No. 714,523. Patented Nov. 25, 1902.

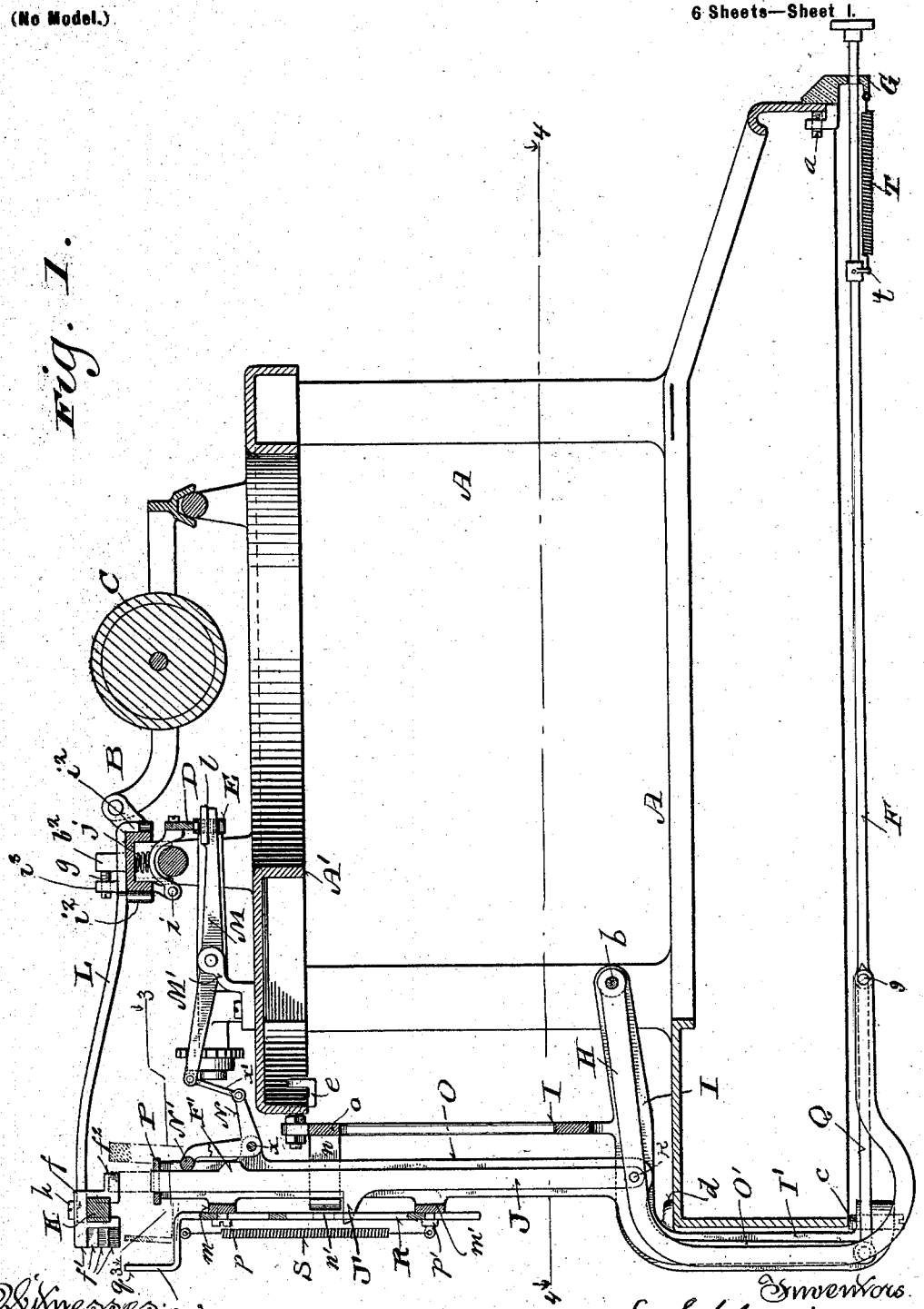
L. SCHLESINGER & G. W. YOUNG.

SPACING MECHANISM FOR TYPE WRITING MACHINES.

(Application filed Dec. 13, 1900.)

(No Model.) 6 Sheets—Sheet 1.

Fig. 1.



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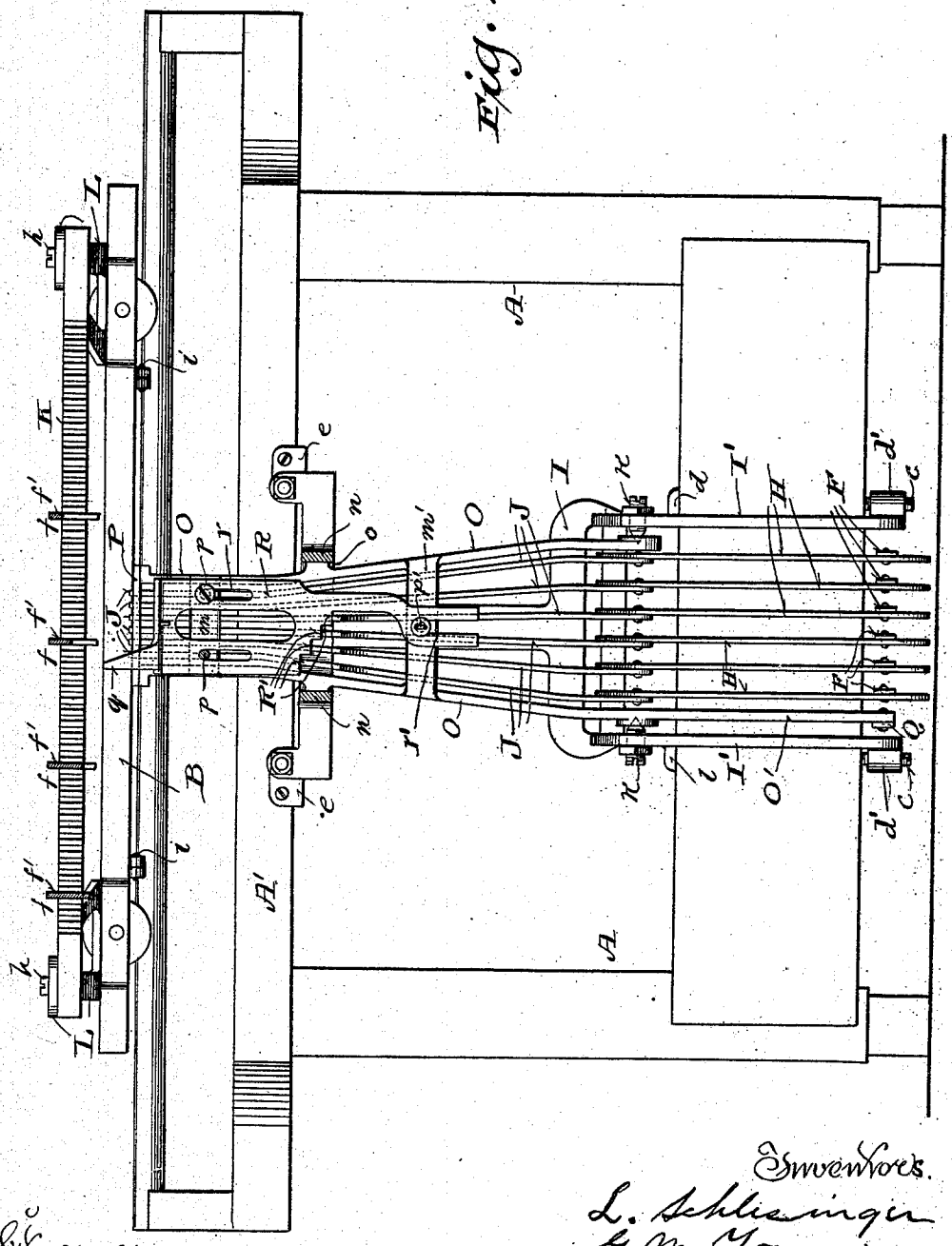
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SPACING MECHANISM FOR TYPE WRITING MACHINES.

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(No Model.) 6 Sheets—Sheet 2.

Fig. 2.



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(No Model.) 6 Sheets—Sheet 3.

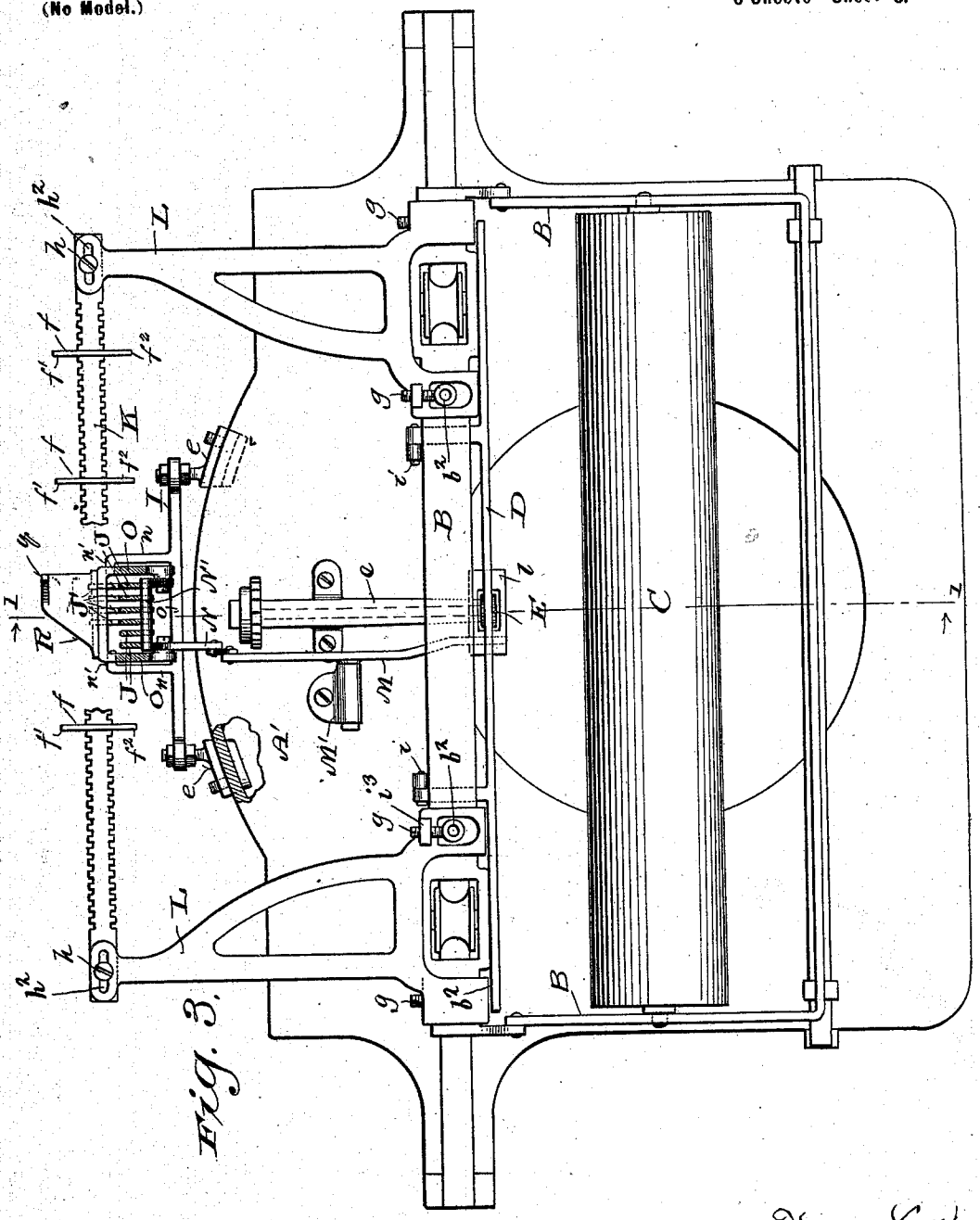


Fig. 3.

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(No Model.) 6 Sheets—Sheet 4.

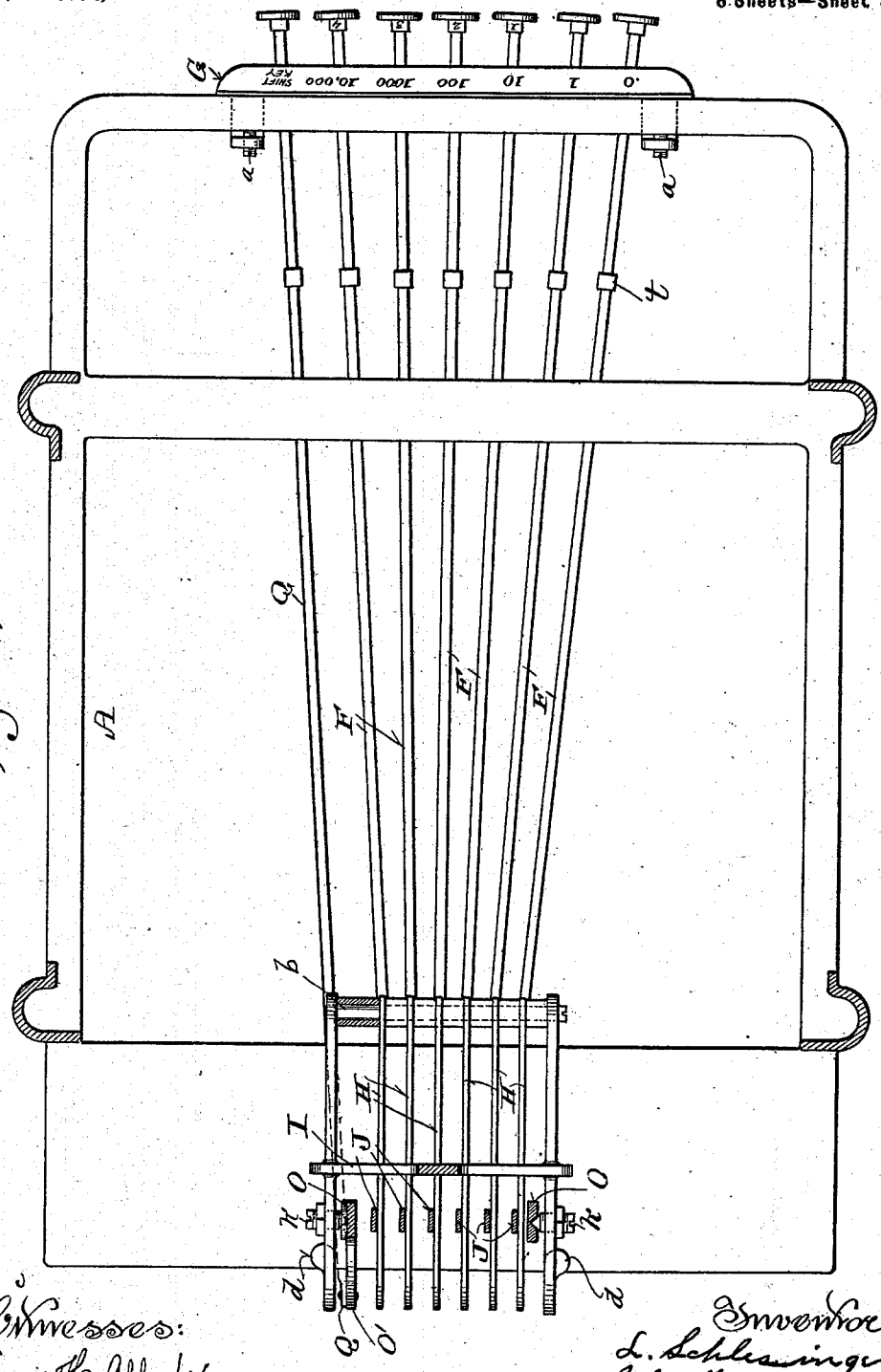


Fig. 4.

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(Application filed Dec. 13, 1900.)

(No Model.) 6 Sheets—Sheet 5.

Fig. 6.

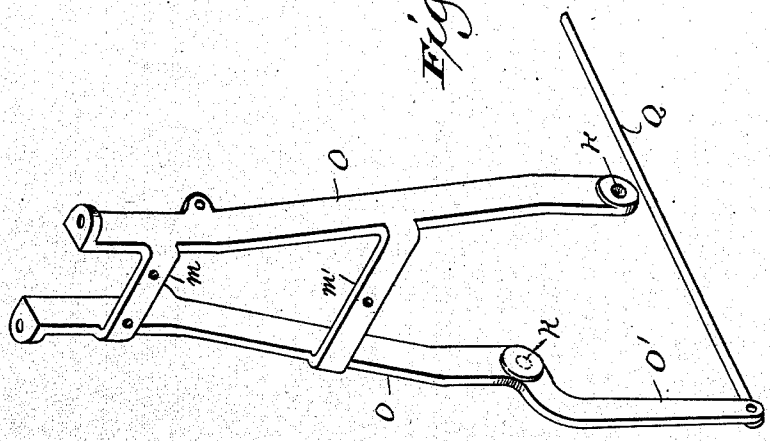
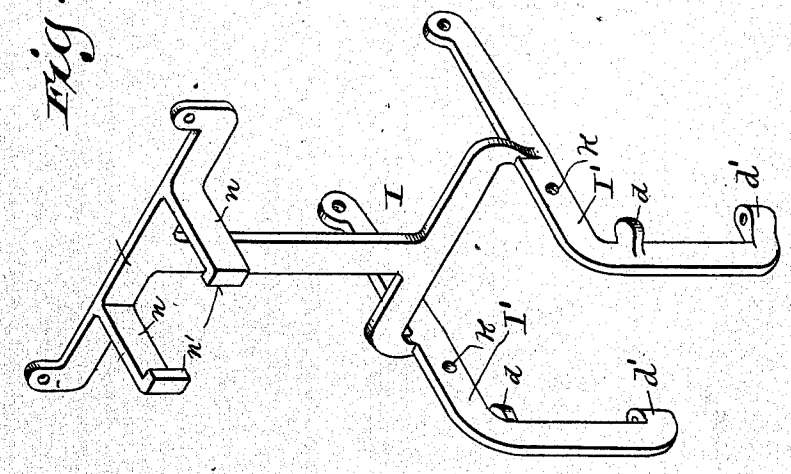


Fig. 5.



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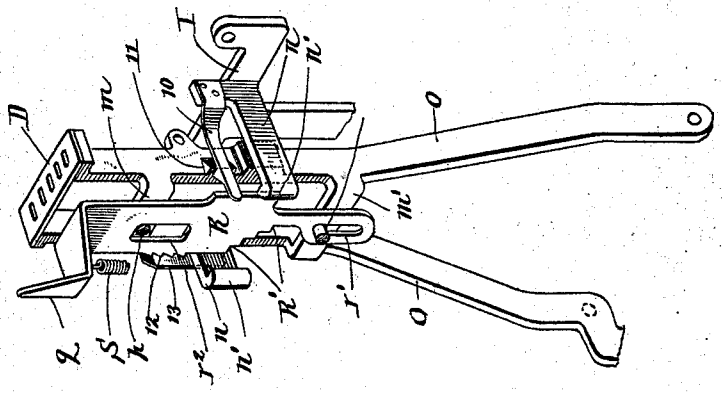
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SPACING MECHANISM FOR TYPE WRITING MACHINES.

(Application filed Dec. 13, 1900.)

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Fig. 7.



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UNITED STATES PATENT OFFICE.

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SPACING MECHANISM FOR TYPE-WRITING MACHINES.

SPECIFICATION forming part of Letters Patent No. 714,523, dated November 25, 1902.

Application filed December 13, 1900. Serial No. 39,667. (No model.)

To all whom it may concern:

Be it known that we, LOUIS SCHLESINGER and GEORGE W. YOUNG, residents of the city and county of Milwaukee, in the State of Wisconsin, have invented certain new and useful Improvements in Spacing Mechanism for Type-Writing Machines, of which the following is a full, clear, and exact description.

Type-writing machines of the most modern styles may be divided into two general classes, in one of which the carriage or support for the paper is movable with respect to the printing mechanism and in the other of which (commonly called "book type-writers") the sheet or book to be written upon is mounted upon a stationary support, while the printing mechanism is movable with respect thereto, and in both of these styles of machines an escapement mechanism is interposed between the fixed and movable members in order to permit the step-by-step movement in the direction of the line of print. Both of these types of machines have heretofore been provided with devices whereby the movable member—for example, the paper-carriage—after being released from the control of its escapement mechanism is permitted to run free or to be moved manually until arrested by the engagement of a dog or arm with a series of so-called "column-field stops" arranged at desired intervals along the entire line of print corresponding to definite points of the paper or book at which it is desired to arrest the carriage. In some instances the series of column-field stops have been arranged upon the movable paper-carriage and the engaging dog has been placed upon the frame of the printing mechanism, while in other cases the opposite arrangement has been employed. In all of these prior devices, however, the operative relation of the parts has been such that when the carriage or movable member was allowed to run free it would necessarily engage the first and thereafter successively the remaining column-field stops whatever their number might be. In certain classes of type-writing work, in which it is desired to employ a number of column-field stops for defining a plurality of columnar fields upon the sheet to be printed, it often happens that in certain of the lines of writing no entry is required in the first one or perhaps the first several of the columns or fields, the entry or entries being made only in the last one or more of the predetermined columns.

All prior constructions of columnating apparatus have been subject to the objection that under all conditions the carriage or movable member when released from its escapement was necessarily arrested at the first and at each succeeding column-field stop until it finally reached the stop at which the desired entry was to be made.

Our present invention has for one of its objects to overcome this objection, and this feature of the invention consists in providing a series of column-stops or other suitable means whereby a series of columnar positions or fields ranged along the entire line of print may be defined or produced and in providing in connection therewith column-skipping mechanism by which the carriage or movable member may be released from its escapement and arrested at a predetermined one of the columnar positions or fields without being temporarily checked by the first or intermediate column-field stops, as with prior devices, the carriage or movable member thus skipping, as it were, all the column-fields between its starting-point and a particular one at which the desired entry is to be made.

Type-writing machines have also been heretofore equipped with so-called "tabulating" or "denominational-stop" mechanism, whereby the carriage or movable member when released from its escapement is allowed to run free or to be moved manually to any one of a group of several positions determined by a group of stops arranged at letter-space distances apart, these last devices being more especially designed to permit rows of figures to be printed in proper denominational order, one beneath the other.

A further object of our invention is to provide an improved construction of tabulator mechanism of the type last described.

A still further object of the invention is to provide an apparatus embodying in combination a columnating mechanism whereby the paper-carriage or movable member may be arrested at a predetermined one only of a series of column-fields ranging across entire

line of print and tabulator or denominational-stop mechanism whereby the orderly printing of rows of figures or the like may be effected.

With these several objects in view the invention consists in the features of improvement and novel combination of parts hereinafter described, illustrated in the accompanying drawings, and particularly pointed out in the claims at the end of this specification.

Figure 1 is a view in vertical section on line 1 1 of Fig. 3 through a type-writing machine having our invention applied thereto. Fig. 2 is a rear elevation of the machine with parts broken away. Fig. 3 is a plan view, parts being broken away for better illustration. Fig. 4 is a view in horizontal section on line 4 4 of Fig. 1. Fig. 5 is a detail perspective view of a stationary frame forming a part of the improved apparatus. Fig. 6 is a perspective view of the shifting frame, and Fig. 7 is a detail perspective view of certain locking devices hereinafter described.

The particular form of the invention hereinafter described being more especially designed for that class of machines in which a movable paper-carriage is employed, it has been deemed necessary only to illustrate such style of machine; but as certain broad features of the invention are manifestly applicable to other styles of machines it is not intended that the claims hereinafter made should be understood as limited to a machine of the type shown.

The main frame A of the machine may be of any suitable form, and the carriage B may be mounted thereon in any convenient manner, this carriage being shown as furnished with the usual platen C, whereon will be supported the paper to be printed. As shown, the carriage B, which is of the familiar "Remington" style, has connected therewith a rack-bar D, with which engages a pinion E, the shaft of this pinion being mounted in a stationary bearing *e*, this rack and pinion forming part of the usual escapement mechanism whereby the step-by-step feed of the paper-carriage is controlled. The rack D is provided with rearwardly-extending arms that are pivotally connected in the usual manner, as at *i*, to lugs depending from the rear bar of the carriage B, and a suitable coil-spring *j* serves to hold the rack D in normal engagement with the pinion E. The rack D will be provided with the usual mechanism, (not shown,) whereby it may be raised from the pinion E when it is desired to move the carriage in either direction independently of its escapement mechanism. The top A′ of the main frame is formed with the usual circular opening, around which will be grouped the type-bars whereby the printing of the paper on the platen C will be effected. To the back bar of the carriage B is suitably connected the rearwardly-projecting arms L, these arms being shown as provided upon their front ends with depending lugs i^2, that straddle the back bar of the carriage, and with vertical lugs i^3, through which pass the set-screws *g*, adapted to bear against studs b^2, rising from the back bar of the carriage through openings in the front ends of the bars L. Manifestly, however, the bars L may be connected to the carriage in any other convenient manner. The rear ends of the bars L carry a column-stop bar K, that is preferably connected to the arms L by set-screws *h*, that pass through slots h^2, formed in the rear ends of the bars L, the purpose of these slots being to permit an accurate adjustment of the column-stop bar with respect to the letter-space mechanism of the machine. Upon the bar K will be suitably mounted suitable means, such as stops, for producing or defining a series of columns and which will coöperate with the dogging means and with the denominational contacts or plungers to be presently described. In the preferred form of the invention the bar K is formed with serrations or notches arranged at letter-space distances apart and adapted to receive adjustable column-field stops *f′*, coöperating with the dogging means, and denominational column-stops f^2, coöperating with the denominational plungers. Preferably but not necessarily these two sets of stops consist of contact parts or projections upon the combined column-field and denominational column-stops *f*, located when the latter are in position on opposite sides of the column-stop bar K. Column-stops *f′* are thus adapted to be adjusted along the column-stop bar K to define column-fields at variable positions along the line of print and are adapted to be held or set in adjusted position.

By reference more particularly to Figs. 1 and 2 of the drawings it will be seen that the column-field stops *f′* are graded or stepped, so that these stops stand progressively at different points with respect to the dogging mechanism with which they will engage.

Beneath the main frame A of the machine extend a series of push-keys F, the front ends of which are provided with finger-pieces and are mounted in manner free to slide within a bar G, that may be conveniently attached to the base of the main frame, as clearly shown in Fig. 1, by lugs that carry set-screws *a*. In the drawings (see Fig. 4) six push-keys F are shown, these keys being numbered, respectively, from "0" to "10,000," although manifestly any desired number of such keys may be employed. The rear ends of the keys F are pivotally connected, as at 9, to the lower forwardly-projecting ends of a corresponding series of levers H, the upper ends of which levers are pivotally mounted upon a rod *b*, that is journaled in the front portion of a stationary frame I. This frame I is preferably constructed as shown, reference being had more particularly to Fig. 5 of the drawings, in which the lower part of the frame I comprises side bars I′, having inwardly-extending lugs *d*, adapted to rest upon the back of the main frame and having at their ex-

treme lower ends lugs d', that set beneath the main frame and are clamped thereto by suitable set-screws c. (See Figs. 1 and 2.) Within the frame I and pivoted thereto at the points K K is mounted a shifting frame, which, as shown, consists of side bars O O, that are united by cross-bars m m' and by a slotted cap-plate P. The upper ends of the bars O set between the arms n n of the frame I, the swinging movement of the bars O being limited by the bent ends n' of said arms. One of the bars O of the shifting frame is extended downwardly, and to its lower end is pivotally connected the rear end of a supplemental push-key or shift-key Q, the forward end of this key Q passing through the plate G and being provided with a finger-piece similar to the keys F F. Each of the keys F and as well also the shift-key Q is shown as retracted by a coil-spring T, one end of which is connected to the front bar G, while the opposite end is attached to a lug t, fixed to the corresponding key. (See Fig. 1.) Upon the cross-bars m m' of the shifting frame is mounted a plate R, carrying at its upper end an arresting device or stop-dog q, which, as shown, is bent rearwardly or in offset relation to the plate R, so as to stand normally out of the line of travel of the column-field stops f' above it. The plate R is formed with slots r and r', through which pass the headed screws p p', respectively, (see Figs. 1 and 2,) whereby the plate is held in manner free to slide upon the cross-bars m m' of the shifting frame. A coil-spring S, connected at its upper end to the angular portion of the plate R and at its lower end to the head of the screw p', (or other relatively fixed part,) serves to hold the plate in the normally retracted position shown in the drawings. To each of the levers H is pivotally connected the lower end of a plunger J, the upper ends of these plungers passing through the slotted cap-plate P and stand normally beneath the path of travel of the denominational column-stops f^2. In the preferred form of this invention the plungers J perform the double function of operating the plate R to bring its dog q into engagement with the contact parts f' of the column-stops and of bringing the upper ends or contact parts of the plungers into engagement with the stops f^2 when columns of figures are to be tabulated; but manifestly if the columnating mechanism of our invention alone is to be employed the upper ends or denominational contacts of the plungers and the stops f^2 may be omitted. In the preferred embodiment of our invention a variable movement is imparted to the dog q in order to bring this dog into proper position for engagement with a predetermined one of the set of stops f' above it and to enable the dog to skip the intermediate column-stops. Preferably this variable movement of the dog is effected by providing lost-motion connections at suitable points between the dog and the keys, whereby it is shifted. As shown, the variable movement of the dog q is effected by providing the plate R (see Fig. 2) with a series of graded steps R', these steps corresponding in number and arrangement with the correspondingly-graded stops f'. Each of the plungers J is formed with a lug or offset J', that is arranged beneath the corresponding step or shoulder R' of the plate R. Hence it will be seen that when either of the plungers J is raised its lug J' will contact with the corresponding step or shoulder of the plate R and lift the plate into position to engage the contact part of one of the column-stops f. Inasmuch as the lugs J' of the plungers are in horizontal line, it will be seen that with certain of the plungers there will be lost motion until their lugs J' have been raised far enough to strike the steps R' of the plate R above them. Hence it will be seen that a varying extent of movement will be imparted by the plungers to the plate R, and consequently to the dog q, and the effect of this will be to cause the engagement of the dog with a predetermined column-stop, as will presently more fully appear. In the drawings the column-stop bar K is shown as provided with but four column-field stops, and consequently only four of the plungers J are shown as provided with lugs or offsets J', (the corresponding keys being designated by numerals 1 to 4,) although if more column-field stops are desired others of the plungers J will be provided with offsets and additional steps R' will be added to the plate R. In this manner column-skipping mechanism is provided by which the carriage is released and the stop-dog actuated to engage a predetermined column-field stop and bring a predetermined column to the printing-point.

The release of the paper-carriage from its escapement mechanism in order to permit the carriage to run free until arrested by any predetermined column-stop is preferably effected by the mechanism next to be described. Pivotally mounted, as at x, between the arms O of the swinging frame is a bell-crank lever N, the rear portion of which comprises two arms united by a bail or cross-bar N'. The front arm of the bell-crank lever is pivotally connected by a link x' to a releasing-bar M, that is pivotally mounted upon a bracket M' upon the top plate of the main frame. This arm M is furnished at its forward end with a shoe l, having an opening therein to set over the pinion E, (see Fig. 3,) and when the shoe l is lifted in manner to be presently described it will contact with the lower edge of the rack D and lift the rack from engagement with the pinion. Each of the plungers J is provided upon its front edge with a lug or offset F', which when the plungers are raised from normal position to the position shown by dotted lines in Fig. 1 will contact with the cross-bar or bail N' of the elbow-lever N, thereby rocking this lever and causing it in turn to rock the releasing-lever M, so as to effect the disengagement of the rack-bar D from the pinion E and so permit the

paper-carriage to be drawn forward by its propelling spring independently of the escapement mechanism.

From the foregoing description the operation of the parts will be seen to be as follows, the operation of the column-field-stop mechanism being first described: The operator will first arrange the several stops f at positions upon the bar K in keeping with the number of predetermined points along the line of print at which the carriage is to be arrested. If then it is desired to print at the extreme right-hand side of the sheet in the fourth column-field, (for example, a date,) the operator will force inward the shift-key Q and at the same time also the push-key F, No. 4, adjacent the shift-key Q. The effect of moving inward the shift-key Q is to cause the swinging frame O with parts carried thereon to turn about its pivot-points K, thereby moving the dog q and the plungers J from the position shown by full lines to the position shown by dotted lines in Fig. 1. The dog q is thus brought into the plane of travel of the column-field stops, while the upper ends of the plungers J are moved from the path of the stops f^2. By reference to Fig. 2 it will be seen that the operation of this particular push-key will lift the corresponding plunger J, the lug J′ of which is beneath the extreme right-hand step or shoulder R′ of the plate R. As the plunger J is lifted, its lug J′ will contact with the bail or bar N′ of the elbow-lever N, thereby causing this lever to rock the release-lever M until its forward end raises the rack-bar D from engagement with the pinion E, thereby permitting the paper-carriage thus freed from its escapement to be drawn rapidly toward the left. Inasmuch as the plunger J must move a considerable distance before its lug J′ contacts with the corresponding shoulder R′, it follows that the dog q will be lifted by the plunger a sufficient distance only to enable it to engage the column-field stop f' of the column-stop f at the extreme right of the carriage, the dog thus skipping or escaping the column-field stops intervening between it and the column-stop at the extreme right. If upon the next line to be printed it is desired to stop, for example, at the second column-field stop from the left-hand end of the carriage, the operator will push inward the shift-key Q in manner above described and at the same time will force inward the third push-key F, No. 2, therefrom. The effect will be to lift the dog q sufficiently high to engage the second column-field stop f' from the left-hand end of the carriage, but not high enough to contact with the column nearest such end. It will be seen that by means of our improved columnating mechanism the carriage is released and arrested at any one of a series of positions arranged along the entire line of print and predetermined by the adjustment of the column-field stops on the carriage instead of having the carriage arrested by the first and each succeeding column-stop, as in the prior constructions. This provision of means whereby the carriage may run uninterruptedly until it reaches the predetermined one of a plurality of column-field stops is a marked advance in the art, as it very materially saves the time of the operator. In a preferred modified form of this columnating mechanism to insure certainty of operation we provide means for locking the operating parts after they have been moved from the normal, and whereby both are subsequently unlocked, preferably, when the selected column-stop upon the carriage engages the dog, so that the operator need only actuate the proper key, but need not keep his finger upon it.

The locking devices are illustrated in Fig. 7. A bent spring-catch 10 extends parallel to one of the arms n and is adapted to engage a lug 11 on the swinging frame O. The lug 11 has an inclined and an abrupt face, so that the frame O may be readily swung inwardly by the shift-key Q, but will be locked in such inward position as the spring-catch 10 engages the abrupt face of the lug 11. The slot r^2 in the plate R, through which passes the pin p, is enlarged laterally, so as to permit not only a longitudinal movement of the plate R, but also a certain amount of lateral play to the upper end of the plate R and to the dog q attached thereto. The plate R and dog q are urged toward the right of the machine by the spring-catch 10, the end of which engages a projecting edge portion of the plate R. The opposite edge of the plate R is provided with a series of ratchet-teeth 12, (in this case four,) corresponding to the steps R′ and the various positions into which the plate R and dog q are raised by the plungers J. Secured to the adjacent arm n of the frame I is a strip-spring catch or pawl 13, which slides over the teeth 12 as the plate R is moved upwardly, but which engages one of the ratchet-teeth and locks the plate R and dog q in the position to which they have been raised by the selected one of the plungers J. The carriage will be released, as above described, when the plunger J is actuated, and will be drawn toward the left by its main spring until the selected column-field stop f' engages the dog q, which will then be forced slightly to the left, disengaging the plate R from the catch 13 and disengaging the catch 10 from the lug 11 and the parts will be returned to the normal, the plate R by the spring S and the frame O by the spring T on the shift-key Q. These locking devices insure certainty and accuracy of operation and obviate the necessity of holding the shift-key Q in its inward position while the proper key F is being pushed, or, in other words, the shift-key Q and the selected push-key F may be actuated in succession, and it is not necessary that they should both be actuated simultaneously. Such locking devices we believe to be broadly new as applied to tabulators and may be used

with the ordinary forms of such spacing devices other than the special form herein set forth for the purpose of relieving the operator from the necessity of holding the actuating-key until the carriage is arrested at the proper point.

When columns of figures, for instance, are to be written, the plungers J or denominational contacts will be employed to insure that figures of like denominations shall fall under each other in vertical lines. The operation of this part of our invention is similar to that of the apparatus set forth in Letters Patent No. 559,449, granted to Gorin & Company May 5, 1896. The plungers J are arranged at distances apart corresponding to the letter-space movements of the carriage, and as there are six of these plungers shown it is obvious that these plungers allow for the writing of five digits and a decimal-point in the field defined by any column-field stop. Thus, for example, if by the operation of the shifting-key Q and one of the push-keys F the carriage is allowed to run freely toward the left until it is arrested by a predetermined one of the column-field stops and it is then desired to write a series of digits constituting a number at such point the operator will release the shift-key and the push-key, thereby allowing the paper-carriage to reëngage its escapement mechanism and the frame O to resume its normal position. The operator will then press inward the push-key F corresponding to the denomination of the left-hand digit of the number to be written and the carriage will be again released and run free until the denominational contact part f^2 of the adjacent stop engages the upper end of the plunger corresponding to the key forced inward. Thus, for example, if the amount "54.62" is to be written in, say, the last column at the right-hand side of the page the operator will move the shift-key Q and the next adjacent push-key F No. 4 in manner above described, thereby allowing the carriage to run free until the dog q engages the fourth column-field stop f' at the extreme right-hand side of the machine. The operator will then release the shift-key and the push-key to permit the escapement mechanism to reëngage the paper-carriage and thereafter will force inward the push-key F beneath the denomination "10," thereby allowing the figures and decimal-point "54.62" to be written in proper position. As the operation of this part of our invention will be readily understood by those familiar with the well-known Gorin tabulator, it need not be more fully described. It is obvious that this part of our invention, however, may be employed independently of the columnating mechanism last described, although from what has been shown it will be seen that the devices when combined afford a most effective spacing apparatus without increasing to any considerable extent the number or cost of the parts.

While we have described what is regarded as the preferred embodiment of the invention and have shown it in connection with but one type of machine, it will be understood that without departure from its spirit or scope the invention can be modified within wide limits and can be adapted to machines of other types. Thus, for example, other forms of stops may be substituted for the combined column-field and denominational column stops shown, the term "column-field stops" as used in the following claims being designed to include any stops that serve to coöperate with suitable dogging means to locate a predetermined one of a series of columnar positions or fields along the entire line of print and each comprising multiple letter-spaces, and the term "denominational column stops" to include any stops that will serve to coöperate with suitable means to select one of a series of letter-space positions, whereby the series of numbers will be written in proper denominational order—*i. e.*, in the units, tens, hundreds column, &c. The term "columnating mechanism" as used in the claims is desired to be understood as indicating the mechanism by which the column-field stops are brought into operation, and by the term "denominational-stop mechanism" the mechanism whereby the denominational stops are properly operated. Further, other devices could be substituted for the variably-movable dog and for the denominational contacts or plungers. The term "means for dogging" or "dogging means" and the term "denominational contacts" as used in the following claims are designed to include any suitable dogging device or devices which will serve for engaging with the column-field stops and with the denominational column-stops to perform the assigned functions of these parts.

Having thus described our invention, what we claim as new, and desire to secure by Letters Patent, is—

1. In a type-writer, the combination with the paper-support and with the printing mechanism, one of said parts being movable with respect to the other in the direction of the line of print, of means for arresting the travel of said movable part embracing two members, one of said members comprising a plurality of column-field stops mounted on one of said parts, and the other of said members comprising means for dogging said stops and being mounted upon the other of said parts; one of said members being movable to engage the other, and means for variably actuating said movable member to effect the engagement of the dogging means and a predetermined one of said column-field stops.

2. In a type-writing machine, the combination with the paper-support and with the printing mechanism, one of said parts being movable with respect to the other and with an escapement and propelling means for said movable part, of means for arresting the run of said movable part embracing two members, one of said members comprising a plurality

of column-field stops mounted on one of said parts and the other of said members comprising means for dogging said stops and being mounted upon the other of said parts; one of said members being movable to engage the other, a series of keys arranged to variably actuate said movable member to effect the engagement of the dogging means and a predetermined one of said column-field stops and means for releasing the escapement mechanism.

3. In a type-writing machine, the combination with the paper-support and with the printing mechanism, one of said parts being movable with respect to the other in the direction of the line of print, of means for arresting the travel of said movable part embracing two members, one of said members comprising a plurality of column-field stops mounted on one of said parts, and the other of said members comprising means for dogging said stops and being mounted upon the other of said parts; one of said members being movable to engage the other, and means for actuating said movable member to effect the engagement of the dogging means and a predetermined one of said column-field stops.

4. In type-writing machines, the combination with the paper-support and the printing mechanism, one of said parts being movable and provided with an escapement and propelling means, of a series of column-field stops mounted upon one of said parts, means for dogging said stops mounted upon the other of said parts, a series of finger-keys arranged to effect the engagement of said dogging means and a predetermined one of said column-field stops, and means for releasing the escapement arranged to be actuated by each one of said series of finger-keys.

5. In a type-writer, the combination with the paper-support and with the printing mechanism, one of said parts being movable with respect to the other in the direction of the line of print, of means for arresting the travel of said movable part embracing two members, one of said members comprising a plurality of column-field stops mounted on one of said parts, and the other of said members comprising means for dogging said stops and being mounted upon the other of said parts; one of said members being movable to engage the other and means for variably shifting said dogging means to effect the engagement of the same with a determined one of said column-field stops.

6. In a type-writer, the combination with the paper-support and with the printing mechanism, one of said parts being movable with respect to the other and with an escapement and propelling means for said movable part, of means for arresting the run of said movable part embracing two members, one of said members comprising a plurality of column-field stops mounted on one of said parts and the other of said members comprising means for dogging said stops and being mounted upon the other of said parts; one of said members being movable to engage the other, and a series of keys arranged to variably shift said dogging means to effect its engagement with a predetermined one of said column-field stops, and means actuated by said keys for releasing the escapement mechanism.

7. In a type-writer, the combination with the paper-support and with the printing mechanism, one of said parts being movable with respect to the other in the direction of the line of print, of means for arresting the travel of said movable part embracing two members, one of said members comprising a plurality of independently-adjustable stops mounted on one of said parts, and the other of said members comprising means for dogging said stops and being mounted upon the other of said parts; one of said members being movable to engage the other, and means for actuating said movable member to effect the engagement of the dogging means and a predetermined one of said stops.

8. In type-writing machines, the combination with the paper-support and the printing mechanism, one of said parts being movable and provided with an escapement and propelling means, of a series of independently-adjustable stops mounted upon one of said parts, means for dogging said stops mounted upon the other of said parts, a series of finger-keys arranged to effect the engagement of said dogging means and a predetermined one of said stops, and means for releasing the escapement arranged to be actuated by each one of said series of finger-keys.

9. A spacing mechanism for type-writers comprising a plurality of column-field stops, a dog arranged to oppose said column-field stops and means for imparting a variable movement to said dog, whereby it may be caused to engage any predetermined one only of said column-field stops and whereby its engagement with the stops between it and said predetermined stop is avoided.

10. In spacing mechanism for type-writers, the combination of a plurality of column-field stops by which the position or field of a plurality of columns may be predetermined upon the paper to be written upon, a dog adapted to coöperate with said column-field stops, one of said column-field stop and dog elements being movable step by step in a direction parallel with the line being written, means for releasing said step-by-step moving element from the control of its feeding mechanism and means for causing said dog to engage with any desired one of said column-field stops and thereby cause the said step-by-step feeding mechanism to be arrested at any predetermined column-field on the paper.

11. In spacing mechanism for type-writers, comprising a plurality of column-stops, a dogging device for engaging any predetermined one of said column-stops, and means for imparting variable movement to said dogging

device, comprising a series of key-operated parts, said parts being arranged to actuate said dogging device with varying degrees of lost motion.

12. A spacing mechanism for type-writers comprising a plurality of column-stops, a dog arranged to oppose said column-stops and means for imparting a variable movement to said dog, whereby it may be caused to engage any predetermined one only of said column-stops, said means for moving said dog comprising a plate or part having steps or shoulders, a series of plungers having corresponding lugs to engage said steps or shoulders, and a series of keys connected with said plungers.

13. A spacing mechanism for type-writers comprising a plurality of column-stops, a dog arranged to oppose said column-stops and means for imparting a variable movement to said dog, whereby it may be caused to engage any predetermined one only of said column-stops, said means for moving said dog comprising a plate or part having steps or shoulders, a series of plungers having corresponding lugs to engage said steps or shoulders, said steps or shoulders and said plunger-lugs being at varying distances apart, whereby a variable movement of the dog will be effected and keys for actuating said plungers.

14. A spacing mechanism for type-writers, comprising in combination a plurality of column-stops, a dog for engaging any predetermined one of said column-stops and means for imparting variable movement to said dog, comprising a vertically-movable plate or part, a series of plungers for shifting said plate or part, said plungers being arranged to engage said plate or part at different points and with varying degrees of lost motion, and keys for actuating said plungers.

15. A spacing mechanism for type-writers, comprising in combination a plurality of column-stops, a dog for engaging any predetermined one of said column-stops and means for imparting variable movement to said dog comprising a vertically-movable plate or part, a series of plungers for shifting said plate or part provided with lugs or offsets at varying distances from the points of said plate or part wherewith they will engage, and a series of keys for operating said plungers.

16. In spacing mechanism for type-writers, the combination with a series of graded column-field stops having contact-points in different planes of travel and means adapted at will to engage and arrest a predetermined one of said series of graded column-field stops.

17. In spacing mechanism for type-writers, the combination with a series of column-field stops having their contact-points out of line, dogging means for engaging said column-field stops, and selecting devices for effecting the engagement of said dogging means with a predetermined one of said stops.

18. In spacing mechanism for type-writers, the combination of a series of column-stops and a variably-movable dog adapted to engage at will any predetermined one of said series of column-stops.

19. In spacing mechanism for type-writers, the combination of a series of column-field stops, dogging means for engaging said column-field stops and means for causing a movement between said stops and said dogging means for effecting the engagement of said dogging means with a predetermined one of said stops.

20. In spacing mechanism for type-writing machines, the combination of a series of column-field stops having their contact-points out of line, a variably-movable dog for engaging said column-field stops and key-actuated mechanism for imparting a variable movement to said dog, whereby it may be brought into position to engage any predetermined one of said column-field stops.

21. In spacing mechanism for type-writers, the combination of a series of column-field stops having their contact-faces arranged progressively in different planes, a movable dog to engage said stops and means for imparting a variable movement to said dog to cause it to engage any predetermined one of said column-field stops.

22. In a spacing mechanism for type-writers, the combination with a paper-carriage, of a series of column-field stops having their contact-faces arranged in progressive horizontal planes, a vertically-movable dog to engage said stops and key mechanism for imparting variable movement to said dog to cause it to engage any predetermined one of said column-field stops.

23. In type-writing machines, the combination with a power-propelled paper-carriage and with an escapement therefor, of a series of column-field stops mounted upon said paper-carriage, means for dogging said stops mounted on the machine-frame, mechanism for actuating said dogging means to effect the engagement of said dogging means and a predetermined one of said column-field stops, a series of finger-keys for said mechanism and means for releasing said escapement arranged to be actuated by each one of said series of finger-keys.

24. In type-writing machines, the combination with a power-propelled paper-carriage and with printing mechanism therefor, of a series of column-field stops, means for dogging said stops, and mechanism for effecting the engagement of said dogging means with a predetermined one of said column-field stops.

25. In type-writing machines, the combination with a power-propelled paper-carriage and with printing mechanism therefor, of a series of independent, adjustable stops, means for dogging said stops, and mechanism for effecting the engagement of said dogging means with a predetermined one of said independent, adjustable stops.

26. In a type-writer, the combination with the paper-support and with the printing mech-

anism, one of said parts being movable with respect to the other in the direction of the line of print, of means for arresting the travel of said movable part embracing two members, one of said members comprising a plurality of column-field stops having their contact-points out of line, and the other of said members comprising means for dogging said stops; one of said members being movable to engage the other, and means for actuating said movable member to effect the engagement of the dogging means and a predetermined one of said column-field stops.

27. In type-writing machines, the combination with the paper-support and the printing mechanism, one of said parts being movable and provided with an escapement and propelling means, of a series of column-field stops having their contact-points out of line mounted upon one of said parts, means for dogging said stops mounted upon the other of said parts, a series of finger-keys arranged to effect the engagement of said dogging means and a predetermined one of said column-field stops, and means for releasing the escapement arranged to be actuated by each one of said series of finger-keys.

28. In spacing mechanism for type-writers, the combination with a series of independent, adjustable column-field stops having contact-points in different planes of travel and means adapted at will to engage and arrest a predetermined one of said series of column-field stops.

29. In spacing mechanism for type-writers, the combination with a series of independent, adjustable column-field stops having their contact-points out of line, dogging means for engaging said column-field stops, and selecting devices for effecting the engagement of said dogging means with a predetermined one of said stops.

30. In spacing mechanism for type-writers, the combination of a series of independent, adjustable column-field stops having their contact-points out of line, a dog for engaging said column-field stops and means for causing a variable movement between said stops and said dog for effecting the engagement of said dog with any predetermined one of said stops.

31. In a spacing mechanism for type-writers, the combination with a paper-carriage, of a series of independent, adjustable column-field stops having their contact-faces arranged in progressive horizontal planes, a vertically-movable dog to engage said stops and key mechanism for imparting variable movement to said dog to cause it to engage any predetermined one of said column-field stops.

32. In spacing mechanism for type-writers, the combination with a paper-carriage, of a series of column-stops having contact-faces arranged progressively in different planes, a movable dog to engage said stops and means for imparting variable movement to said dog, comprising a plate or part having steps or shoulders corresponding in number and arrangement to said stops, a series of plungers for engaging the steps or shoulders of said part and a series of keys for operating said plungers.

33. In spacing mechanism for type-writers, the combination with a paper-carriage and its escapement mechanism, of a series of column-field stops having contact-faces arranged in different planes, a movable dog to engage said stops, and means for imparting variable movement to said dog to cause it to engage any predetermined one of said stops, comprising a plurality of keys each one adapted to cause the engagement of said dog with a different column-field stop and each one adapted to release the paper-carriage from its escapement mechanism.

34. In a spacing mechanism for type-writers, the combination with a paper-carriage and its escapement, of adjustable stops mounted upon said paper-carriage, a supplemental frame mounted upon the frame of the type-writer, a series of longitudinally-movable plungers mounted upon said supplemental frame and arranged to engage said stops, a series of push-keys horizontally disposed beneath the type-writer frame, levers pivoted to said supplemental frame and connecting said keys and plungers and an escapement-releasing device arranged in position to be engaged by each of said several plungers.

35. In spacing mechanism for type-writers, the combination with the paper-support and with the printing mechanism, one of said parts being movable with respect to the other in the direction of the line of print, of columnating mechanism comprising a series of column-field stops and dogging means for engaging said stops, a denominational-stop mechanism comprising a series of denominational contacts and stops wherewith they engage, and means whereby said columnating mechanism and said denominational-stop mechanism may be operated together and separately.

36. In spacing mechanism for type-writers, the combination with the paper-support and with the printing mechanism, one of said parts being movable with respect to the other in the direction of the line of print, of a plurality of column-field stops mounted upon one of said parts, a variably-movable dog connected to the other of said parts, a series of denominational contacts and means for variably shifting said dog to effect its engagement with any predetermined one of said column-field stops and for actuating said denominational contacts.

37. In spacing mechanism for type-writers, the combination with the paper-support and with the printing mechanism, one of said parts being movable with respect to the other in the direction of the line of print, of a plurality of stops mounted upon said movable part, variably-operating dogging means con-

nected to the other of said parts and serving to arrest said movable part at any one of a number of columnar positions, a series of denominational contacts arranged at letter-space distance apart and a series of keys for operating said denominational contacts and said dogging means.

38. In a spacing mechanism for type-writers, the combination with the paper-support and with the printing mechanism, one of said parts being movable with respect to the other in the direction of the line of print, of a plurality of stops mounted upon one of said parts, dogging means connected to the other of said parts, said dogging means being normally out of operative relation with respect to said stops, denominational contacts normally in operative relation with respect to said stops, means for causing said dogging mechanism and said denominational contacts to engage said stops and shifting mechanism for moving said dogging means into and said denominational contacts out of operative position.

39. In spacing mechanism for type-writers, the combination with the paper-carriage and with the printing mechanism, of a plurality of stops connected with the paper-carriage, a movable dog for engaging said stops, means for imparting variable movement to said dog to cause it to engage any predetermined one of said paper-carriage stops, denominational contacts or plungers adapted to contact with said paper-carriage stops, a series of keys for operating said plungers and said dogging mechanism, and a shift-key for moving said dogging mechanism and said denominational plungers from their normal position with respect to said paper-carriage stops.

40. In spacing mechanism for type-writers, the combination with the paper-support and printing mechanism, of a plurality of stops mounted upon one of said parts, dogging means mounted upon the other of said parts and standing normally out of operative position with respect to said stops, a key for shifting said dogging means into operative position with respect to said stops, a series of denominational contacts or plungers and a series of keys for imparting variable movement to said dogging means and for operating said denominational contacts or plungers.

41. In spacing mechanism for type-writers, the combination with the paper-carriage and printing mechanism, of a series of stops mounted to travel with the paper-carriage, dogging means arranged to engage said stops but standing normally out of operative position with respect thereto, a series of plungers in normal operative position to engage said stops, a shifting frame wherein said plungers are carried, means for shifting said frame to throw said dogging means into and said plungers out of operative position to engage the stops and keys for moving said plungers and said dogging means into engagement with said stops to arrest the paper-carriage at predetermined points.

42. In spacing mechanism for type-writers, the combination with a paper-support and with a printing mechanism therefor, one of said parts being movable with respect to the other in the direction of the line of print, of column-field stops mounted upon one of said parts, dogging means for engaging said column-field stops, a series of denominational column-stops mounted on one of said movable parts, denominational contacts for engaging said denominational column-stops, and operating means for such spacing devices.

43. In spacing mechanism for type-writers, the combination with a paper-support and with a printing mechanism therefor, one of said parts being movable with respect to the other in the direction of the line of print, of a series of column-field stops mounted upon one of said parts, means for dogging said column-field stops and mechanism arranged to effect the engagement of said dogging means with any predetermined one of said column-field stops, a series of denominational column-stops mounted upon one of said movable parts and denominational contacts arranged to engage said denominational column-stops.

44. In spacing mechanism for type-writers, the combination with a paper-support and with a printing mechanism therefor, one of said parts being movable, of a series of column-field stops upon one of said parts and having their contact-points out of line, dogging means for engaging said column-field stops, and selecting devices for effecting the engagement of said dogging means with any predetermined one of said stops, denominational column-stops mounted on one of said movable parts and denominational contacts arranged to engage said denominational column-stops.

45. In spacing mechanism for type-writers, the combination with a paper-support and with a printing mechanism therefor, one of said parts being movable and provided with an escapement and propelling means, of a series of column-field stops and a series of denominational stops mounted upon one of said parts, dogging means and denominational contacts mounted upon the other of said parts, mechanism for effecting the engagement of said dogging means with any predetermined one of said column-field stops, a series of finger-keys for said mechanism and arranged to effect the engagement of said denominational contacts with said denominational stops, and means for releasing said escapement arranged to be actuated by each one of said series of finger-keys.

46. In type-writers, the combination with a power-propelled paper-carriage and with printing mechanism therefor, of column-field stops and denominational column-stops mounted upon one of said parts, said column-field stops having their contact-points

out of line, dogging mechanism and denominational contacts mounted upon the other of said parts, mechanism arranged to effect the engagement of said dogging means with any predetermined one of said column-field stops and for effecting the engagement of said denominational contacts with said denominational column-stops, and a series of finger-keys for said mechanism.

47. In spacing mechanism for type-writers, the combination with a power-propelled paper-carriage and with an escapement and printing mechanism therefor, of a series of column-field stops and a series of denominational column-stops mounted on said paper-carriage, dogging means and denominational contacts carried by the type-writer frame, mechanism arranged to effect the engagement of said dogging means with any predetermined one of said column-field stops and for actuating said denominational contacts to engage said denominational column-stops, finger-keys for said mechanism and means for releasing said escapement arranged to be actuated by each one of said finger-keys.

48. In spacing mechanism for type-writers, the combination with a paper-support and with a printing mechanism therefor, one of said parts being movable with respect to the other, of a series of column-field stops mounted upon one of said parts, a series of denominational column-stops mounted upon one of said parts, and separate contact devices for engaging each series of stops to arrest the movement of said movable part.

49. In spacing mechanism for type-writers, the combination with the paper-carriage and with the printing mechanism, one of said parts being movable with respect to the other, of a series of stops mounted upon one of said parts, each of said stops having two contact parts forming a series of column-field stops and a series of denominational stops, and separate devices for engaging each of said contact-faces to arrest the movement of said movable part.

50. In spacing mechanism for type-writers, the combination with the paper-carriage and with the printing mechanism, one of said parts being movable with respect to the other, of a series of stops mounted upon one of said parts, each of said stops having plural contact parts, dogging means for engagement with one set of said contact parts and denominational contacts for engaging with the other of said contact parts, and means for actuating said dogging means and said denominational contacts to cause their engagement with the respective parts of said stops.

51. In spacing mechanism for type-writers, the combination with the paper-carriage and with the printing mechanism, one of said parts being movable with respect to the other, of a series of stops mounted upon one of said parts, each of said stops having plural contact parts, dogging means for engagement with one set of said contact parts and denominational contacts for engaging with the other of said contact parts, and a series of keys serving to operate both said dogging means and said denominational contacts.

52. In type-writing machines, the combination with the machine-frame and with paper-support, of spacing mechanism comprising a column-stop member mounted on one of said parts, a dogging member upon the other of said parts normally out of line with said stop member, means for moving one of said members and a device for locking said movable member in line with the other of said members, said locking device arranged to be released by the contact of said members.

53. In spacing mechanism for type-writing machines, the combination of a member comprising a series of column-field stops, a member comprising dogging means for engaging said stops, means for variably moving one of said members to effect the engagement of said dogging means with any predetermined one of said column-field stops, and a device for locking the movable member in any one of a number of positions.

54. In spacing mechanism for type-writing machines, the combination of a member comprising a series of column-stops, a member comprising dogging means for engaging said stops, means for variably moving one of said members to effect the engagement of said dogging means with any predetermined one of said column-stops, and a device for locking the movable member in any one of a number of positions, said locking device arranged to be released by the engagement of said predetermined stop with said dogging means.

55. A spacing mechanism for type-writers comprising a plurality of column-field stops, a dog arranged to oppose said column-stops, means for moving said dog to a number of different positions to engage any predetermined one of said column-field stops, and a device for locking said dog in any one of such positions.

56. A spacing mechanism for type-writers comprising a plurality of column-stops, a dog arranged to oppose said column-stops, means for moving said dog to a number of different positions to engage any predetermined one of said column-stops, and a device for locking said dog in any one of such positions, said locking device arranged to be released by the engagement of said predetermined stop with said dog.

57. In spacing mechanism for type-writers, the combination with a column-stop, of a dog normally out of line with said stop, means for moving said dog into the path of said stop, a catch for locking said dog when so moved, said dog being laterally movable and spring-held against said catch, whereby said dog is disengaged from said catch by the contact of said stop.

58. In spacing mechanism for type-writers, the combination of a series of column-stops having their contact-points out of line, a dog

normally out of line with said stops, means for moving said dog to a number of positions to engage any predetermined one of said column-stops, a series of ratchet-teeth on said dog and a catch for engaging said teeth to lock the latter in any one of such positions.

59. In spacing mechanism for type-writers, the combination of a series of column-stops having their contact-points out of line, a dog normally out of line with said stops, means for moving said dog to a number of positions to engage any predetermined one of said column-stops, a series of ratchet-teeth on said dog and a catch for engaging said teeth to lock the latter in any one of such positions, said dog being laterally movable and spring-held against said catch, whereby said dog is disengaged from said catch by the contact of said predetermined column-stop.

60. In spacing mechanism for type-writers, the combination with a series of column-field stops, and with a series of denominational column-stops, of dogging means for engaging any predetermined one of said column-field stops, normally out of operative position, denominational contacts for engaging said denominational column-stops, normally in operative position, and means for shifting the relative positions of said dogging means and said denominational contacts.

61. In spacing mechanism for type-writers, the combination with a series of column-field stops, and with a series of denominational column-stops, of dogging means for engaging any predetermined one of said column-field stops, normally out of operative position, denominational contacts for engaging said denominational column-stops, normally in operative position, a shifting frame whereon said dogging means and said denominational contacts are mounted, and a finger-key for shifting said frame whereby the relative positions of said dogging means and said denominational contacts are changed.

62. In spacing mechanism for type-writers, the combination with a series of column-field stops, and with a series of denominational column-stops, of dogging means for engaging any predetermined one of said column-field stops, normally out of operative position, denominational contacts for engaging said denominational column-stops, normally in operative position, a shifting frame whereon said dogging means and said denominational contacts are mounted, a finger-key for actuating said frame whereby the relative positions of said dogging means and said denominational contacts are changed, a series of finger-keys for actuating said dogging means and said denominational contacts, and escapement-releasing means arranged to be actuated by each one of said series of finger-keys.

63. In spacing mechanism for type-writers, the combination of a series of column-stops and a series of denominational column-stops, dogging means for engaging any predetermined one of said column-stops, normally out of operative position, denominational contacts for engaging said denominational column-stops, normally in operative position, means for shifting the relative positions of said dogging means and said denominational contacts, and a locking device for said shifting means.

64. In spacing mechanism for type-writers, the combination of a series of column-stops, dogging means for engaging any predetermined one of said column-stops, normally out of operative position, denominational contacts for engaging said stops, normally in operative position, means for shifting the relative positions of said dogging means and said denominational contacts, and a locking device for said shifting means, said locking device arranged to be released by the engagement of said predetermined stop with said dogging means.

65. In spacing mechanism for type-writers, the combination of a series of column-stops, dogging means for engaging any predetermined one of said column-stops, normally out of operative position, denominational contacts for engaging said stops, normally in operative position, means for shifting the relative positions of said dogging means and said denominational contacts, means for variably moving said dogging means and locking devices for said shifting means and said dogging means.

66. In spacing mechanism for type-writers, the combination of a series of column-stops, dogging means for engaging any predetermined one of said column-stops, normally out of operative position, denominational contacts for engaging said stops, normally in operative position, means for shifting the relative positions of said dogging means and said denominational contacts, means for variably moving said dogging means and locking devices for said shifting means and said dogging means, arranged to be released by the contact of said predetermined stop with said dogging means.

67. In spacing mechanism for type-writers, the combination of a series of column-stops, a dog and a series of denominational plungers for engaging said stops, said dog being normally out of and said plungers normally in operative position, means for shifting the relative positions of said dog and said plungers, a series of keys for operating said plungers and for imparting a variable movement to said dog to engage any predetermined one of said column-stops, and a spring-catch for locking said shifting means adapted to be released by the engagement of said predetermined stop with said dog.

68. In spacing mechanism for type-writers, the combination of a series of column-stops, a dog and a series of denominational plungers for engaging said stops, said dog being normally out of and said plungers normally in operative position, means for shifting the rela-

tive positions of said dog and said plungers, a series of keys for operating said plungers and for imparting a variable movement to said dog to engage any predetermined one of said column-stops, a series of teeth on said dog, a pawl for engaging said teeth, and locking said dog, a spring-catch for locking said shifting means, said dog being laterally movable and held in engagement with said pawl by said spring-catch, whereby the engagement of said predetermined stop with said dog will release the latter from said pawl and said shifting means from said spring-catch.

69. In a type-writing machine, the combination of a series of adjustable column-stops arranged to be set in adjusted position to define columnar points along the line of print, means for dogging said stops, column-skipping mechanism for effecting the engagement of said dogging means with a predetermined one of said column-stops.

70. In a type-writing machine, the combination of a series of column-stops independently adjustable to define various columnar positions along the line of print, dogging means for opposing said stops and column-skipping mechanism for actuating said dogging means whereby at will a predetermined column may be brought to the printing position.

71. In type-writing machines, the combination with the carriage, of a column-stop mechanism arranged to arrest the free run of said carriage at a predetermined one of a series of column-fields along the line of print and denominational-stop mechanism for effecting the orderly printing of rows of figures or the like at the separate column-fields.

72. In spacing mechanism for type-writing machines, the combination of a member comprising a series of column-field stops, a member comprising dogging means for engaging said stops, means for moving one of said members to effect the engagement of said dogging means with a predetermined one of said column-field stops, and a lock for holding said movable member in its shifted position.

73. In spacing mechanism for type-writing machines, the combination of a member comprising a series of column-field stops, a member comprising dogging means for engaging said stops, means for moving one of said members to effect the engagement of said dogging means with a predetermined one of said column-field stops, a lock for holding said movable member in its shifted position and means for releasing said lock.

74. In a type-writing machine and tabulating mechanism, the combination of a series of column-stops in a straight line, and means for skipping columns at will.

75. In a type-writing machine and tabulating mechanism, the combination of column-stops set in position, an arresting device, and column-skipping mechanism whereby at will a predetermined column may be brought to the printing position.

76. In a type-writing machine and tabulating mechanism, the combination of a series of column-stops set in position, and means whereby one or more of these stops may be skipped and a predetermined column-stop engaged for selecting a desired column.

77. In a type-writing machine and tabulating mechanism, the combination of a plurality of column-stops set in position, an arresting-stop to coöperate therewith and means for causing one or more of said column-stops to skip said arresting-stop and for causing another selected or predetermined one of said column-stops to engage said arresting-stop.

78. In a type-writing machine and tabulating mechanism, the combination of adjustable means for producing a plurality of column-fields at variable points along the line of print, a carriage, carriage-releasing mechanism, and means for skipping column-fields and automatically arresting the carriage at a desired column-field.

79. In a type-writing machine and tabulating mechanism, the combination of adjustable means for producing a plurality of columns, a carriage, means whereby the columns at variable points along the line of print may be arrested in succession, and means for enabling one or more columns to be skipped and the carriage to be arrested automatically at a predetermined column.

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