

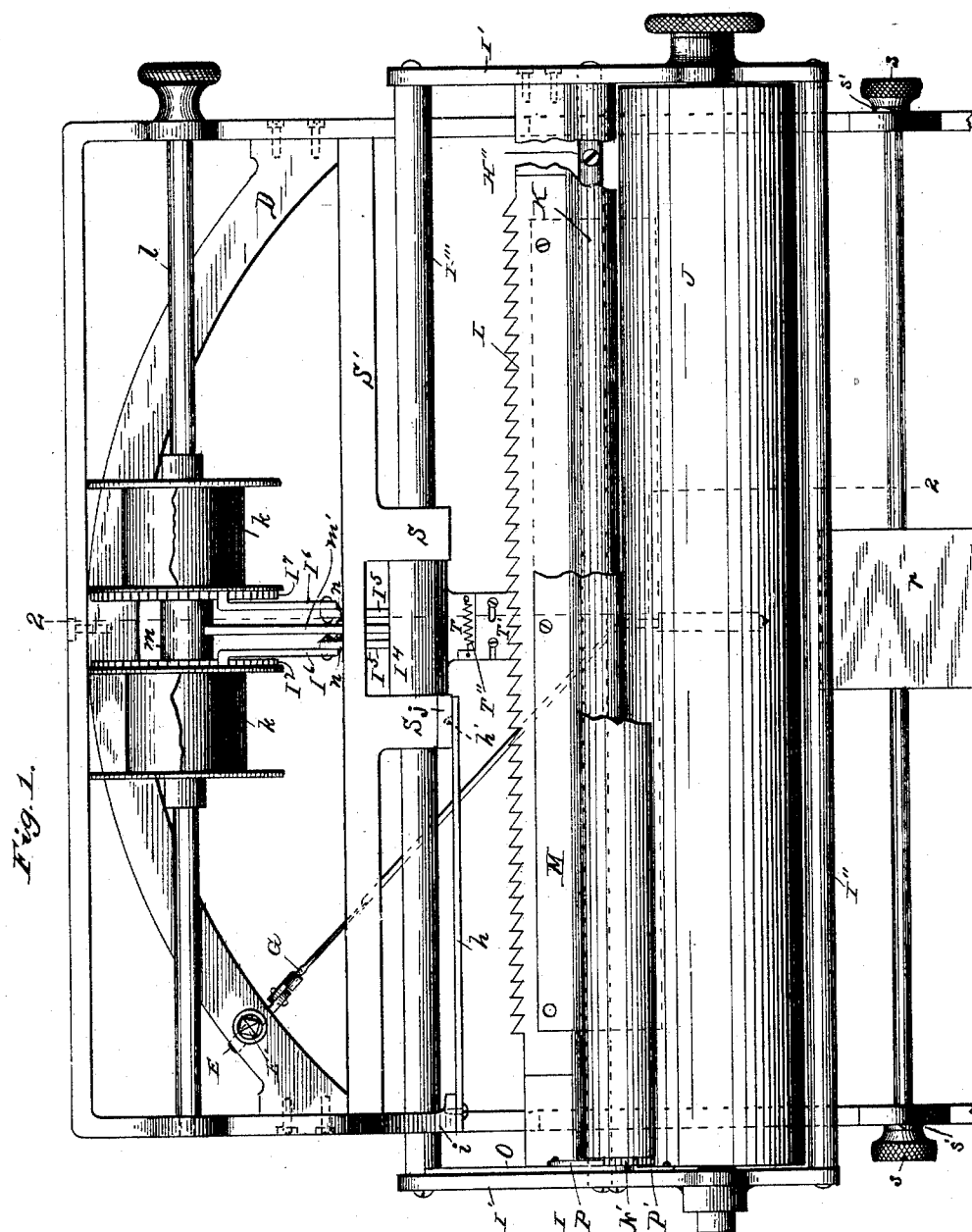
(No Model.)

4 Sheets—Sheet 1.

D. C. STOVER.
TYPE WRITING MACHINE.

No. 468,139.

Patented Feb. 2, 1892.



Witnesses
Harry S. Rohrer,
W. H. Lamon

Inventor
Daniel C. Stover,
by *Wills & Stone,*
Attorneys.

(No Model.)

4 Sheets—Sheet 2.

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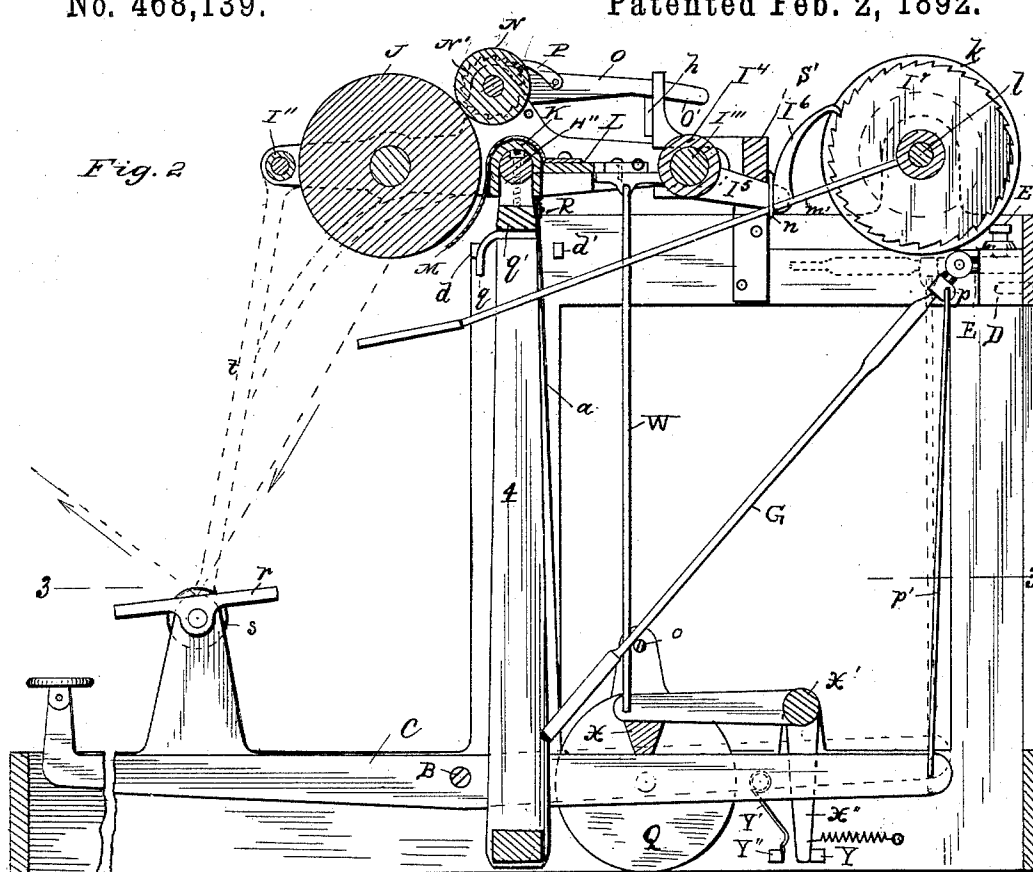


Fig. 8.

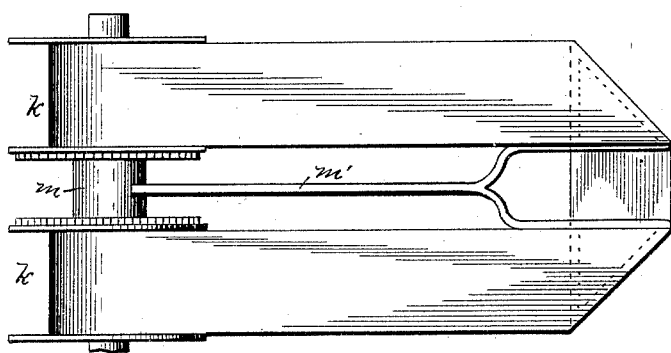
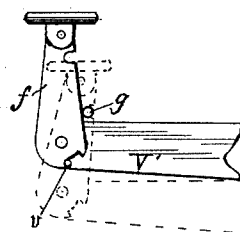


Fig. 9.



Witnesses:

Harry S Rohrer
W. A. Lammor

Inventor:
Daniel C. Stover.
by *Wm. H. Moore,*
Attorneys.

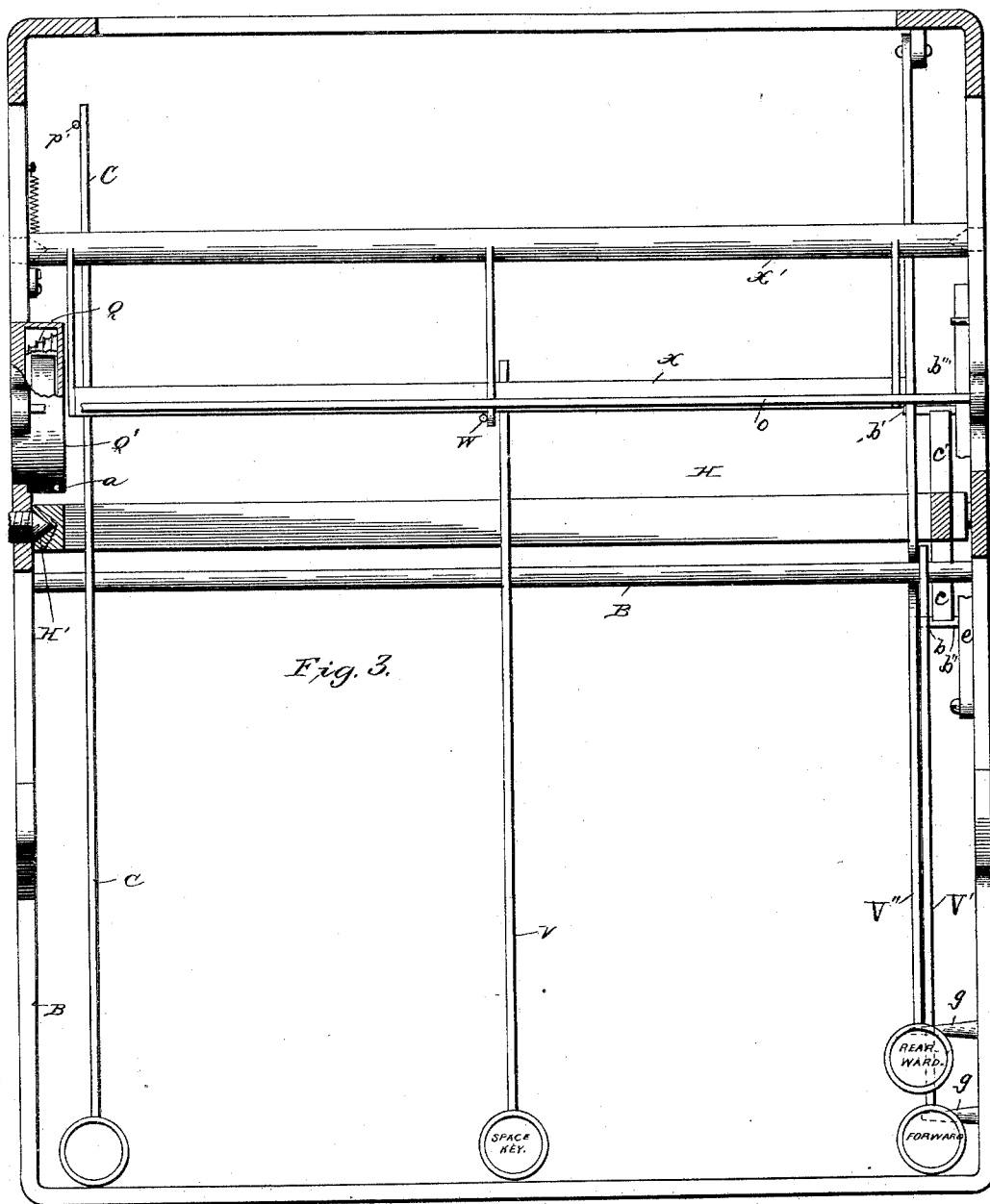
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Witnesses
Harry S. Rohrer.
Wm. H. Lammor

Inventor
Daniel C. Stover.
by Viles & Greene,
Attorneys.

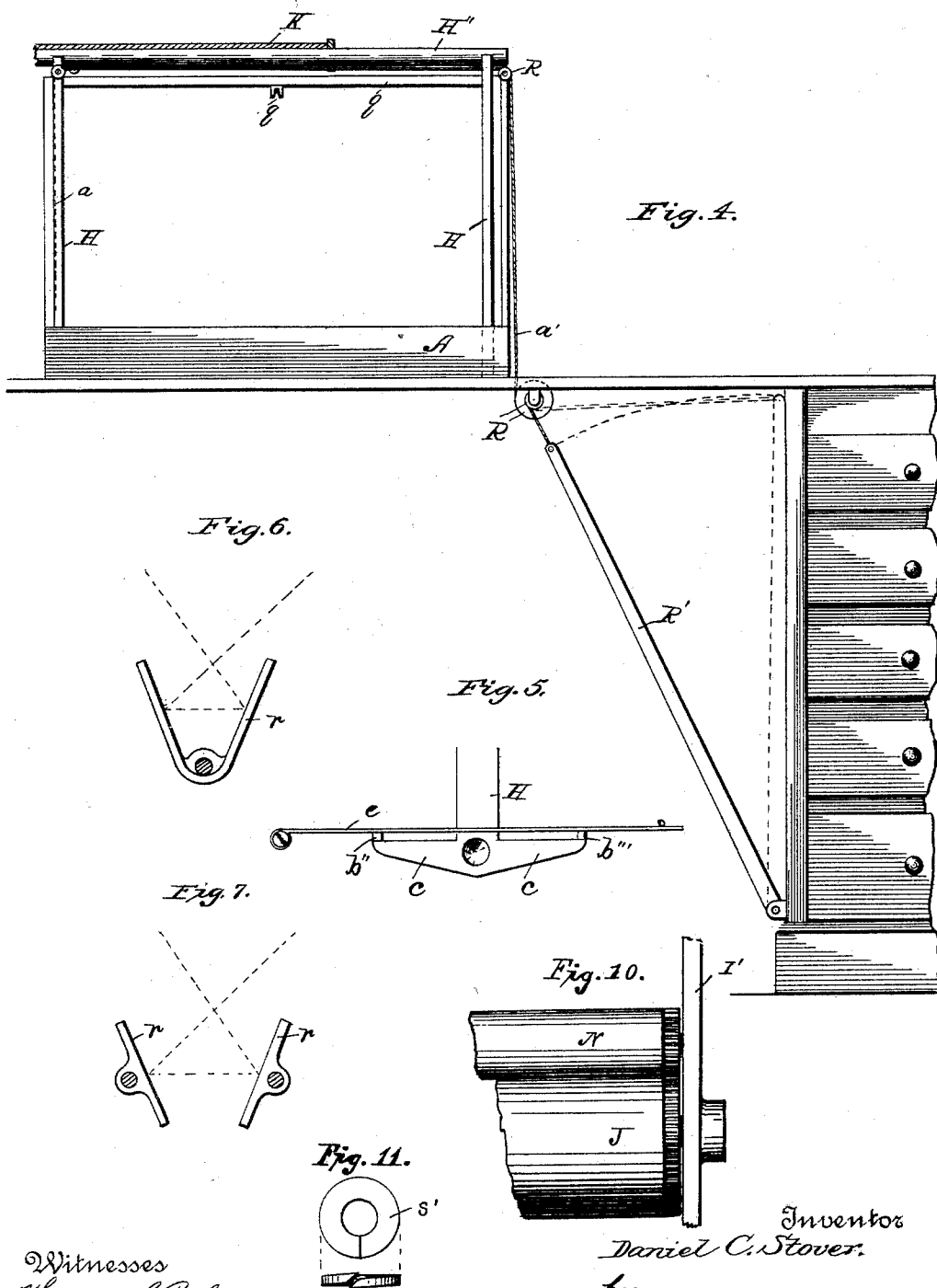
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Witnesses
Harry S. Rohrer.
W. H. Lammor

Inventor
Daniel C. Stover.
by Wiles & Stover,
Attorneys.

UNITED STATES PATENT OFFICE.

DANIEL C. STOVER, OF FREEPORT, ILLINOIS.

TYPE-WRITING MACHINE.

SPECIFICATION forming part of Letters Patent No. 468,139, dated February 2, 1892.

Application filed September 26, 1890. Serial No. 366,234. (No model.)

To all whom it may concern:

Be it known that I, DANIEL C. STOVER, a resident of Freeport, in the county of Stephenson and State of Illinois, have invented certain new and useful Improvements in Type-Writing Machines; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it pertains to make and use the same.

This invention involves novel means for enabling the operator to see each character as it is formed, and, indeed, the entire length of one or more lines, for spacing both letters and lines, for moving the carriage in each direction, for operating the ribbon, for throwing into place characters not normally in position to print, and for securing various other results, as will hereinafter appear.

In the accompanying drawings, Figure 1 is a partial plan view of a machine embodying my devices. Fig. 2 is a partial section on the line 2 2, Fig. 1. Fig. 3 is a partial section on the line 3 3, Fig. 2. Fig. 4 is a partial front view of a machine and its stand or table. Fig. 5 is a detail view of a certain swinging frame. Figs. 6 and 7 are modifications of certain reflecting devices. Fig. 8 is a plan of the ribbon-carrier. Fig. 9 shows certain lever-locking devices. Fig. 10 illustrates gearing together with the feed-roller and platen. Fig. 11 is a detached view of a certain spring-washer of Fig. 1.

In the drawings, A is a frame supporting such other parts of the mechanism as are not more directly connected with the stand, and B is a transverse shaft upon which most of the key-levers C are fulcrumed in the usual manner. For clearness in the drawings one only of these levers and one only of the type-arms are shown.

In the upper and rear part of the frame A is fixed a horizontal circular segment D, in which radial studs E are secured by set-screws E' in such manner as to admit of both rotary and longitudinal adjustment. Type-arms G are hinged, respectively, to these studs, by the rotary adjustment of which the several arms are caused to swing to a common point near the center of the machine, where each is so bent that its free end may lie in the medial line passing from front to rear of the frame.

Near the middle of the machine is a transverse vertical frame H, of rectangular outline, supported in the main frame A, near its base, upon conical pivots H'. The upper member of this frame is a rounded bar H'', which projects beyond the side members and serves as a support or track upon which the carriage may readily move back and forth.

The carriage I consists, primarily, of end plates I', whose corresponding front and rear ends are connected, respectively, by bars I'' I'''. In the front part of the carriage is revolutely mounted a platen J, having at one end of its shaft a milled disk by which it may be conveniently rotated. In the rear of the platen is a semi-cylindrical saddle K, open below and fixed in the carriage in position to rest upon the upper rounded member of the frame H, from which, however, it may be lifted and beyond the ends of which it may project as it slides back and forth. The rear wing of the saddle supports a common bar or rack L, having the usual teeth upon its rear edge. A thin metallic sheet M is secured upon the top of the bar last named, and, bending over the saddle, and thence downward, following the curve of the platen, it forms a paper-guide. Above the saddle is a paper-feeding roller N, mounted in the carriage and provided at one end with a ratchet-disk N'. The forward end of a peculiar lever O is pivoted upon the roller-shaft contiguous to the ratchet, and upon this lever is pivoted a pawl P, which engages the ratchet and rotates the roller when the lever is swung in the proper direction by means to be described. The carriage is moved longitudinally by a cord a, attached beneath and wound upon a cone-pulley Q at the bottom of the frame and upon its left side. This is inclosed in case Q', and is actuated by a coiled spring within it in the same manner as the analogous construction in the earlier forms of watch-movements. The carriage is moved in the contrary direction, after the completion of a line, by a second cord a', attached to the middle of its lower side and passing over suitable pulleys R to the upper end of an approximately vertical lever R', whose lower end is hinged to the stand in position to be conveniently swung to one side, as indicated in dotted lines, by the knee of the operator. The lever, being of considerable length, is

adapted to be readily operated whatever the height of the knee. The rear bar I''' of the carriage is embraced by forked projections S from a parallel bar S', fixed in the main frame of the machine, and slides freely therein both longitudinally and laterally—longitudinally when the carriage passes back and forth in printing and laterally when the carriage is thrown either forward or rearward to bring into use different types upon the same type-arm. Between the projections which hold it against longitudinal movement is a sleeve I⁴, loosely mounted upon the bar I''' and having in front a multiple-pointed pawl T to engage the rack-bar. A second pawl T' slides upon the first through the space of one rack-tooth, and is drawn in a contrary direction by a spring T''. The two pawls are alternately thrown into engagement with the rack by a slight rotary motion of the sleeve produced by any of the type-levers or by a space-lever V in the middle of the machine. The levers all act through a rod W, attached to the lower pawl, and connected below with a rectangular swinging frame X X', whose front member X rests upon all the edges of all the levers and whose rear member is pivoted in the sides of the main frame B. To limit the motion of the pawls, the member X' is provided at one end with a downwardly-extending arm X'', which normally rests against a lug Y upon the main frame, the upper pawl being engaged with the rack. When the frame is thrown upward to bring the lower pawl into engagement with the rack, this arm strikes a spring Y', and is thus limited in movement, the spring being strong enough to perfectly resist the ordinary force applied to the keys. If, however, the spacing-key be pressed with greater force, the resistance of the spring is overcome, and the pawls are both thrown above the rack, leaving the carriage free to move in either direction; the arm X'' meantime meeting the lug Y'', which prevents unnecessarily great displacement.

The carriage is thrown bodily forward or rearward from the normal (illustrated) position by the swinging of the frame H, upon which it rests. This is accomplished by two key-levers V' V'', (shown at the right side of the machine,) which, when depressed, press, respectively, upon lugs b b', projecting beneath the levers from the ends of rigid arms c c', extending, respectively, forward and rearward from the base of the frame H, whose oscillation is limited by lugs d d' upon the main frame near its top. Upon the opposite side of the arms c c' lugs b'' b''' project beneath a flat spring e, secured at each end against upward movement upon the side of the main frame. The spring holds the frame in the position shown, but yields to allow its displacement when the levers V' V''' are operated. The lever V' is fulcrumed upon the same axis as the type-key levers; but the other is bent to pass below this axis and is

independently pivoted at the rear of the machine.

It being desirable to have means for locking the swinging frame when in either its forward or rearward position, the devices shown in Figs. 3 and 9 are employed. The key-supports f are hinged to the forward end of the corresponding levers, and each is provided with a notch in its front edge, so that when the key is depressed it may, by swinging forward, engage a fixed stud or catch g, projecting from the main frame. The lever is thus kept depressed, and the frame, and consequently the carriage which it bears, must remain in the new position till the key-support is again swung forward. The margin of the support is cut away, and the shoulders thus formed strike a pin v and limit the movement of the key.

To operate the lever O, above mentioned, and thus to obtain a single or double space between consecutive lines, there is provided a spring-bar h, whose outer end is pivoted to an arm i, projecting from the left side of the main frame over the rear bar of the carriage and having its inner end pressing at a higher point the face of a lug j upon one of the projections S. The elasticity of the bar h holds a projection h' in one of two corresponding depressions in the lug j, the upper recess being employed when a double line-space is desired. Now, the carriage being in position to begin a line, the lever O rests upon the bar h, near its inner end, and as the carriage advances step by step, the lever slides along the bar and falls gradually until the attached pawl has passed over one or two teeth upon the ratchet N', whose following rotation is prevented by a second pawl P'. As the lever passes off the bar it is supported by a pin x. When the line is completed and the carriage returns to its primary position, the lever rides along the upwardly-inclined bar, and, acting through its pawl, necessarily rotates the roller.

From the lower rear side of the sleeve I⁴ project two rigid arms I⁵, each bearing a pawl I⁶ to engage a ratchet I' upon one of two ribbon-spools k. These latter are loosely mounted upon a shaft l, extending from side to side of the machine. One only of these pawls works at any given time, the other being thrown back upon the fixed bar S' until the transfer of the ribbon from one spool to the other necessitates reversing the pawls. Between the spools is a sleeve m, loosely mounted upon the spool-shaft, and from it projects a ribbon-carrying arm m'. This is bifurcated near its free end, and each branch is provided with a turning bar oblique to and along side of the normal path of the ribbon extending from the corresponding spool, whereby the ribbon passing around both turning bars may advance continuously from one spool to the other and at the same time lie between the turning bars in a plane practically parallel to the axis of the platen, beneath and at

some distance from the surface of which both bars are supported by the arm m' , which swings in a stirrup n , depending from the bar S' . The type-arms G all normally drop below the plane of their hinges and rest against a bar o , fixed across the main frame in position to receive them. Each arm has near its hinge a collar p , which is connected by a rod p' with the rear end of the corresponding key-lever below. The type-arms bear at their free ends three types, of which the middle one strikes the platen when the carriage is in its normal position. As each arm swings upward to impress its character in a plane oblique to the segment from which all are suspended, it tends to strike the platen obliquely. To correct this tendency, there is provided a small plate q , depending from a cross-bar q' , fixed to the frame H near the common point for the arms, and having in its lower margin a gradually-narrowing notch, which at length becomes vertical. Each arm swings into the notch, and is thereby caused to strike the platen perpendicularly by changing its course in the last eighth of an inch of its path. Such change necessitates yielding at some point, and it is found desirable to provide for it by flattening each arm near its hinge, so that while retaining all its rigidity in its striking plane it readily springs in a transverse direction. As the type-arm swings upward to print, it strikes and carries with it the ribbon, the whole carrier swinging upon the spool-axis and the two branches passing upon opposite sides of the notched directing-plate. As the type-arm recedes, the carrier follows from the force of gravity, aided by a spring, if necessary, until it is arrested by the stirrup n .

A little in front of and below the platen is mounted a reflector r , which permits the operator to see, without raising the eyes from the key-board, all characters near the printing-point as fast as they are impressed upon the paper. For erecting the image of the characters the reflector may be so formed as to give a double reflection, as in Fig. 6, or it may be replaced by two distinct reflectors, as in Fig. 7. As shown, the reflector is pivoted on or in the main frame and provided with milled rotating nuts s and spring-washers s' to maintain the desired angle. It is also shown as short, so that it can show to the eye only a small portion of a line; but it may be of any convenient length, so that one or more entire lines may be read, and it may be otherwise supported—*e. g.*, from the carriage, as suggested by the dotted lines t .

If desired, the feed-roller and platen may be geared together to give them a simultaneous positive motion, and the construction may be varied in many other minor points without material change in the invention or the use of more than the ordinary skill of the mechanic.

What I claim is—

1. The combination, with a platen, of a ribbon-carrier pivotally suspended and extend-

ing beneath the platen in position to be swung against it by the striking types, and a mirror mounted in position to reflect rays from the point of impression, substantially as set forth.

2. The combination, with a platen, of a ribbon-carrier pivoted at one side of its center of gravity and extending beneath the platen in position to be swung against it by the striking types, whereby it may automatically swing away from the platen after each impression, and a mirror mounted in position to reflect rays from the line of impression upon the platen, substantially as and for the purpose set forth.

3. The combination, with the main frame, of the vertical frame pivoted at its lower side in the main frame and provided with the forwardly and rearwardly projecting arms, the key-levers acting, respectively, upon the ends of said arms, and a spring resisting the displacing force of the key-levers.

4. The combination, with the rack-bar and oscillating pawls, substantially as set forth, of a spring resisting oscillation beyond the amount necessary to throw one of the pawls out of and the other into engagement with the rack, but yielding to permit both to pass out of engagement when greater force is applied.

5. The type-arms hinged to swing to a common point upon revolubly and longitudinally adjustable studs lying in lines radiating from substantially the common point.

6. The combination, with the circular segment, of radial studs revolubly and longitudinally adjustable therein, type-arms hinged to said studs, and means for securing said studs in any desired rotary or longitudinal adjustment.

7. The combination, with the vertical frame pivoted at its lower side and normally spring-retained in its vertical position, of a carriage supported upon and swinging with said frame, two keys operating, respectively, to swing said frame forward and rearward of its vertical position to certain limits upon its pivotal axis, and means whereby the frame may be locked at either limit.

8. The combination, with the circular segment having radial perforations of circular cross-section, of studs fitting in said perforations, type-arms hinged to said studs, and means for locking the studs in position.

9. The combination, with the frame and the sliding carriage bearing the platen and contiguous feed-roller, of the lever pivoted upon the roller-shaft, mechanism whereby raising the rear end of said lever rotates the feed-roller, a transverse bar beneath the rear end of said lever pivoted at one end to the frame and provided at the other with a projection spring-pressed into one of several retaining-recesses, whereby the return of the carriage rotates the feed-roller a predetermined amount.

10. The combination, with type-arms hinged in a circle and swinging to a common point in planes oblique to that circle, of a plate

mounted near the common point and provided with a notch to direct the striking-arms, and a movable bifurcated ribbon-carrier, whose branches pass upon opposite sides of said plate.

11. The combination, with the ribbon-spool and the carriage rack-bar, of the pivotally-mounted sleeve bearing upon one side, the two detent-pawls to engage the carriage rack-bar, and upon the opposite side pawls operating to rotate the ribbon-spool, substantially as set forth.

12. The combination, with the sliding car-

riage, of the fixed forked projections embracing its rear member, the sleeve revolvably mounted upon said member between the projections, and the detent-pawls projecting from said sleeve, substantially as set forth.

In testimony whereof I have signed this specification in the presence of two subscribing witnesses.

DANIEL C. STOVER.

Witnesses:

WALLACE GREENE,
MARTIN S. DECKER.