

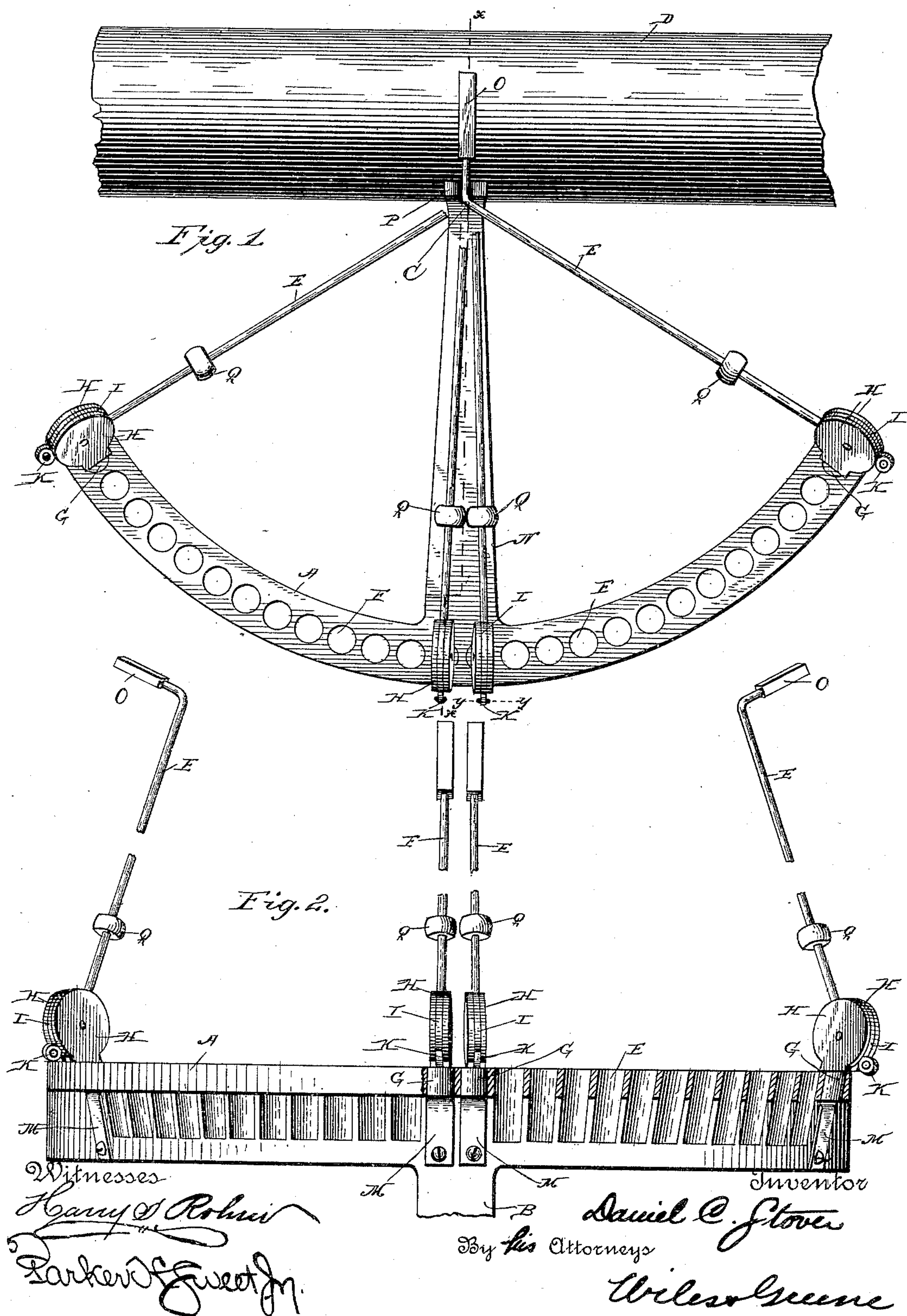
(No Model.)

2 Sheets—Sheet 1.

D. C. STOVER.  
TYPE WRITING MACHINE.

No. 446,720.

Patented Feb. 17, 1891.



(No Model.)

2 Sheets—Sheet 2.

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Fig. 4.

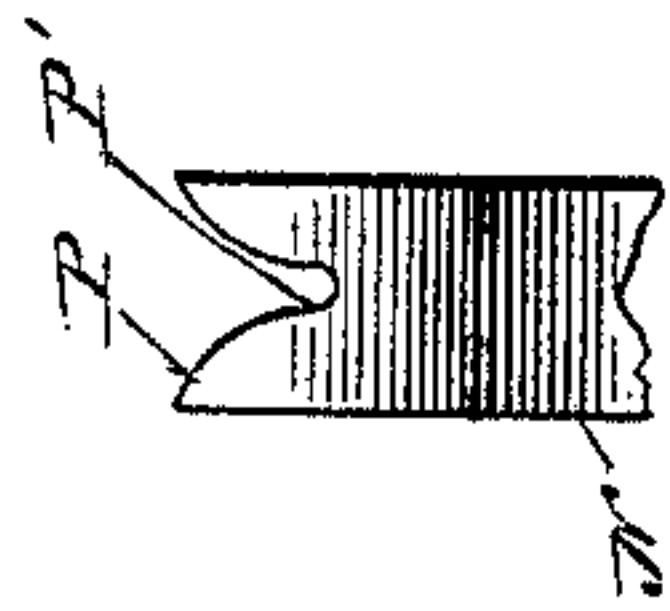


Fig. 3.

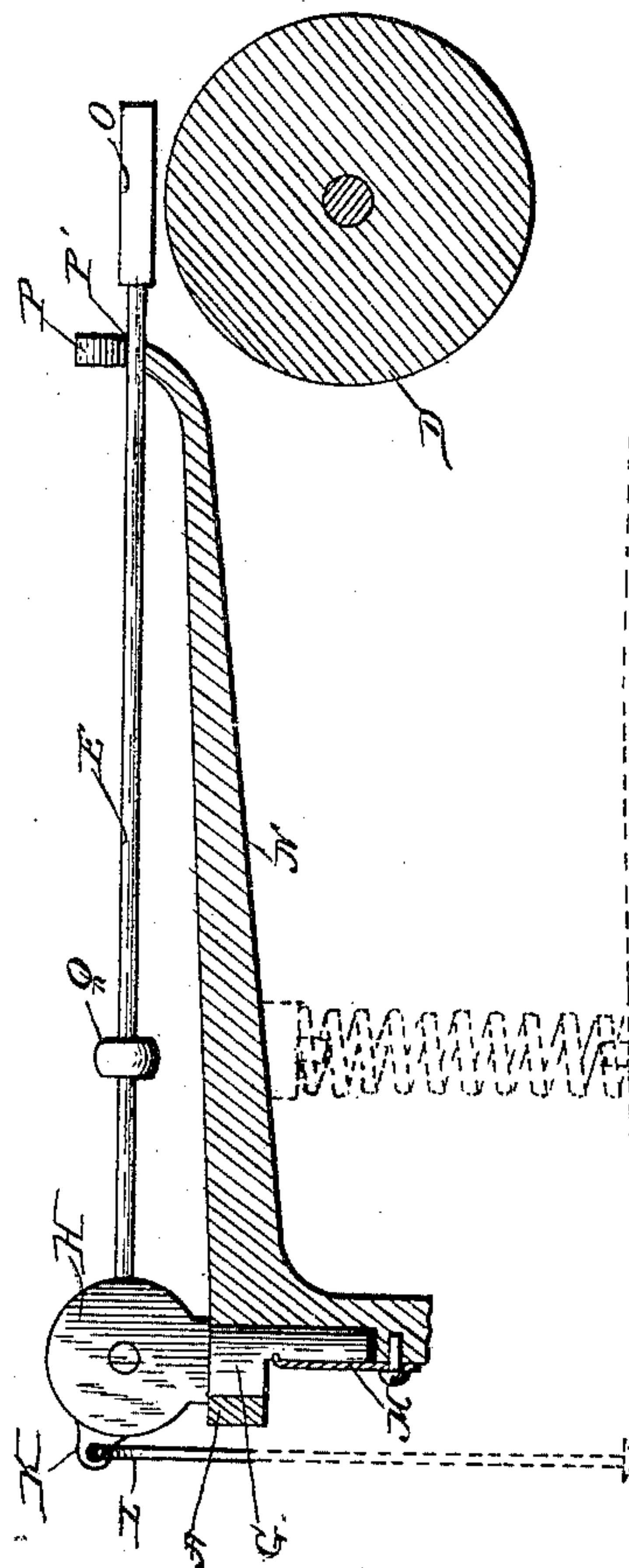
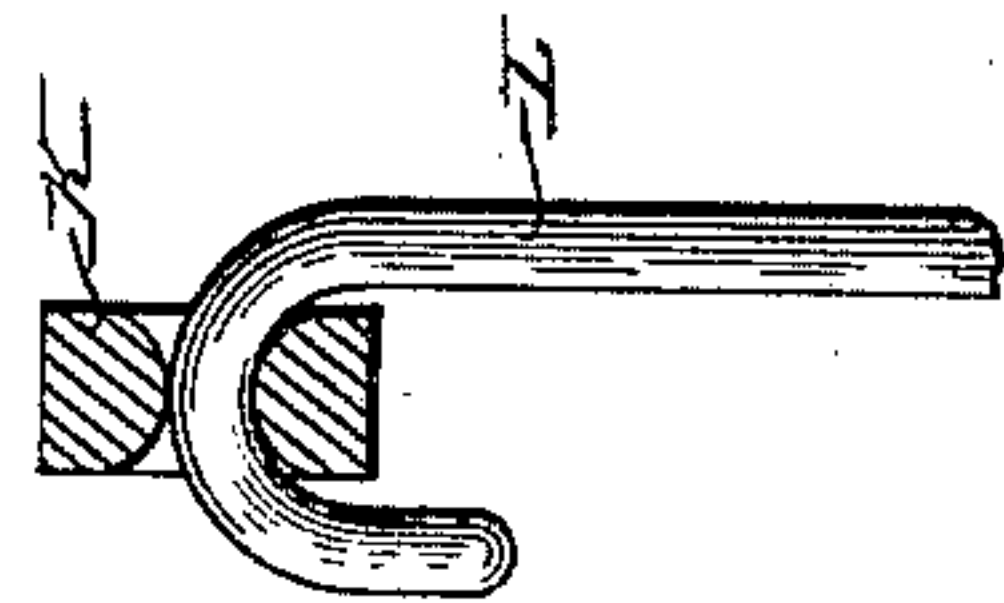


Fig. 5.



Witnesses  
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Inventor  
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# UNITED STATES PATENT OFFICE.

DANIEL C. STOVER, OF FREEPORT, ILLINOIS.

## TYPE-WRITING MACHINE.

SPECIFICATION forming part of Letters Patent No. 446,720, dated February 17, 1891.

Application filed June 27, 1889. Serial No. 315,756. (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.

My invention pertains only to the type-bearing arms, their supports, mounting, and adjustments. Type-arms have long been hinged at points in the arc of a circle in order that while of the same length they might strike at a common point, and that their paths might diverge rapidly from that point, enabling them to strike in quick succession without clashing. In this invention, also, the arms are hinged at points in the arc of a circle, but to greatly increase the rapidity of divergence above mentioned they are caused to swing to the common point in planes having successively greater inclination to the plane of the circle in which they are hinged instead of in planes perpendicular thereto, as in the common constructions. As illustrated, the arms are caused to move in this novel manner by the new expedient of giving to the axes upon which they swing progressively-increasing inclination to the plane of said circle instead of making them parallel thereto. As shown, these axes are perpendicular to the axes of certain post-like type-arm supports by which they are respectively borne, and are caused to incline by giving the proper inclination to the supports. These supports are made revoluble about their longitudinal axes in order that the type-arms may readily yield laterally to the directing action of a certain notch, into which they all fall at the common point the instant before impact of the type; but this is a subordinate consideration, the main result of rapid separation being dependent upon the old plan of hinging the arms at points in the arc of a circle and the broadly new expedient of causing them to swing to the common point in planes oblique to the plane of that circle. The frame-roller for receiving the impact of the type and the

mechanism for actuating the arms, and all such parts as are not shown, may be the mechanism used for similar purposes in well-known type-writers, and therefore such parts are not illustrated in this specification.

In the drawings, Figure 1 is a plan view of the parts involved in my invention, three arms only being shown, and of these all being depressed two are broken away near their free or printing ends where they must necessarily conflict if simultaneously depressed. Fig. 2 is a rear view of the same parts, the arms being in their raised or normal positions and parts being broken away to show construction. Fig. 3 is a section on the line  $x x$ , Fig. 1. Fig. 4 is a front view of a type-arm guide. Fig. 5 is a section on  $y y$ , Fig. 1.

In the drawings, A is a circular segment which supports all the type-arms, and is itself supported by arms B, that are either fixed or pivoted to the frame below, according as it is desired to place one or more types upon each arm. As illustrated, this segment is adapted to bear twenty-six type-arms E, it being provided with thirteen perforations F upon each side, arranged symmetrically, and successively increasing in inclination with reference to the plane of the circle by equal amounts until the outer one upon each side makes an angle of preferably about sixty degrees with reference to the plane of the circle. In each perforation is mounted a type-arm support G, of primarily cylindrical form, having at its upper end two slightly-separated parallel disks H, whose planes pass through the axis of the corresponding supports G and the center C of the segment's curvature. Between these disks is pivoted a closely-fitting disk I, to one side of which is rigidly secured a type-arm E, while upon its opposite side projects a short arm K. The latter is engaged by a rod L, which at proper times receives from known mechanism below an upward impulse, which depresses the arm E. The lower and rear portion of the segment is cut away, as shown, to expose the lower part of the cylindrical bearings G, which are flattened upon the exposed side and pressed, respectively, by flat springs M, fixed to the segment near its lower edge by screws. The upper end of each



spring is bent forward and enters a corresponding groove in the bearing or support G, and prevents the withdrawal of the latter from the segment. Now when any arm is thrown down into printing position, as shown in Fig. 1, it would cross the center of curvature C; but at this center each arm is bent so that its free or printing end may cross, on the medial line of the machine, a printing-roller D. The angle of bending is of course different, for each arm upon the same side of the machine, although upon the opposite side, is an arm making an equal but opposite angle. With the arms so formed and supported, evidently all, when depressed, strike the roller at the same point, but more or less obliquely, and this latter fact might possibly cause imperfection in the imprint. To avoid this, a rigid arm N, preferably secured to the segment A, projects forward to receive the free ends of the descending arms and deflect them at the last instant before impact upon the paper, which passes over the roller D in the usual manner. The end of the arm N is bent upward and provided with a V-shaped notch P, terminating at the bottom in a recess P', (see Fig. 4,) having vertical sides and a depth a little greater than the diameter of the arms. The walls of the notch slope at an angle of a little more than thirty degrees, and between them the descending arms always pass, each, if it strike at one side of the recess, passing along one of these walls and thence against the opposite wall of the recess, which gives it a vertical direction. The notch and the recess preferably pass insensibly into each other by a gentle curve, and the point of contact with the arm is preferably between the bend and a type-bearing sleeve O upon the arm's free end. In all type-writers having these long arms striking a common center, each arm in returning to position after striking passes quickly out of the path of the more distant of the remaining arms, and the letters are commonly so distributed that in the language for which the machine is intended the letters upon adjacent arms rarely occur in succession; but at best adjacent arms must now and then follow each other, and in rapid writing they then strike or impinge, producing permanent displacement, or faulty alignment. This is partially obviated by making the arms heavy, which is in itself objectionable for well-known reasons, so that the machine has some degree of two faults instead of a greater degree of one of them. In the apparatus shown this evil, instead of being modified, is overcome. Each arm bears near its axis of motion a preferably revoluble disk Q, adapted to impinge upon the like disk upon the adjacent arms whenever the arms would otherwise clash, and to thus cause the arms to separate and pass without injury. The disks, being placed near the axes of the arms instead of springing them, rotate slightly

the arm bearings or supports G, the springs M yielding as they are pressed by the flat sides of the bearings and instantly returning the latter to their normal positions when the pressure ceases—that is, when the disks have passed each other.

Evidently the construction may be varied without passing the proper limits of my invention.

What I claim as new, and desire to secure by Letters Patent, is—

1. A series of type-arms hinged, respectively, upon suitable supports in the arc of a circle to swing to a common point, the several axes of motion being placed at successively-increasing angles with reference to the plane of the circle.

2. The combination, with the circular segment and the type-arm supports revolubly mounted therein and having progressively-increasing opposite inclination upon each side of the middle of the segment, of the type-arms hinged to said supports, respectively, and swinging to a common point.

3. The combination, with the circular segment and the differently-inclined type-arm supports revolubly mounted therein, and the type-arms hinged, respectively, to said supports to swing in planes passing through the several axes of the supports and the center of curvature of the segment and all bent at said center into the same fixed line, of the rigid arm N, projecting from the segment and having the forked end P to receive said bent arms as they descend, substantially as set forth.

4. In combination, a series of type-arms hinged to swing to a common point, and disks fixed, respectively, to each arm in position to impinge upon the disks mounted upon the adjacent arms when both move together through conflicting parts of their paths, whereby adjacent arms are separated and allowed to pass each other.

5. In combination, a series of type-arms hinged upon distinct axes to swing to a common point, each having its hinge-axis itself mounted in a support revoluble in a different plane, and springs offering, respectively, yielding resistance to the rotation of said supports, whereby each type-arm may swing in different planes and be automatically returned to one of those planes when the force removing it therefrom ceases to act.

6. In combination, the circular segment, the variously-inclined type-arm bearings or supports revolubly mounted therein and having one side flattened and recessed, the flat springs pressing said flattened sides, respectively, and provided with the bent ends entering the recesses therein, and the type-arms hinged, respectively, to said bearings and swinging to a common point.

7. In combination, the circular segment, the revoluble type-arm supports mounted



5 therein, the series of type-arms hinged to said supports, respectively, each upon an independent axis, and the notched rigid arms adapted to receive each type-arm as it descends, and to insure to all a vertical direction as they pass to the bottom of the notch, 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,  
HARRY S. ROHRER.