

No. 676,591.

Patented June 18, 1901.

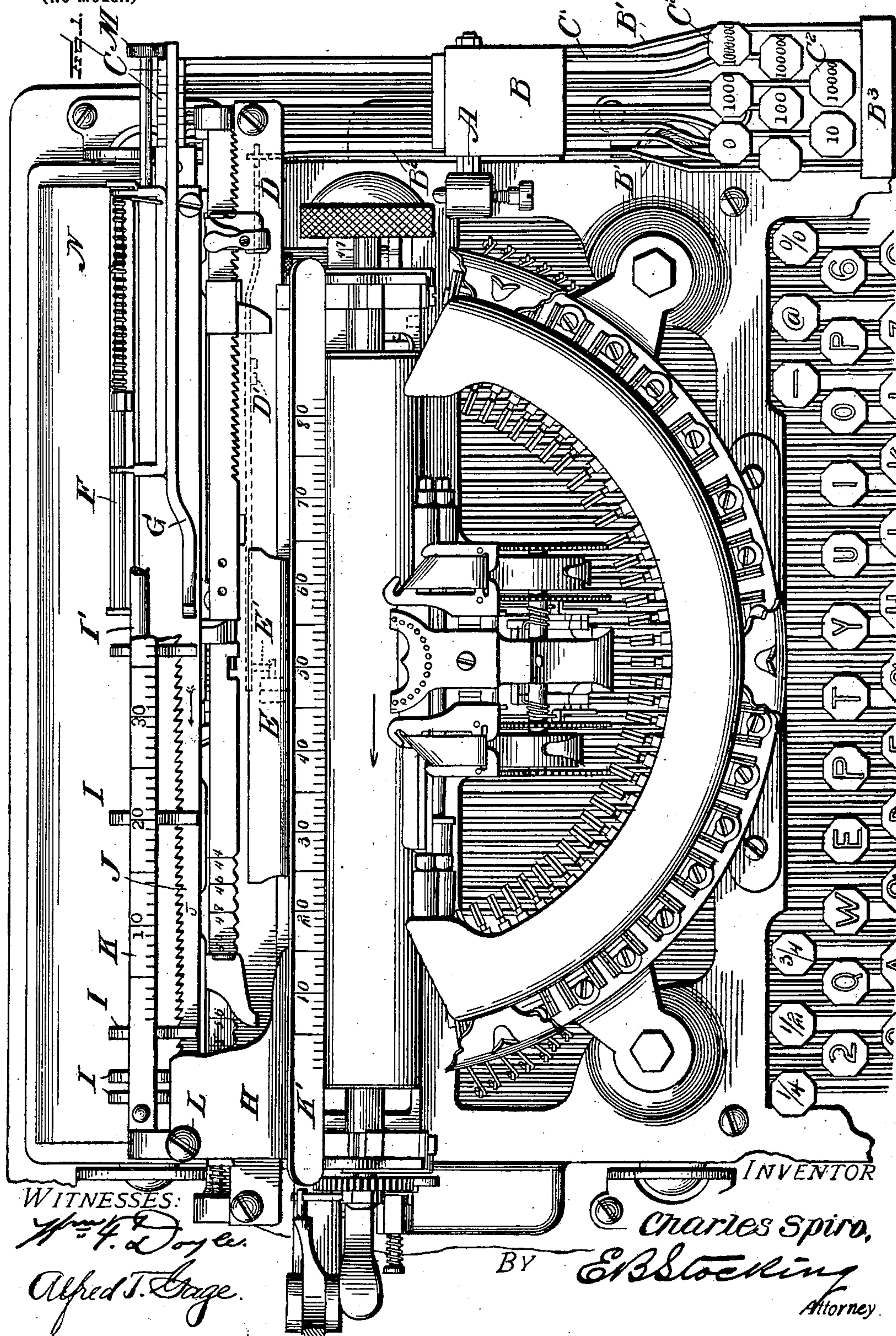
C. SPIRO.

TABULATING MECHANISM FOR TYPE WRITING MACHINES.

(Application filed Jan. 12, 1901.)

(No Model.)

4 Sheets—Sheet 1.





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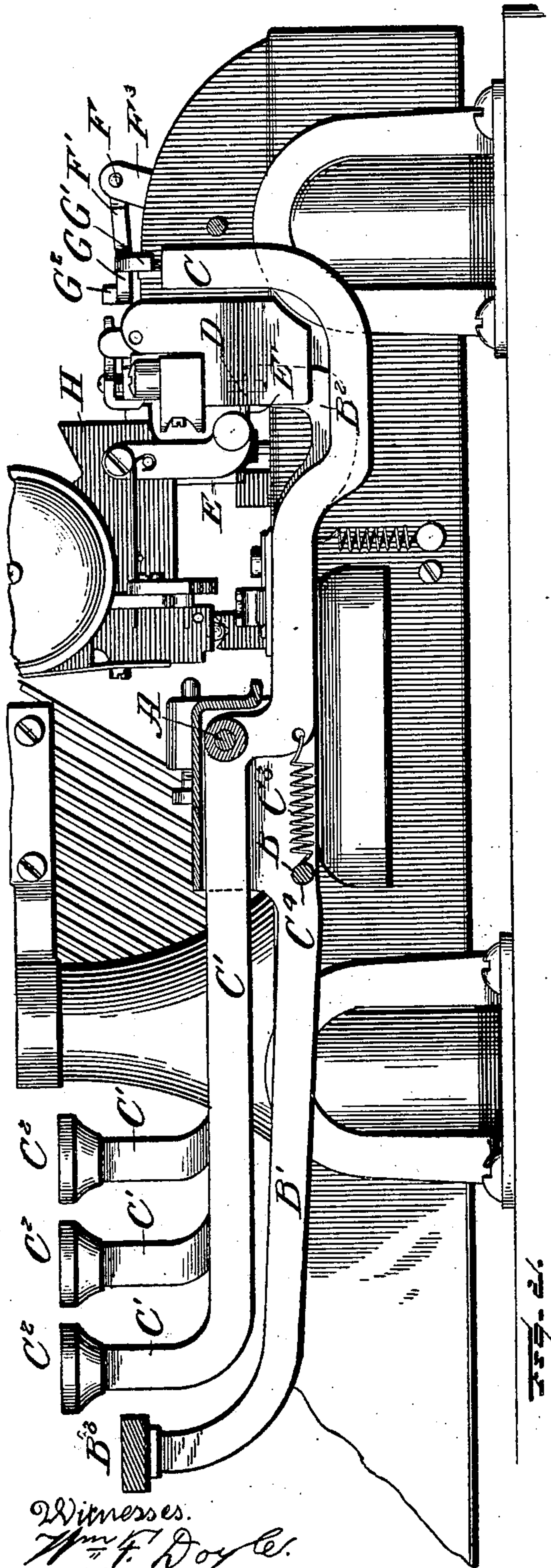
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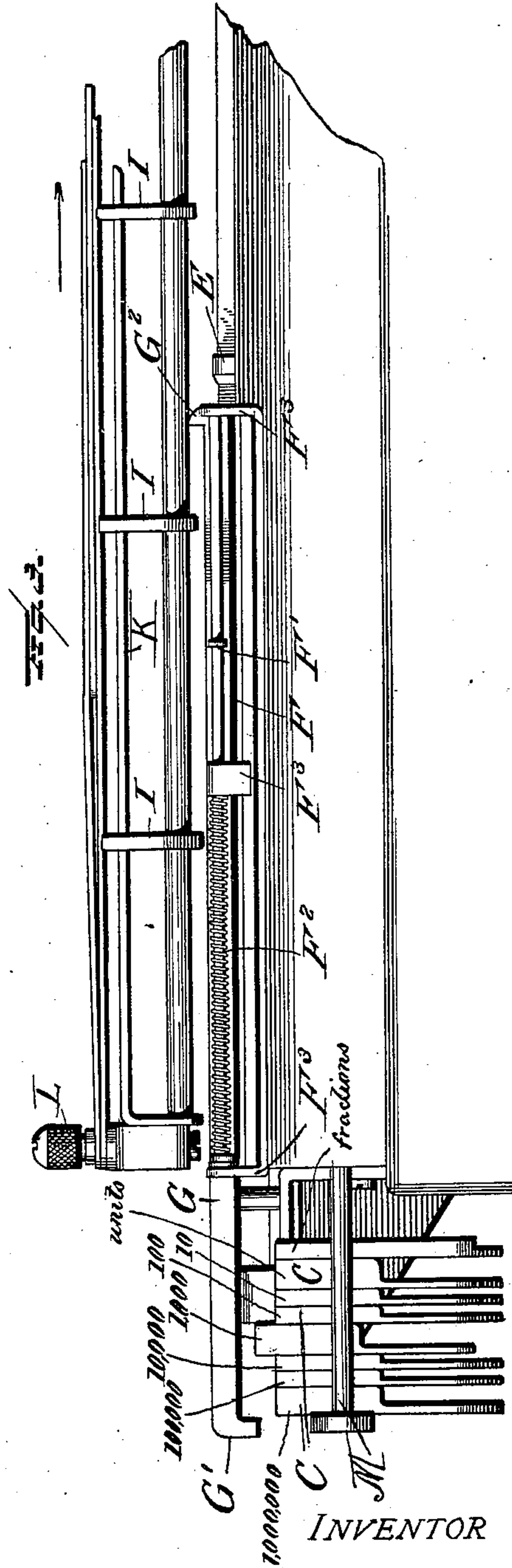
(Application filed Jan. 12, 1901.)

(No Model.)

4 Sheets—Sheet 2.



Witnesses.  
Wm. F. Doyle.  
Alfred T. Sage.



BY

Charles Spiro,  
E. B. Stocking  
Attorney

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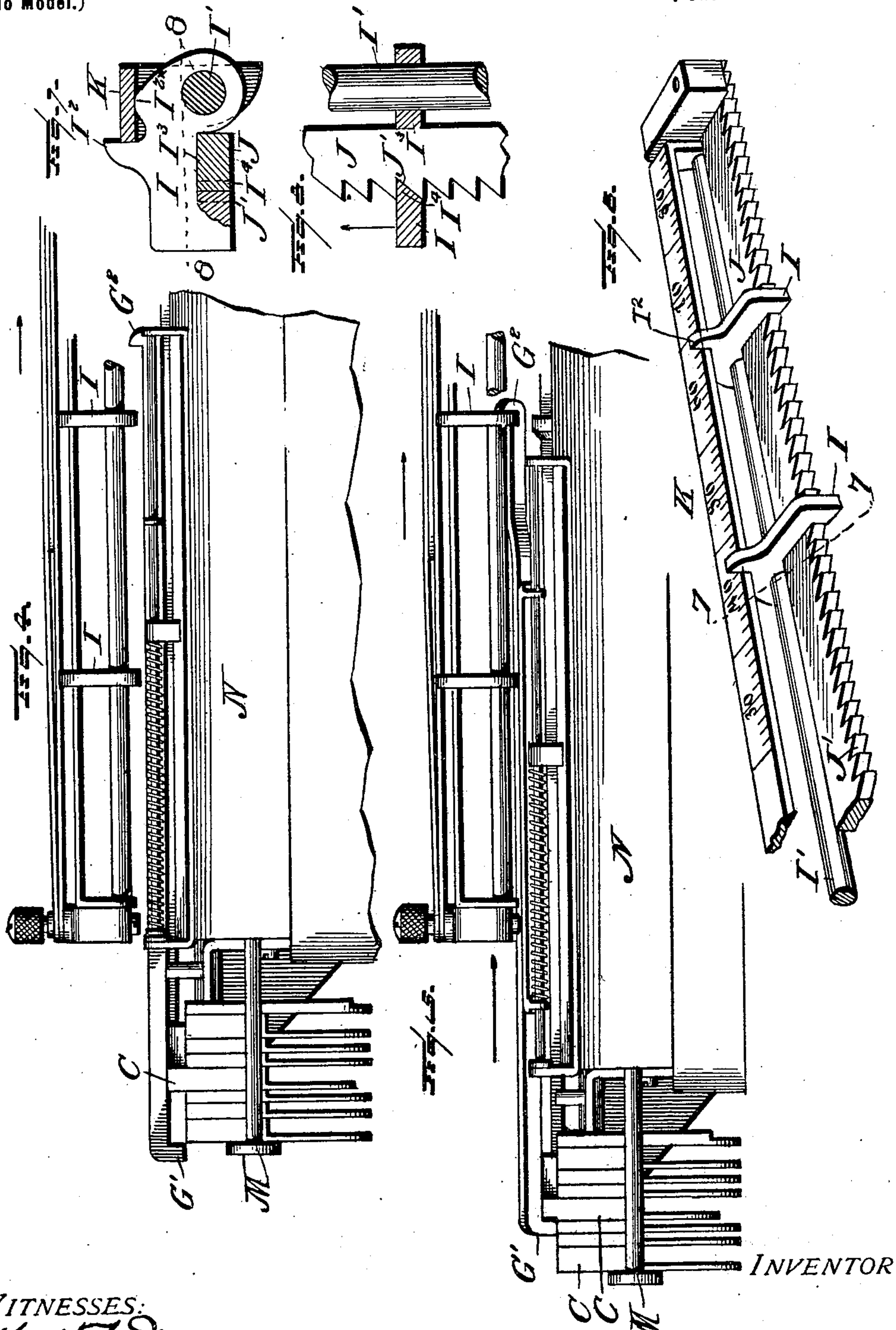
**C. SPIRO.**

# TABULATING MECHANISM FOR TYPE WRITING MACHINES.

(Application filed Jan. 12, 1901.)

(No Model.)

**4 Sheets—Sheet 3.**



*WITNESSES:*

H<sup>m</sup> F Doyle.

Alfred I. Gage.

 $BV$ 

*Charles Spiro,*

*E. B. Stalling*  
Attorney



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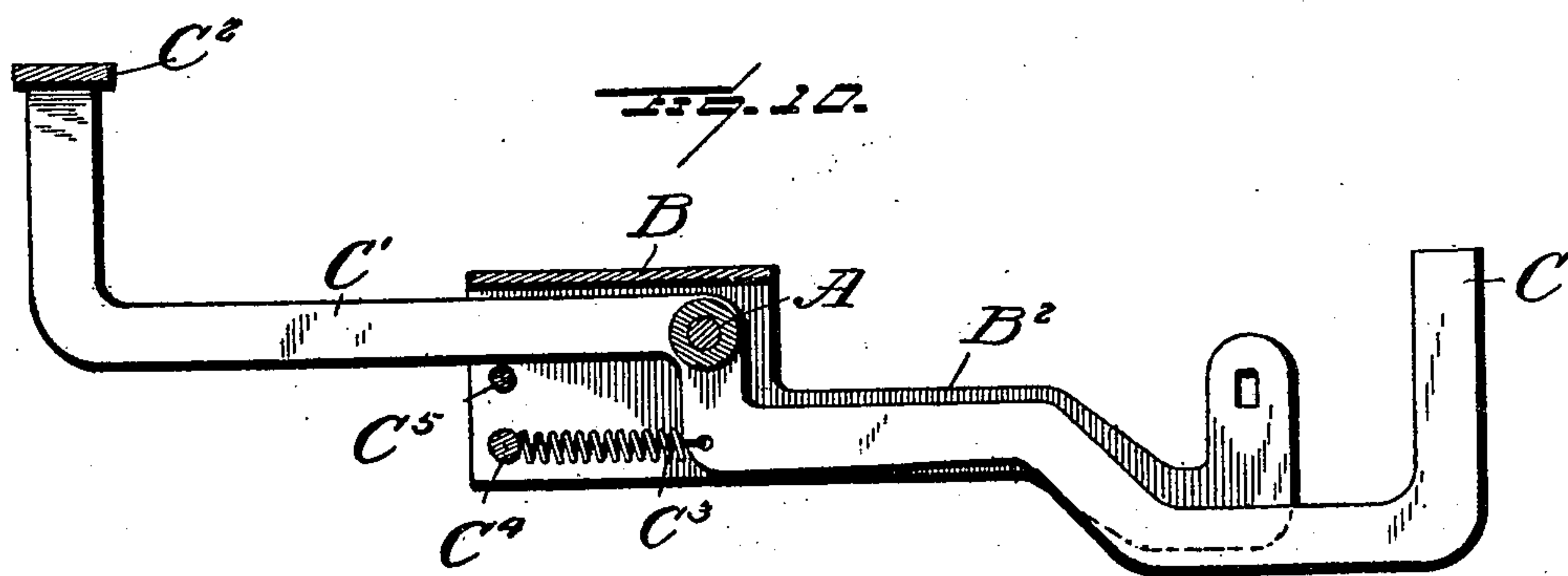
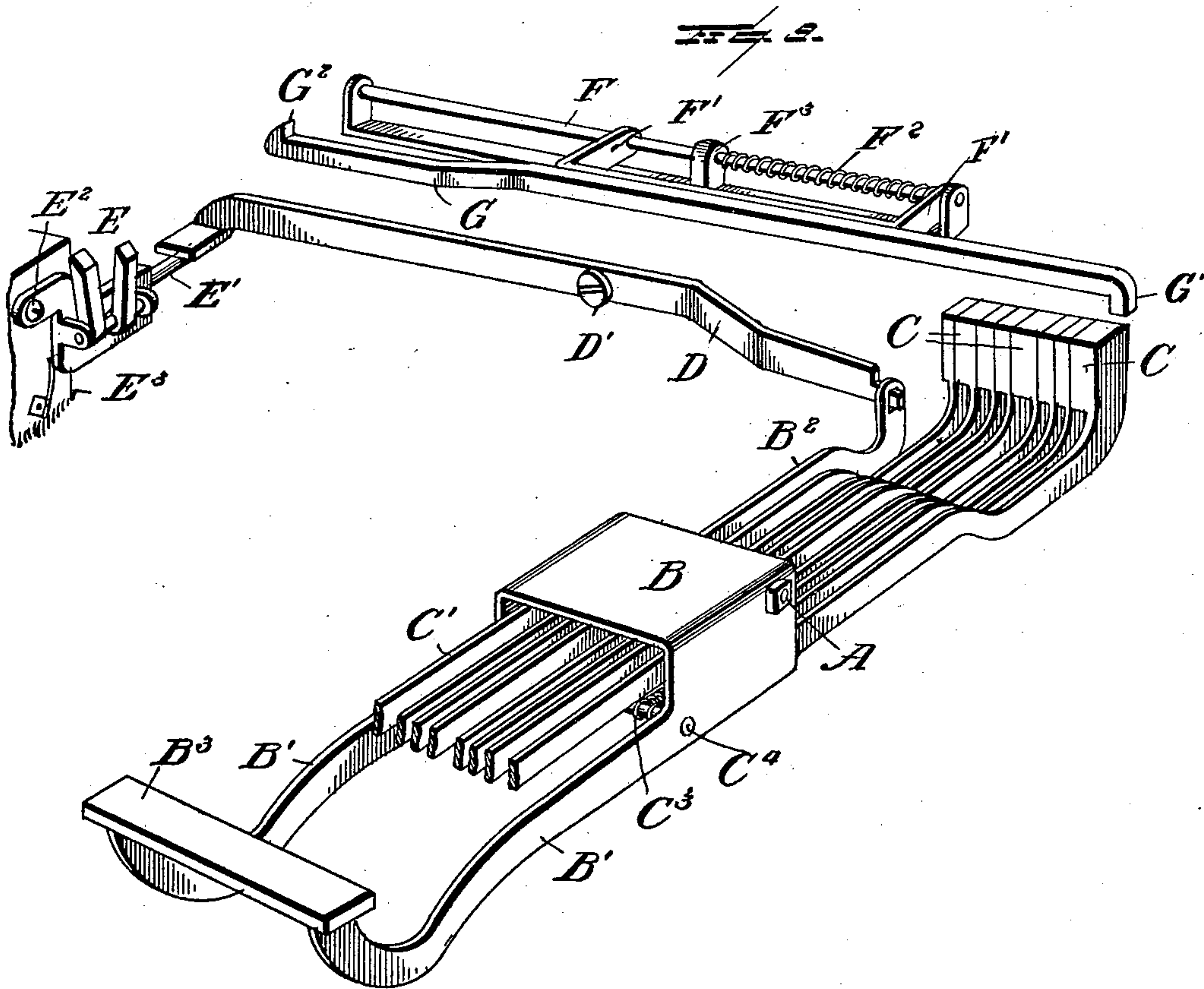
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4 Sheets—Sheet 4.



WITNESSES:

*Wm. F. Doyle*  
*Alfred T. Bage*

INVENTOR

*Charles Spiro,*

BY

*E. B. Stocking*

Attorney



# UNITED STATES PATENT OFFICE.

CHARLES SPIRO, OF NEW YORK, N. Y.

## TABULATING MECHANISM FOR TYPE-WRITING MACHINES.

SPECIFICATION forming part of Letters Patent No. 676,591, dated June 18, 1901.

Application filed January 12, 1901. Serial No. 43,046. (No model.)

*To all whom it may concern:*

Be it known that I, CHARLES SPIRO, a citizen of the United States, residing at New York, in the county of New York, State of New York, have invented certain new and useful Improvements in Tabulating Mechanism for Type-Writers, of which the following is a specification, reference being had therein to the accompanying drawings.

10 This invention relates to type-writers, and particularly to an attachment therefor for the purpose of executing tabulated work, such as columns of figures; and the invention is an improvement upon prior inventions, patents for which were granted me July 23, 1895, numbered, respectively, 543,111 and 543,112.

15 Among the objects of the invention herein disclosed is the provision of a tabulating mechanism which is constructed as an attachment consisting of an individual or separate organization and which is compact, provided with a keyboard harmonious in location, depth of depression, and touch with that of the type-writer to which it is applied.

20 Another object is to so construct and arrange the elements of the tabulating mechanism as to constitute an attachment which can be applied by any operator to any prominently-known and commonly-used type-writer without change of its construction or interference with its usual operation.

25 Another object of the invention is to provide a series of selecting devices or column-stops which shall automatically space a printed number into distinct separated periods or portions of three digits each, whereby the operator is relieved of the thought and work of depressing the ordinary spacing key or bar or any special spacing key or bar when the same is provided. This advantage I secure by making the selecting device which is employed to set the carriage and the paper thereon to print the first digit of a number comprising three digits thicker than the adjacent selecting devices for printing the successive digits of that number. To state this feature in other words, those selecting devices which are to produce the units of a number are thick. The adjacent selecting devices, 30 which produce the tens and hundreds, are thin. Those for the thousands and millions

are thick and the intermediate selectors are thin. In order to make this principle of my invention clear in a general sense, it may be stated that those selectors which are employed to print the last or right-hand digit of a set of three are made approximately twice as thick as those for printing the remaining digits of such set of digits. A selector is also provided to automatically space the printed work where 35 decimals or fractions are to be printed.

Other advantages of the invention will be set forth in the following description, and the novel features thereof will be particularly pointed out in the appended claims.

Referring to the drawings, Figure 1 is a plan of a type-writer provided with my invention. Fig. 2 is a side elevation of the type-writer with the attachment shown in longitudinal section. Figs. 3, 4, and 5 are diagrammatic elevations showing the successive steps in the operation of the selecting devices and their adjuncts when printing a number comprising four digits with or without fractions. Fig. 6 is a perspective of the jump-feed rack gages and scale for tabular work. Fig. 7 is a transverse section on the line 7 7 of Fig. 6. Fig. 8 is a horizontal section on the line 8 8 of Fig. 7. Fig. 9 is a diagrammatic perspective of the entire attachment and the escapement-dogs of a type-writer in operative positions, and Fig. 10 is a modification involving a universal spacing-rod for the selector-keys.

Like letters refer to like parts in all the figures of the drawings.

While my invention is applicable to any type-writer having a traveling paper-carriage, I have illustrated it in Fig. 1 in plan applied to a type-writer well known as the "bar-lock," by which visible printing is done, the type making their impressions upon the top of the platen or paper thereon. It being understood that the invention herein disclosed involves setting the carriage and platen thereon so as to print in tables of columns, only those parts of the type-writer directly employed will be particularly referred to. Other coacting parts will be readily perceived by persons skilled in the art, as will also the general principles of the "jump-feed" employed in tabulated work. A more particular descrip-



tion of such a feed will be found in my prior patents, hereinbefore mentioned.

Referring to Fig. 9, which shows the attachment in perspective and diagrammatically with its parts in their relative operative positions, A represents an attachment-supporting stud, bolt, or bar, which is seated in the framework of a type-writer, so as to project therefrom. Upon the bolt, bar, or stud A is mounted a housing-case or supplementary frame B and a series of selectors or column-stops C, terminating in key-levers C' and keys C<sup>2</sup>. This brings the keys of the attachment adjacent to those of the type-writer. At a convenient point on each selector or its key-lever and in suitable relation to the point of pivotal support on the stud A there is connected a spring C<sup>3</sup>, the opposite end of which is secured to a relatively fixed part, such as a rod C<sup>4</sup>, extending from one to the other vertical wall of the case B, in which walls the rod is supported. By this construction whenever a key C<sup>2</sup> is depressed it, the key-lever, and selector are by the spring returned to a normal position.

As shown in Fig. 9, the case B has extensions B' and B<sup>2</sup>, the former connected by a spacing-bar B<sup>3</sup>, and the latter extension, B<sup>2</sup>, is adapted to be operatively connected to a lever D, pivoted to a fixed part of the type-writer, as at D', and extending into proximity to the escapement-dogs E, which give the step-by-step movement to the paper-carriage. One form of connection for the lever D and spacing extension B<sup>2</sup> is shown, comprising an aperture into which the end of the lever enters, although any other desired form of connection may be employed. So, also, various forms of connection with the dogs E may be used. In this instance a stud E' projects beneath the lever D, so that a depression of the spacing-bar B<sup>3</sup> elevates the end of lever D that is connected therewith and depresses its opposite end, which in turn depresses the dog-carrier, pivoted at E<sup>2</sup> upon a fixed part, against a spring E<sup>3</sup>, and thus the dogs are removed from the step-by-step-feed rack of the type-writer in the same manner as when the usual release-key is operated.

In the modification illustrated in Fig. 10 a cross-rod in the housing or case B, arranged above and supported like the rod C<sup>4</sup>, is substituted for the extensions B' and space-bar B<sup>3</sup>, whereby a depression of any of the keys C<sup>2</sup> upon the bar C<sup>5</sup> actuates the housing of the case on its pivotally-supporting rod or stud A, so as to elevate the extension B<sup>2</sup> and produce a separation of the feed-dogs from the rack. However, notwithstanding the necessity of using a thumb or additional finger for the purpose of releasing the dogs in operating the attachment over the accomplishment of the same work by the use of a single finger in the modified forms, there is the advantage in a separate release, such as the space-bar B<sup>3</sup>, in that if the wrong key of the attachment be struck correction can be made with-

out moving the carriage by releasing the dogs from the rack. It is understood that when using the space-bar B<sup>3</sup> it may be depressed at the same time as or, if desired, after one of the keys C<sup>2</sup> has been depressed.

Upon a fixed part of the type-writer there is a sliding connection arranged parallel with the paper-carriage and comprising a rod F, upon which is a bail F', adapted to sliding upon the rod and nominally held at one end of the rod by a spring F<sup>2</sup>, bearing at one end against the bail and at the other against one of the standards F<sup>3</sup>, projecting from a fixed part, through which standards the rod F passes. To the bail is formed or secured in any desirable manner a bar G, having at each end a hook G' G<sup>2</sup> for contact with the selectors and with certain gages, respectively. Normally the hook G' stands above and beyond the first of the series of selectors, as shown clearly in Fig. 3.

Referring to Figs. 1 and 6, I represents the tabulating-gages, all of which are removably and adjustably mounted on a jump-feed rack-bar J, fixed to and moving with the carriage H. Each of the gages I comprises a plate perforated to be supported on a rod I' and provided with a lug I<sup>2</sup> at its top, while its lower edge is cut away at I<sup>3</sup> to receive the rack-bar and is formed with an inwardly-projecting tooth I<sup>4</sup>. A peculiarity of the formation and operation of the gage and rack-bar results in a wedging action, which occurs when the carriage is stopped by any one of the series of gages. It is well known that any jump-feed of the carriage causes a severe shock and wear of the parts far exceeding that of the ordinary step-by-step feed thereof, which of itself requires care in the designing and construction of type-writers. The increased distance of travel and the acquired momentum of a carriage in jump-feeding for tabular work calls for some further provision of means to prevent damage to the carriage and its adjuncts, which from the precision of action required are fairly to be considered delicate mechanisms.

Hitherto gages have been constructed to abut against the straight wall of a tooth of the rack-bar, as it provides a more solid surface of resistance; but I have found that in time the point of the tooth is bent or upset over and out of line with either wall of the tooth, thus unfitting the rack-bar for practical and satisfactory work. To overcome this objection, I employ the inclined wall J' of the tooth as the contact face, against which the inclined wall of the tooth I<sup>4</sup> of the gage abuts. This produces a tendency in the gage to travel outwardly up the inclined wall of the tooth, and this tendency is checked by the vertical wall of the recess I<sup>3</sup>, (see Fig. 8,) whereby a wedging action of the gage and bar occurs, which provides a solid stop for the carriage absolutely independent of its ordinary step-by-step feed and a stop which by means of the spring F<sup>2</sup> is also in a measure cushioned,



as the spring is compressed as the gage and hooked bar G stops the carriage. (Compare Figs. 4 and 5.)

The lugs  $I^2$  and  $I^{2x}$  on each gage maintain it in an adjusted position on the rack-bar J, a bail K, (bearing a scale agreeing with the scale  $K'$  of the type-writer), pivoted on the rod  $I'$ , bearing against the lugs  $I^2$  and  $I^{2x}$  when the bail is raised, and when lowered any gage of the series may be moved up out of mesh with the rack-bar and along the rod to a desired point at which a column is to be printed. Additional gages may be assembled or stored at one end of the bar when not in use, as shown in Fig. 1.

The attachment is applied as follows: The stud or bolt A is seated in the frame of a type-writer to pivotally support the case B and its adjunct. Another bolt M, having a head projecting beyond the outside selection C, may be used to protect them from accidental displacement. Two screws L secure the jump-feed rack-bar to the carriage. The screw  $D'$  in the frame pivotally supports the lever D, and the sliding hooked bar G may in like manner be secured to the frame or the shield N over the rear ends of the key-bars of the type-writer. The type-writer may be provided when made with all the necessary threaded openings for the bolts and screws mentioned for the attachment.

The operation of the attachment is as follows: Referring to Figs. 3, 4, and 5, the successive steps will be readily understood. On depressing a key  $C^2$ —for example, key 1,000—the selector for that denomination will be first slightly raised above the remaining selectors, and as the depression of the key proceeds the selector thus raised will be carried farther up into the path of the hook  $G'$ . Now completing the depression of the key, or if the space-bar  $B^3$  be employed, it is by the thumb depressed. Either will depress the lever D, which releases the step-by-step-feed dogs E from the carriage-rack, when the carriage jumps forward (to the left, Fig. 1, or to the right in Figs. 3, 4, and 5) until a gage I abuts against the hook  $G^2$ , as shown in Fig. 5, which stops the carriage at the point to receive an impression of any digit in a thousands-column of any one of the tables arranged on the page to be printed, such tables being determined by the location of the gages I. The “thousands-selector” being one of the thick ones so positions the carriage that any digit printed by the number-keys of the type-writer keyboard will be placed such a distance from the succeeding digit to be printed that punctuation (it may be a comma or period) may be printed after the thousands-digit and before the following digit. Herein lies the advantage of relieving the operator from thought and work in spacing between periods of three digits each and also between whole numbers and decimal fractions. A table thus punctuated presents the columns and periods with in-

creased distinctiveness, which makes computation more convenient. This is apparent, as follows:

1,000,000.00  
142,350.25  
1,000.00

70

The longer the columns the more prominently do the periods and fractions appear. 75

If desired, a rod separate from the bolt, stud, or rod A may be provided for the selectors and their key-levers and keys; but for simplicity the rod A alone is preferable. It is clear that the lug  $I^2$  of the gage I, which serves as a lift and stop, may be dispensed with; but as after several gages have been adjusted by the aid of the scale on the bail all the gages may be at once lifted and turned by the bail over on the rack, the bail contacting with the lugs  $I^2$ . The lug  $I^{2x}$  is intended to be pressed upon by the under surface of the bail slightly inside of the center of the rod  $I'$ , thus serving to lock the gages in mesh with the rack. Pressure of the front edge of the bail against the lug  $I^2$  being also inside of said center might be the sole and sufficient locking means, while said lug also may serve as the only stop to any further movement of the bail. 85 90 95

It is clear that details of construction, proportion, location, and arrangement may be made by any one skilled in the art without a departure from the gist of my invention, and I therefore do not limit the same in these particulars. 100

What I claim is—

1. In a tabulating mechanism for type-writers a selector constructed to space for punctuation; substantially as specified. 105

2. In tabulating mechanism a selector of a width more than a letter-space of the step-by-step feed of a type-writer; substantially as specified. 110

3. In a tabulating mechanism a series of selectors of varied thicknesses; substantially as specified.

4. In a tabulating mechanism a series of selectors of which those selecting the last of a period of three digits are thicker than the others; substantially as specified. 115

5. In a tabulating mechanism a series of selectors, one for selecting units of greater thickness than adjacent selectors whereby automatic spacing for punctuation between whole numbers and decimal fractions is provided; substantially as specified. 120

6. In tabulating mechanism a series of selectors of varied thickness, jump-feed mechanism for bringing desired tables or columns into position, and a connection controlled by said selectors, and varying the printing-point in said table or column in accordance with the thickness of a coacting selector; substantially as specified. 125 130

7. In a tabulating attachment for type-writers, a series of selectors having keys, a case for the same adapted to be moved by



said keys for releasing a carriage-feed mechanism, and means for pivotally supporting said case at the side of a type-writer with said keys accessibly adjoining the keyboard of a  
5 type-writer; substantially as specified.

8. In a tabulating attachment for type-writers, a case operatively connected to release a carriage-feed mechanism, series of selectors each having a key-lever pivoted in  
10 said case, means for pivotally supporting said case to a fixed part of a type-writer, and means to impart a movement of the key-levers to said case; substantially as specified.

9. In a tabulating attachment for type-writers, a series of selectors each having a key-lever, a case operatively connected to release a carriage-feed mechanism and having said lever pivoted thereto, a spring extending  
15 from each lever to a part carried by the case, means for pivotally supporting said case to a fixed part of a type-writer, and means to impart a movement of the key-levers to said case; substantially as specified.

10. In a tabulating mechanism a pivoted  
25 case, having an extension for operating carriage-feed-release mechanism and carrying a space-bar; substantially as specified.

11. In a tabulating mechanism a pivoted case, having an extension for operating carriage-feed-release mechanism and carrying a  
30 space-bar, a series of selectors having key-levers and keys, a cross-bar, and a spring extending therefrom to a lever; substantially as specified.

12. In a tabulating mechanism a pivoted case having an extension for operating carriage-feed-release mechanism, and means carried by the case to operate said extension and a series of selectors having key-levers and  
35 keys; substantially as specified.

13. In a tabulating attachment for type-writers, a series of selectors, a case for the same provided with a device for releasing a carriage-feed, and a pivotal support for the  
45 case and for the selectors; substantially as specified.

14. In a tabulating attachment for type-writers, a series of selectors, a case for the same provided with a device for releasing a carriage-feed adapted to move with the case, and a pivotal support for the case and for the selectors; substantially as specified.

15. In a jump-feed mechanism, a toothed rack-bar, and a gage pivotally mounted to  
55 slide parallel to said bar upon a separate support and arranged to swing into contact with

the faces of the toothed rack-bar; substantially as specified.

16. In a jump-feed mechanism, a toothed rack-bar, a gage pivotally mounted independently of said bar and having a depending tooth arranged to coact on the inclined faces of the bar-teeth, and means for resisting lateral travel on the rack-teeth; substantially  
60 as specified.

17. A gage having a pivotal support at one end and an open side with a tooth with an inclined face and a bearing-wall at opposite sides of the opening combined with a rack adapted to bear against said wall and having  
65 teeth, one face of which is inclined and adapted to bear against said toothed wall of the gage; substantially as specified.

18. The combination with a rack-bar, of a gage, a rod on which said gage is pivotally  
75 and slidably mounted, and a bail mounted on said rod for engaging said gage to prevent oscillation thereof; substantially as specified.

19. A gage-plate provided with a pivoting aperture and having a rack-engaging tooth  
80 at its free ends; substantially as specified.

20. A gage having a rack-engaging tooth and opposite wall and a locking-lug in combination with a movable bail arranged to prevent movement of the gage laterally of said  
85 rack; substantially as specified.

21. A gage having a rack-engaging tooth and a lifting-lug in combination with a movable bail arranged to engage the lug to hold the gage against movement laterally of the  
90 rack; substantially as specified.

22. A rack, a gage having a tooth and opposite wall, a lifting and locking lug in combination with a movable bail arranged to engage the lug to hold the gage against movement laterally of the rack; substantially as  
95 specified.

23. A tabulating attachment for a type-writer comprising a series of selectors arranged at one side of the type-writer, a sliding connection and jump-feed rack arranged parallel with the carriage, release mechanism connecting with the feed-dogs and with a lever arranged with the selectors, all of said parts being detachably connected with said  
105 type-writer; substantially as specified.

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

CHARLES SPIRO.

Witnesses:

W. J. SPIRO,

EDWD. E. JONES.