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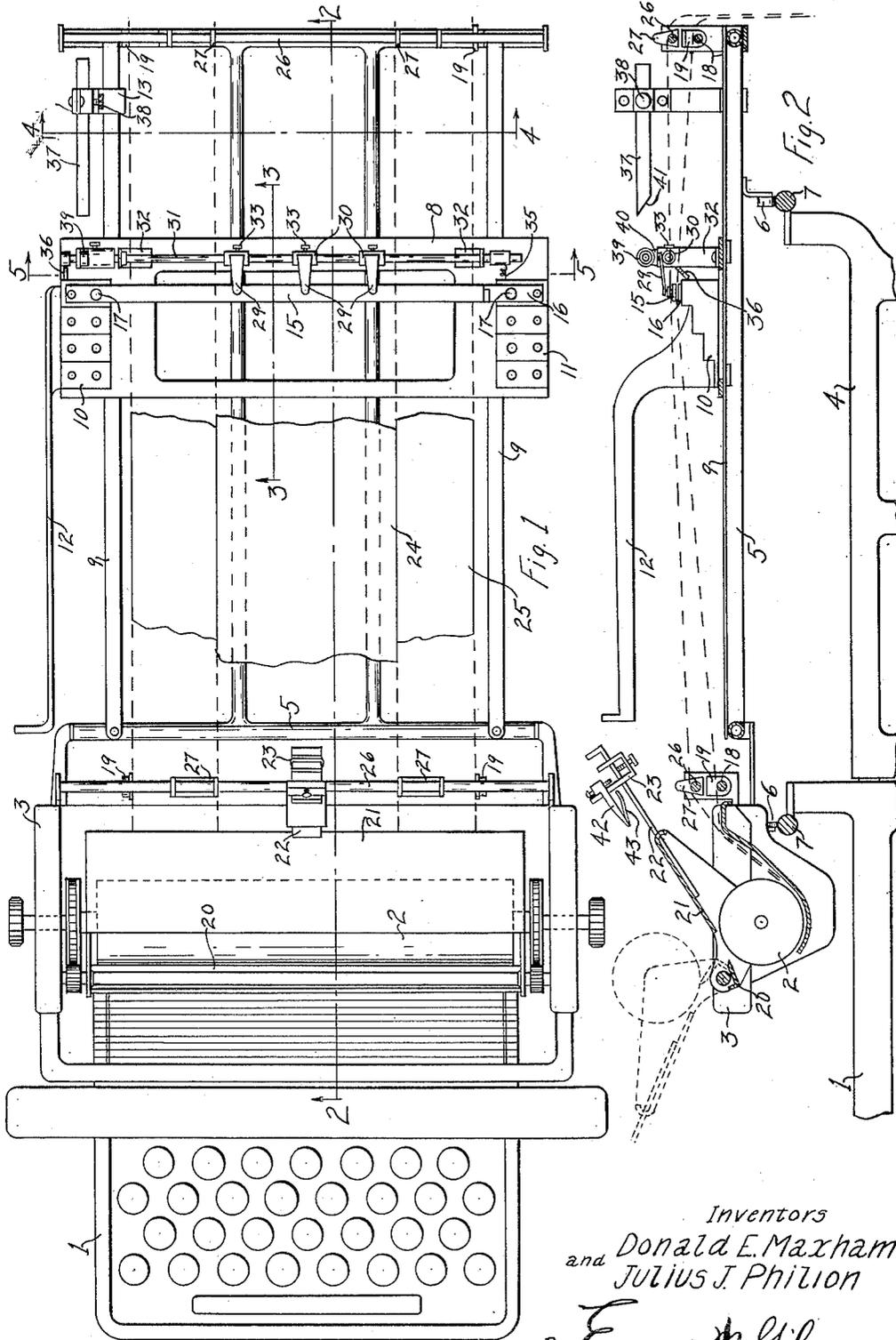
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BILLING MACHINE FORM ALIGNER

Filed July 21, 1930

2 Sheets-Sheet 1



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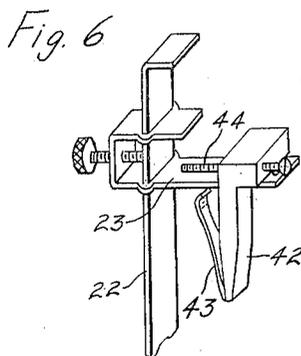
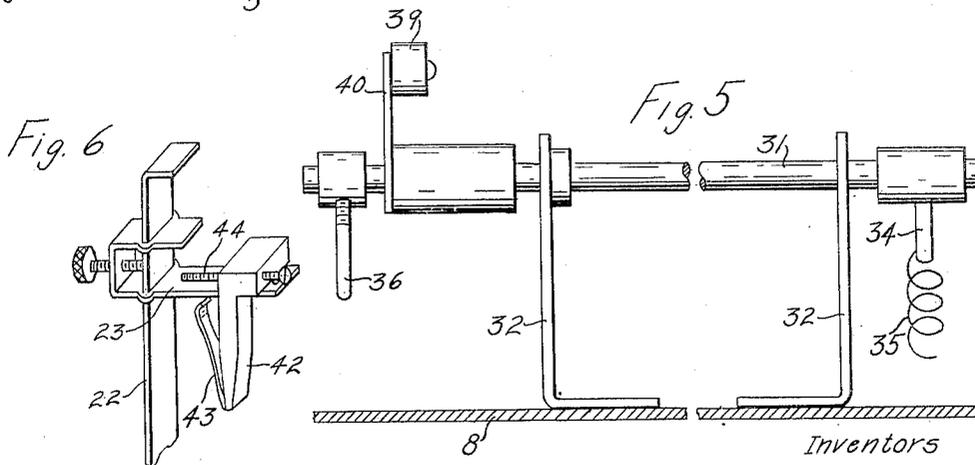
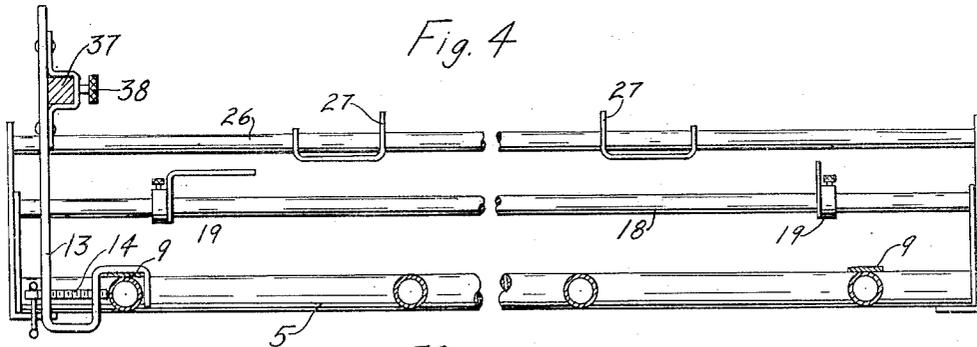
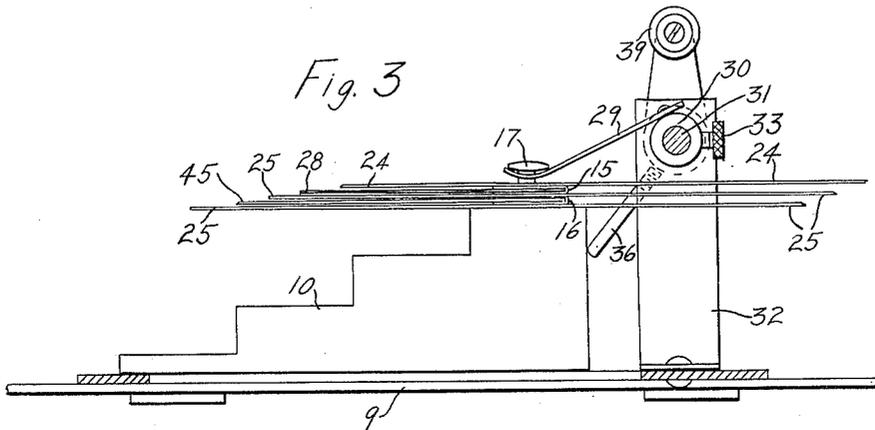
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# UNITED STATES PATENT OFFICE

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## BILLING MACHINE FORM ALIGNER

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Our invention relates to typewriter billing machines wherein forms or the like in continuous strips are used with carbon sheets located between the leading end portions of the form strips and adapted, upon completion of the typing of each set of forms, to be retracted to a position ready for use between the forms of the next succeeding set so that the typed set of forms may be severed from the form strips without mutilating the carbons, and our invention has reference more particularly to improvements in such machines whereby forms of different dimensions may be employed at the same time and readily cut off in different lengths.

The principal objects of our invention are to provide a simple and convenient method and structure whereby forms of different dimensions may be used conjointly in billing machines and the like; to insure relative positioning of such forms in proper superposed registering relation for typing; to permit sets of different length forms to be readily cut off or severed from the form strips; to accomplish the proper relative positioning of forms of different lengths automatically through the usual operations of the billing machine without requiring extra time or special attention of the operator; and to provide a device of this character which is readily adaptable to present forms of billing machines and which does not interfere with use of the billing machine with forms of uniform dimensions.

On the drawings:

Fig. 1 is a plan view of a billing machine equipped with our improvements;

Fig. 2 is a vertical longitudinal sectional view of the upper portion of the machine taken substantially on the line 2—2 of Fig. 1;

Fig. 3 is an enlarged detail vertical sectional view on the line 3—3 of Fig. 1;

Fig. 4 is an enlarged vertical cross sectional view on line 4—4 of Fig. 1;

Fig. 5 is an enlarged detail vertical sectional view on line 5—5 of Fig. 1 with an intermediate portion broken away, and

Fig. 6 is a perspective view of the form cutting gauge stop.

Referring to the drawings, the reference

numeral 1 (see Figs. 1 and 2) indicates the main frame of a typewriter, 2 the cylinder or platen, and 3 the carriage which supports the cylinder or platen 2 in the usual manner for movement across the top of the main frame. An auxiliary frame 4 extends rearwardly from the main frame 1 and supports an intermediate carriage 5 which is attached to the cylinder carriage 3 and provided with rollers 6 running on transverse track members 7 of the auxiliary frame so that the intermediate carriage 5 moves freely with the cylinder carriage 3.

The intermediate carriage 5 is of the usual form and has a carbon blade bracket plate 8 mounted thereon to move along guides 9 to and from the cylinder 2, said plate 8 being provided at each side with stepped carbon blade brackets 10 and 11 on the successive elevations of which carbon blades may be secured for holding carbon sheets between superposed form strips so that the carbon sheets feed with the forms to the cylinder 2 and may be retracted after each typing operation to a position between the next succeeding forms so as to permit the typed forms to be separated or cut from the form strips without mutilating the carbon sheets. For retracting the carbon blade bracket plate assembly and the carbon sheets which are connected therewith, said plate 8 has a long arm 12 extending forwardly therefrom at one side of the machine and provided with an outturned forward end which is positioned so as to be conveniently accessible to the machine operator for pushing the carbon blade bracket plate assembly rearwardly, the extent of such rearward movement being regulated by an adjustable stop 13 on one of the guides 9 which said stop is set in the proper position by the clamping screw 14, to be engaged by the carbon blade bracket plate 8 when the latter is pushed rearwardly away from the cylinder to the desired limit of its rearward movement.

The carbon blades, two of which are shown herein at 15 and 16 mounted on the upper steps of the respective brackets 10 and 11, although additional carbon blades may be

employed and mounted on the other steps of said brackets if desired, are of a known form consisting of a blade proper which is pivoted at one end between opposite side walls of a thin channeled clasp member to swing therein in somewhat the manner of a jack knife so as to clamp onto the end of the carbon sheet, said carbon blade being secured in the closed carbon clamping position to the selected step of one of the carbon blade brackets 10 or 11 in any convenient manner as by a thumb screw 17.

For guiding the form strips over the intermediate carriage and over the carbon blade bracket plate to the cylinder 2 of the billing machine, a transverse rod 18 is provided at each end of the intermediate carriage and each rod 18 has a pair of adjustable guides 19 thereon which may be slid along the respective rod 18 to the required position and in suitable spaced relation to accommodate the width of form strips that are being used, and direct same to the proper place on the cylinder 2.

In using a structure of the above character, which is illustrative of a type of billing machine which has been used heretofore, carbon sheets of the required number corresponding to the number of carbon copies to be made, are provided and each carbon sheet is attached at its rear end with the carbon side up, to a separate carbon blade and the carbon blades are mounted on selected steps of the carbon blade brackets, preferably in alternate order on the two brackets 10 and 11 and the forms (one more than the number of carbon sheets) are fed over the rear rod 18 and between the guides 19 thereof and then over and under and between the carbon blades and their respective carbons so that the form strip which is to constitute the typed original is under the lowermost carbon blade and its carbon, the first copy between the lowermost carbon blade and the one next above and between their respective carbon sheets (if more than one copy is to be made) and so on, the last form strip being located over the uppermost carbon blade and carbon sheet. These form strips and carbon sheets are then extended forwardly over the forward rod 18 and between its guides 19 and run under the platen or cylinder 2 in the usual manner of feeding sheets to typewriters and when properly positioned the first set of forms are typed. As the typing progresses and the cylinder is turned to advance the work, the carbon sheets move forwardly with the form strips and by reason of the connection of the rear ends of the carbon sheets with the carbon blade bracket plate assembly, pull the latter forwardly on the guides 9 of the intermediate carriage 5, the leading ends of the forms and carbon sheets passing between the cylinder 2 and a cutter bar 20 and over a

plate 21 which has a centrally arranged lever 22 with an adjustable gauge 23 thereon for determining the proper positioning of the sets of forms for tearing off or cutting at the proper line of separation between successive forms.

After typing the set of forms, the leading edges thereof are brought up to the gauge 23 which has been previously adjusted to the proper position for the length of forms that are being used and the lever 22 pulled forwardly, which operation, in the particular machine illustrated herein, elevates the cylinder or platen 2 as shown by dotted lines in Fig. 2 so as to release the holding pressure on the form strips and carbons, and while holding the ends of the form strips at places where there are no carbons therebetween and at the same time holding the leading edges of the forms at the gauge 23, the arm 12 is pushed rearwardly until the carbon blade bracket plate 8 strikes the stop 13, thereby retracting the carbons from the typed forms to a position between the next succeeding set of forms and beyond the place where the typed set of forms is to be torn or severed from the next succeeding set. While still holding the typed forms at the gauge the lever 22 is then thrown rearwardly to the full line position of Figs. 1 and 2, thus restoring the platen or cylinder 2 to its former paper holding position, after which the typed set of forms is torn off along the edge of the cutter bar 20, the form strips being preferably perforated between the successive forms thereof where they are to be separated and the gauge 23 being adjusted so that the lines of perforations are positioned along the edge of the cutter bar 20 when the set of forms is adjusted ready for the cutting operation.

With machines of the above described character however, it is customary to use forms of the same dimensions for originals and copies, there being no provision for utilization at the same time of form strips comprising forms of different dimensions and it is the principal purpose of our invention to adapt continuous form strip billing machines to use conjointly or at the same time forms of different transverse or longitudinal dimensions or both.

For permitting use of a form strip of a different width than the others, as for example, a strip as indicated at 24 in Fig. 1 which is narrower than the other strips, indicated at 25, a pair of front and rear transverse rods 26 are mounted on the intermediate carriage 5 above the front and rear transverse rods 18 and each of these rods 26 is provided with a pair of slidable guides 27 which may be relatively adjusted according to the width of the narrower strip 24 and positioned along the rods 26 so as to locate the narrower form strip at the particular place required between the lateral edges of the strips 25.

When a narrow strip 24 is employed, the carbon sheet 28 for that strip is preferably of a corresponding narrow width and attached along its respective carbon blade so that it will be in line with the form strip 24.

In using forms of different lengths it is necessary to locate the short length form at the proper place between the ends or top and bottom edges of the other forms for typing and it is desirable to insure proper positioning of the short length form before the cutting or severing operation so that it will be severed along the proper line in the same operation with the severing of the other forms, these adjustments being accomplished in the illustrated embodiment of our invention by gripping members on the carbon blade bracket plate assembly which are controlled so as to engage and shift the short length form strip at proper times in the retractile movement of said assembly.

In the illustrated embodiment the narrow strip 24 has the short length forms and extends over the uppermost carbon blade 15 and under a plurality of grippers 29 which are arranged at proper intervals to clamp the form strip between the grippers 29 and said uppermost carbon blade 15 so that the strip 24 may be adjusted lengthwise by the movement of the carbon blade bracket plate assembly. These grippers are in the form of leaf springs which are secured at their rear ends to collars 30 which are mounted on the shaft 31 which is journaled near the ends in brackets 32 on the plate 8, said collars and grippers being slidable along the shaft 31 for adjustment to accommodate form strips of different widths and locked in the various positions of adjustment by the set screws 33. A depending arm 34 which is fixed on one end of the shaft 31 is connected by a spring 35 to the adjacent carbon blade bracket 11 so as to exert a constant tension to rotate the shaft 31 in the direction to elevate the grippers 29, the extent of such elevating movement of the grippers being limited by a depending stop arm 36 which is fixed on the other end of the shaft 31 and engages against the adjacent carbon blade bracket 10 so that the grippers are normally maintained by the spring 35 at a distance above the uppermost carbon blade 15 which is sufficient to permit the upper form strip to move freely therebetween.

The form strip 24 is adapted to be adjusted by the retractile movement of the carbon blade bracket plate assembly to the proper position, according to its length, relative to the other form strips 25, for cutting off in the desired short length and locating same in the proper registering relation to the other forms for typing, and for controlling the action of the grippers 29 so as to clamp the form strip 24 to the carbon blade bracket plate assembly at the proper

time, the stop member 13 has a depresser arm 37 adjustably clamped thereon by a set screw 38 and extending forwardly therefrom in position to engage a roller 39 on the upper end of a rocker arm 40 which is fixed on the shaft 31, said depresser arm 37 being formed with a beveled end face 41 which in the retractile movement of the carbon blade bracket plate assembly is engaged by the roller 39 and serves to direct the latter under the arm 37, thereby rocking the grippers 29 to the clamping position and holding same in such position during the further retractile movement of the carbon blade bracket plate assembly so that the form strip 24 is moved rearwardly therewith a distance determined by the length of the projecting portion of the depresser arm, it being understood that the depresser arm 37 may be adjusted on the stop member 13 to regulate the action of the grippers to obtain any desired longitudinal adjustment of the form strip 24.

With this device the forms and carbons are arranged and introduced in the usual manner to the cylinder, the form strip 24 being inserted between the grippers 29 and the uppermost carbon blade 15 and over a narrow carbon sheet 24 which is preferably masked at the proper place to avoid typing on the form strip 24 except over the area thereof constituting the short length form which is being typed, the short length form in the present instance having its leading edge in line with the leading edges of the other forms 25 during the typing operation.

After the set of forms are typed the leading edges of all the forms are brought up to the gauge 23 which is of special construction with a divider 42 thereon which is adapted to be inserted between the short form strip 24 and the other form strips. This divider is slidable on the gauge member 23 to and from the lever 22 and has a spring holder 43 on the under side for releasably clamping the end of the strip 24 against the lever 22 while the ends of the other strips are manually held by the operator against the outer side of the divider 42. In practice the operator presses down on the form strips that overlie the divider 42 and the latter is by this pressure pushed down on the gauge member 23 so that the spring 43 clamps the end of the strip 24 against the lever 22, an adjusting screw 44 being provided which serves as a stop to limit the movement of the divider 42 toward the lever 22 and thus regulates the holding tension of the spring 43, the purpose of this construction being to permit the operator to securely hold all of the form strips excepting the short length form strip 24 at the gauge throughout the entire retractile movement of the carbon sheets so that there is no change in position thereof, while the end of the form strip is held sufficiently by the spring 43 to be re-

tained at the gauge 23 during the retractile movement of the carbons 25 and 45 until the grippers 29 are operated by the depresser arm 37 to clamp the strip 24 against the uppermost carbon knife 15, whereupon the end of the strip 24 is pulled from its position of engagement by the spring 43 and said strip is retracted with the carbon sheets by the further retractile movement of the carbon blade bracket plate assembly.

This retractile movement of the strip 24 is regulated by the adjustment of the depresser arm 37 so that when the retractile movement of the carbon blade bracket plate assembly is arrested by engagement with the stop 13, the typed form at the leading end of said strip 24 is positioned with the line along which it is to be severed coinciding with the lines along which the other typed forms are to be severed, and these lines along which the forms of the typed set are to be severed are located along the cutting edge of the cutter bar 20 so that the typed forms may be readily severed from their respective strips in the usual manner by a tearing operation against the cutting edge of the cutter bar 20. This retractile movement of the form strip 24 with the carbon sheets also positions said strip so that next succeeding form thereof, after the completed one that is being severed, is located in the proper registering relation to the corresponding forms of the other strips 25 for typing the next set of forms, and thus the short length form is adjusted by the operation of the carbon sheet retracting mechanism and without any extra operations, ready for typing, and this adjustment also insures proper positioning of the short length form so that it may be readily severed at the same time and in the same severing operation with the other forms.

While we have shown and described our invention in a preferred form, we are aware that various changes and modifications may be made without departing from the principles of our invention, the scope of which is to be determined by the appended claims.

We claim as our invention:

1. The combination with a typewriter of a carbon sheet retractor whereby sheets of carbon paper are held between superimposed strips of paper which are collectively supplied to the typewriter, a cross member on the retractor over which one of said strips passes and means operable at a predetermined period in the retractile movement of said retractor to clamp said strip to said cross member for selectively adjusting said strip of paper longitudinally of the other strips of paper.

2. The combination with a typewriter of a frame, a carbon sheet retractor movably mounted thereon whereby sheets of carbon paper are held between superimposed strips of paper which are collectively supplied to

the typewriter, an adjustable stop mounted on the frame for limiting the retractile movement of the carbon sheet retractor, and means in said retractor for selectively adjusting one or more of the strips of paper longitudinally of the other strips of paper, said means being operable at a predetermined period during the retractile movement of said retractor by interengaging means adjustably mounted on said stop.

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