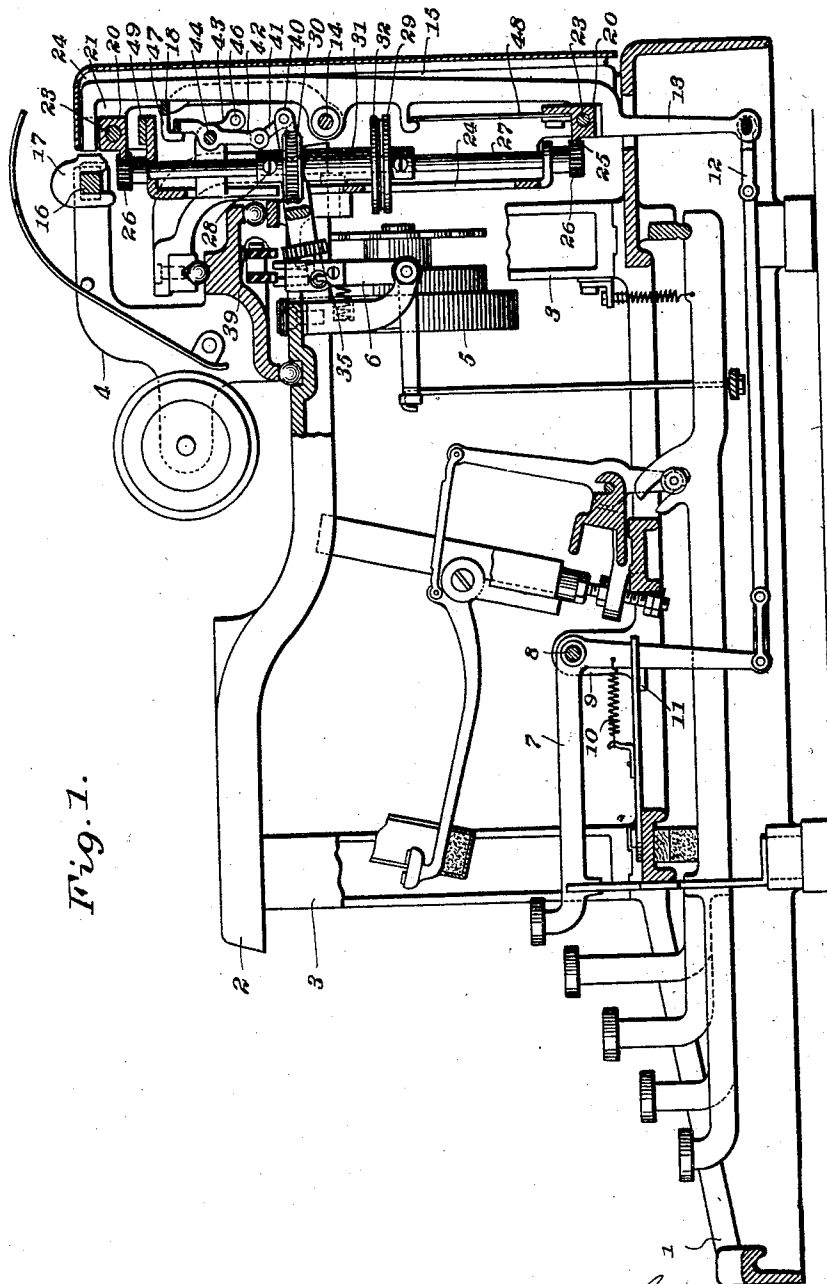


Fig. 1.

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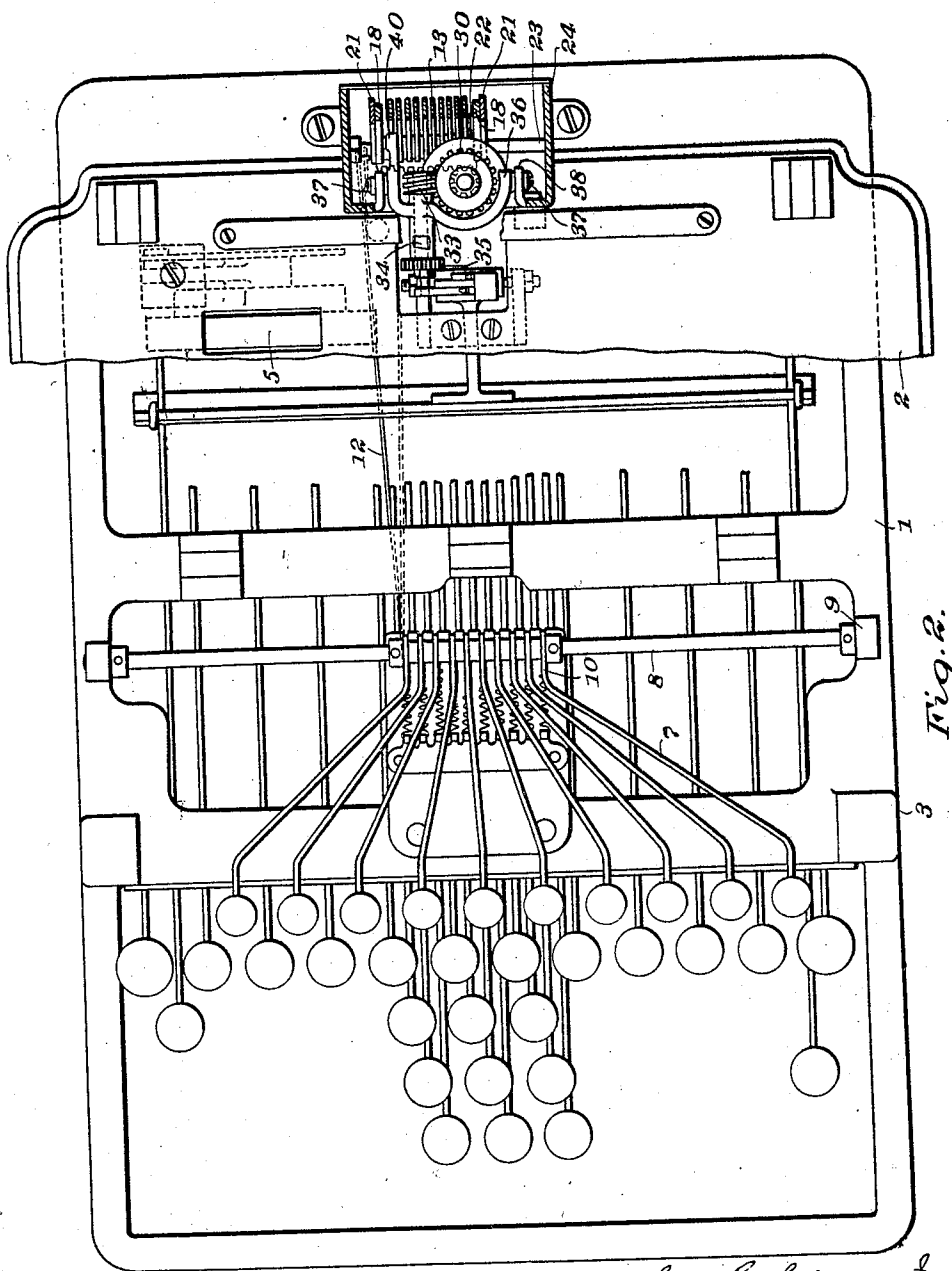


Fig. 2.

Witnesses

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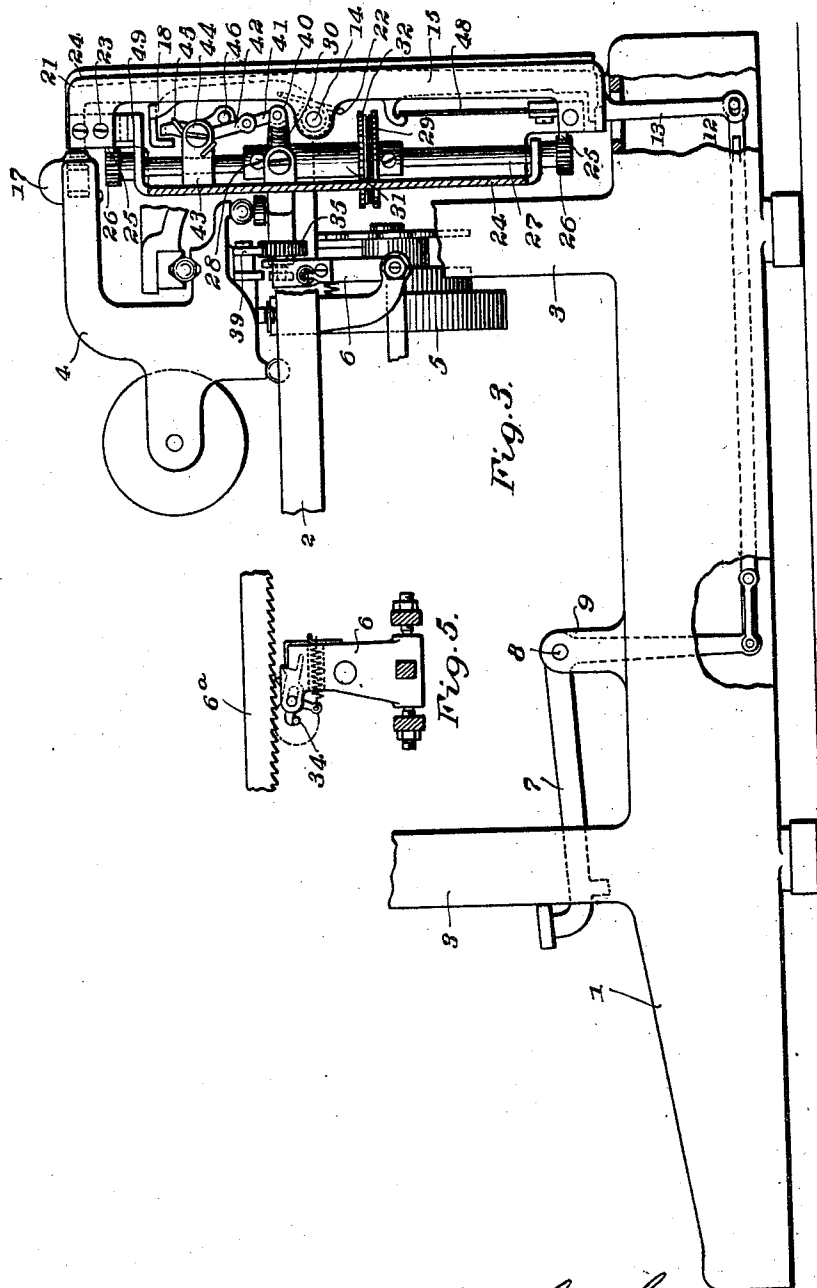
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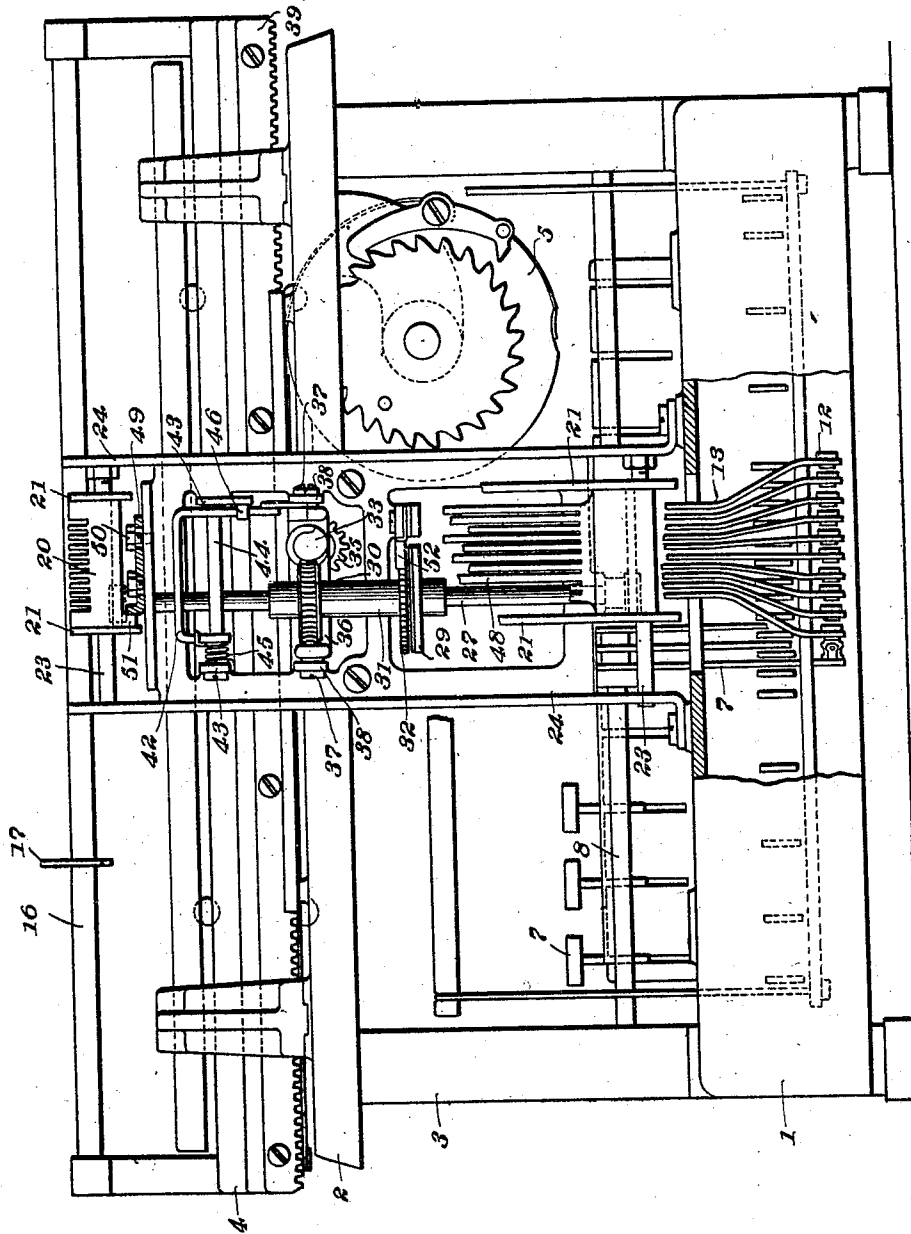


Fig. 4.

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UNITED STATES PATENT OFFICE.

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TABULATING MECHANISM FOR TYPE-WRITING MACHINES.

1,058,230.

Specification of Letters Patent.

Patented Apr. 8, 1913.

Application filed July 6, 1910. Serial No. 570,671.

To all whom it may concern:

Be it known that I, CARL GABRIELSON, a citizen of the United States, and resident of Syracuse, county of Onondaga, State of New York, have invented certain new and useful Improvements in Tabulating Mechanism for Type-Writing Machines, of which the following is a specification.

The object of the present invention is to produce a tabulating mechanism for typewriting machines by means of which the carriage may be stopped at any desired point without shock or jar or injury to the mechanism.

Typewriter carriages are required to move with promptness and rapidity when released by the feed dogs in ordinary writing and for this reason a strong carriage spring is desirable. In tabulating the carriage is permitted to run free for varying distances ranging from a fraction of an inch to a number of inches and sudden stoppage of the carriage after a long run is liable to injure the machine, in addition to producing a loud and disagreeable noise. Cushioning devices have been proposed, but it has been found that any spring or equivalent device which will cushion the carriage satisfactorily after a long run will prevent the carriage from going to its proper destination after a short run, or if the spring be weak enough to cushion a short run satisfactorily it will be ineffective after a long run. Numerous brakes have also been proposed for regulating the movement of the carriage in tabulating but it has been found difficult to use such brakes satisfactorily. The use of an ordinary brake renders the movement of the carriage sluggish and occasions considerable delay in long runs. It is desirable that the carriage should be permitted to run freely and at maximum speed until it nears the tabulator stop and that it should then be arrested gradually and contact with the stop without material shock.

The present invention comprises a brake the retarding force of which is automatically proportioned to the run of the carriage, whereby the carriage is stopped gradually and without shock regardless of the distance that it has traveled; and it further

comprises means by which the brake is brought into action only during a small fraction of the entire run of the carriage, the carriage being free to run at maximum speed when released and until it nears its destination.

The invention will be described in connection with the accompanying drawings, in which,

Figure 1 is a sectional view of a typewriting machine provided with my improved tabulating mechanism; Fig. 2 is a plan view partly in section. Fig. 3 is a side view of the machine, parts being broken away; Fig. 4 is a rear view, partly in section; Fig. 5 is a detail of the carriage escapement.

Throughout the several views of the drawings I have shown only such parts as are necessary to the understanding of the present invention, many of the customary features of a typewriting machine being omitted.

Referring to the drawing, 1 indicates the base of the machine, 2 the top plate and 3 the supporting posts, these portions constituting the frame. The carriage 4 is mounted on the top plate and connected to the spring drum 5 in the usual manner. The movement of the carriage is controlled by the feed dogs carried by the dog rocker 6 and coöperating with the rack 6^a.

The tabulator keys are carried on bell crank levers 7 mounted on a shaft 8 which is carried by brackets 9. Each tabulator key lever is provided with a spring 10 which holds it normally against a cushion stop 11. The downwardly projecting arms of the lever 7 are connected by means of links 12 with the lower ends of tabulator stop levers 13 which are pivotally mounted on a shaft or rod 14 at the back of the machine. The upper ends of the stop levers 13 are arranged at the rear of the tabulator rack 16 on the carriage and stand normally out of the path of the tabulator stops 17 on the rack as shown in Fig. 1.

In the drawing I have illustrated the invention as applied to a decimal tabulator, that is, a tabulator in which there are ten keys and ten stops, the latter being arranged

at unit distances apart and adapted to co-operate with any tabulator stop on the carriage. The general operation of decimal tabulators is now so well known that a detailed explanation thereof is not necessary. I shall refer to the stops 17 on the carriage as column stops and to the upper ends of the stop levers 13 as decimal stops. The carriage may be arrested by the cooperation of any one of the column stops with any one of the ten decimal stops.

The stop levers 13 and their pivot rod 14 are carried in a frame 15 comprising upper and lower transverse portions 20 and side rods 21 suitably connected to the parts 20. The transverse bars 20 are provided with guide slots for the decimal stop levers. The frame 15 travels laterally upon horizontal guide bars 23 mounted in the flanges of a fixed bracket 24, as shown particularly in Figs. 1 and 4. Each of the guide bars 20 is provided with a rack 25 meshing with pinions 26, the pinions 26 being on opposite ends of a shaft 27 mounted in the bracket 24. The shaft 27 has fixed thereon a collar 28 and a friction disk 29. Between the collar 28 and the disk 29 is a wormwheel 30 having a sleeve 31 to which is secured a second friction disk 32. Between the disks 29 and 32 I preferably place a disk of leather or other suitable material adapted to connect the disks frictionally. A disk of sheet metal having spring tongues or other projections adapted to engage the disks 29, 32, respectively, may be used for this purpose.

In constant mesh with the wormwheel 30 is a worm 33 upon a shaft 34 to which is connected a spur gear 35. The shaft 34 runs in a bearing on a bracket 36 supported on pivot screws 37 mounted in ears 38 of the main bracket 24. The teeth of the worm mesh loosely with those of the worm gear permitting of a rocking movement of the bracket 36 to carry the spur gear 35 into and out of engagement with the rack 39 on the carriage. The bracket 36 has a rearwardly extending arm 40 which is connected by a link 41 to a U-shaped lever 42 which is pivoted upon a rod 44 mounted in ears 43 of the bracket 24. A coiled spring 45 tends constantly to force the lever 42 against a pin or abutment 46, but the lever 42 is normally held in the position shown in Fig. 1 by a finger 47 on the tabulator universal bar 18, the spring on said universal bar being stronger than the spring 45.

To the lower guide bar 20 is fastened a spring plate comprising a series of springs 48, one for each of the decimal stop levers 13. The springs 48 are light, just strong enough to hold the stop levers 13 against the rear side of the lower guide 20, as shown in Fig. 1, and serve to prevent the remaining stops 13 from moving when one of the stops

is operated. It will be noted that the connections between the lower ends of the stop levers 13 and the links 12 are loose, permitting slight relative movement, which permits the stop levers together with their frame or carriage 15 to travel slightly to the right or left notwithstanding the tabulator key levers 7 have no such movement.

The upper bent portion of the bracket 24 (Figs. 1 and 4) carries an adjustable stop 49 which is held in place by two screws and the upturned end of this stop arrests the downward projection 51 of the upper bar 20 of the frame 15, thereby regulating the normal position of the frame and the stops 13 with relation to the stops 17 on the tabulator rack.

The operation of the device is as follows: When one of the tabulator keys is depressed the corresponding decimal stop is forced forward into the path of the column stop which travels with the carriage. This forward movement of the upper end of the stop lever 13 moves the tabulator universal bar 18 forwardly thereby releasing the U-shaped lever 42 and allowing the spring 45 to straighten the toggle joint between the lever 42 and the link 41 thereby moving the rocker 36 and throwing the spur gear 35 into engagement with the carriage rack 39. At the same time a projection on the forward end of the shaft 34 which carries the spur gear (Fig. 5) throws the stepping dog out of engagement with the carriage feed rack and releases the carriage from its feed mechanism, permitting it to be drawn rapidly to the left by the spring drum. The movement of the carriage to the left turns the worm wheel and worm gear and the shaft 27 and the pinions on this shaft operating on the racks 25 move the frame 15 and the decimal stop levers 13 slowly to the right through the frictional engagements of the disk 32 with the disk 29 which is fixed on the shaft 27. The parts are so proportioned that for every inch of travel of the carriage the stop frame 15 will move a small fraction of an inch. If, for instance, the stop frame moves one-sixteenth of an inch for each inch of travel of the carriage and the carriage is required to move eight inches, it will be clear that when the carriage has traveled a little over seven and one-half inches the frame 15 will have made up the balance of the distance, and in order that the carriage may reach its desired destination it must force the frame 15 backward to its normal or initial position. To do this the carriage must overcome the friction between the disks 29 and 32 as the disk 32 is prevented from turning by the worm while the disk 29 is geared to the stop frame. The frictional engagement of the disks 29 and 32 is so regulated that the stop frame will yield

under the momentum of the carriage and the tension of the carriage spring. If it be desired to relieve the worm wheel 30 and the worm 33 from the strain resulting from the impact of the carriage upon the stop 13, the disk 32 can be provided with ratchet teeth cooperating with a pawl 52 as shown in Fig. 4.

It will be evident that the frictional resistance interposed in the path of the carriage by the mechanism above described is substantially proportional to the length of free run of the carriage and hence it is possible to stop the carriage gradually and without shock regardless of the distance it travels before reaching the column stop. It will also be evident that the movement of the carriage is not interfered with excepting during a small proportion thereof and that hence this tabulating mechanism permits of very rapid operation while preventing undue wear and shock of the machine.

It will also be evident that the invention described may be modified variously as to details, such for instance as the connections between the tabulator keys and the operative portions of the denominational stops, the means for releasing the carriage, and the friction clutch. It will also be evident that the general arrangement of the invention may be reversed, that is, the stop on the carriage may be movable relatively to the carriage by suitable frictional means and the stop or stops on the frame may be immovable in the direction of the carriage movement. In such case the stop on the carriage would be caused to move forward or to the left slightly faster than the carriage, in tabulating, and restored to its normal position by impact upon the relatively fixed stop, causing the carriage to stop gradually and without shock.

Having thus described the invention, what is claimed is:

1. In a tabulating mechanism for typewriting machines, the combination with the carriage, a stop mounted on the carriage, and means for moving the carriage toward the left when released, of an intercepting stop on the frame, and means for moving said latter stop toward the right to meet the stop on the carriage.

2. In a tabulating mechanism for typewriting machines, the combination with the carriage, a stop mounted on the carriage and means for moving the carriage toward the left when released, of an intercepting stop on the frame, and means for moving said latter stop toward the right to meet the stop on the carriage, said means being operatively connected with the carriage.

3. In a typewriting machine, the combination with the carriage, means for moving the carriage, and a tabulator stop on the car-

riage, of a cooperating stop adapted to be projected into the path of the tabulator stop, a support for the cooperating stop movable parallel with the carriage, and means connecting said support and carriage whereby they are simultaneously driven in opposite directions.

4. In a typewriting machine, the combination with the carriage, means for moving the carriage, and a tabulator stop on the carriage, of a cooperating stop adapted to be projected into the path of the tabulator stop, a support for the cooperating stop movable parallel with the carriage, and means for frictionally connecting said support and carriage whereby they are moved in opposite directions and the support is adapted to yield to the carriage when the stops become engaged.

5. In a typewriting machine, the combination with the carriage, means for moving the carriage, and a tabulator stop on the carriage, of a cooperating stop, a support for the latter stop movable on the frame in a direction opposite to the movement of the carriage in tabulating, and means for simultaneously releasing the carriage from its feed mechanism and engaging it with said support through suitable intermediate connections.

6. In a typewriting machine, the combination with the carriage, means for moving the carriage, and a tabulator stop on the carriage, of a cooperating stop movable into and out of the path of the tabulator stop, a support for said cooperating stop movable parallel with the path of the carriage, and yielding or frictional means for moving said cooperating stop in a direction contrary to that of the carriage in tabulating and at a slower speed.

7. In a typewriting machine, the combination with the carriage, means for moving the carriage, and a tabulator stop on the carriage, of a cooperating stop supported on the frame, means for moving said cooperating stop into and out of the path of the tabulator stop, means for moving said cooperating stop in a direction contrary to the movement of the carriage, and means for simultaneously releasing the carriage and engaging the latter stop moving means therewith.

8. In a typewriting machine, the combination with the carriage, means for moving the carriage, and a tabulator stop on the carriage, of a cooperating stop movable into and out of the path of the tabulator stop, and also movable in a direction parallel with the movement of the carriage, and a friction device for imparting the latter movement, the said friction device being adapted to yield to the momentum of the carriage to gradually stop the same.

9. In a typewriting machine, the combination with the carriage, means for moving the carriage, and a tabulator stop on the carriage, of a plurality of decimal stops, a support for said decimal stops movable on the frame, and means for moving said support simultaneously with the movement of the carriage and in a direction contrary to the movement of the carriage in tabulating.
10. In a typewriting machine, the combination with the carriage, means for moving the carriage, and a tabulator stop on the carriage, of a series of decimal stops, a support for said stops movable in a direction parallel with the movement of the carriage, and means for connecting said support with the carriage whereby they are simultaneously moved in opposite directions.
11. In a typewriting machine, the combination with the carriage, means for moving the carriage, and a tabulator stop on the carriage, of a series of decimal stops, a support for said stops movable in a direction parallel with the movement of the carriage, and means for connecting said support with the carriage whereby they are simultaneously moved in opposite directions, said means including a frictional device adapted to yield under the influence of a carriage propelling means.
12. In a typewriting machine, the combination with the carriage, means for moving the carriage, and a tabulator stop on the carriage, of a series of decimal stops, a support for said stops movably mounted on the frame, a corresponding series of tabulator keys adapted to project said stops into the path of the tabulator stops, and means for moving said support simultaneously with the movement of the carriage and in the opposite direction.
13. In a typewriting machine, the combination with the carriage, means for moving the carriage, and a tabulator stop on the carriage, of a series of decimal stops, a series of levers carrying said stops respectively, a movable support in which said levers are pivotally mounted, keys for operating said levers, and frictional means for moving said support in a direction contrary to the movement of the carriage and tabulator.
14. In a typewriting machine, the combination with the carriage, means for moving the carriage, and a tabulator stop on the carriage, of a series of decimal stops, a series of levers carrying said stops respectively, a movable support in which said levers are pivotally mounted, keys for operating said levers, and frictional means for moving said support in a direction contrary to the movement of the carriage and tabulator, said means being driven by engagement with the carriage, and a tabulator stop on the carriage, of a cooperating stop supported on the frame and movable in a direction contrary to the movement of the carriage in tabulating, and means for moving said cooperating stop in said direction amounts proportional to the respective movements of the carriage in tabulating.
16. In a typewriting machine, the combination with the carriage, means for moving the carriage, and a tabulator stop on the carriage, of a cooperating stop supported on the frame and movable in a direction contrary to the movement of the carriage in tabulating, and means for moving said cooperating stop in said contrary direction each time the carriage is released in tabulating, said means being operated by engagement with the carriage.
17. In a typewriting machine, the combination with the carriage, means for moving the carriage, and a tabulator stop on the carriage, of a plurality of decimal stops, adapted to be projected into the path of the tabulator stop, a support for said decimal stops movable parallel with the path of the carriage, and connections including a frictional element for driving said movable support from the carriage at a relatively slow speed and in the opposite direction to the movement of the carriage, for the purpose set forth.
18. In a typewriting machine, the combination with the carriage, means for moving the carriage, and a tabulator stop on the carriage, of a cooperating stop adapted to be projected into the path of the tabulator stop, a movable support for the cooperating stop, frictional means for moving said cooperating stop in a direction opposite to the movement of the carriage in tabulating, said frictional means being adapted to yield to the carriage moving means, whereby the cooperating stop is returned to its starting point by the carriage, and an abutment for limiting said return movement.
19. In a tabulating mechanism for typewriting machines, the combination of a stop on the carriage, a cooperating stop on the frame, and means for causing said stops to approach each other in tabulating more rapidly than the carriage moves relatively to the frame.
20. In a tabulating mechanism for typewriting machines, the combination of a stop on the carriage, a cooperating stop on the frame, and frictional means for causing said stops to approach each other in tabulating more rapidly than the carriage moves relatively to the frame.
21. In a tabulating mechanism for typewriting machines, the combination with a stop on the carriage, of a cooperating stop carried by the frame, and means for moving

one of said stops relatively to its support and horizontally toward the other stop when the carriage is released.

22. In a tabulating mechanism for type-
5 writing machines, the combination with a stop on the carriage, of a cooperating stop carried by the frame, and frictional means for moving one of said stops relatively to its

support and horizontally toward the other stop when the carriage is released.

In testimony whereof I affix my signature
10 in presence of two witnesses.

CARL GABRIELSON.

Witnesses:

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C. M. STEVENS.