No. 686,775. Patented Nov. 19, 1901.

W. D. SMITH.

WRITING MACHINE.

(Application filed Oct. 22, 1900.)

(No Model.)

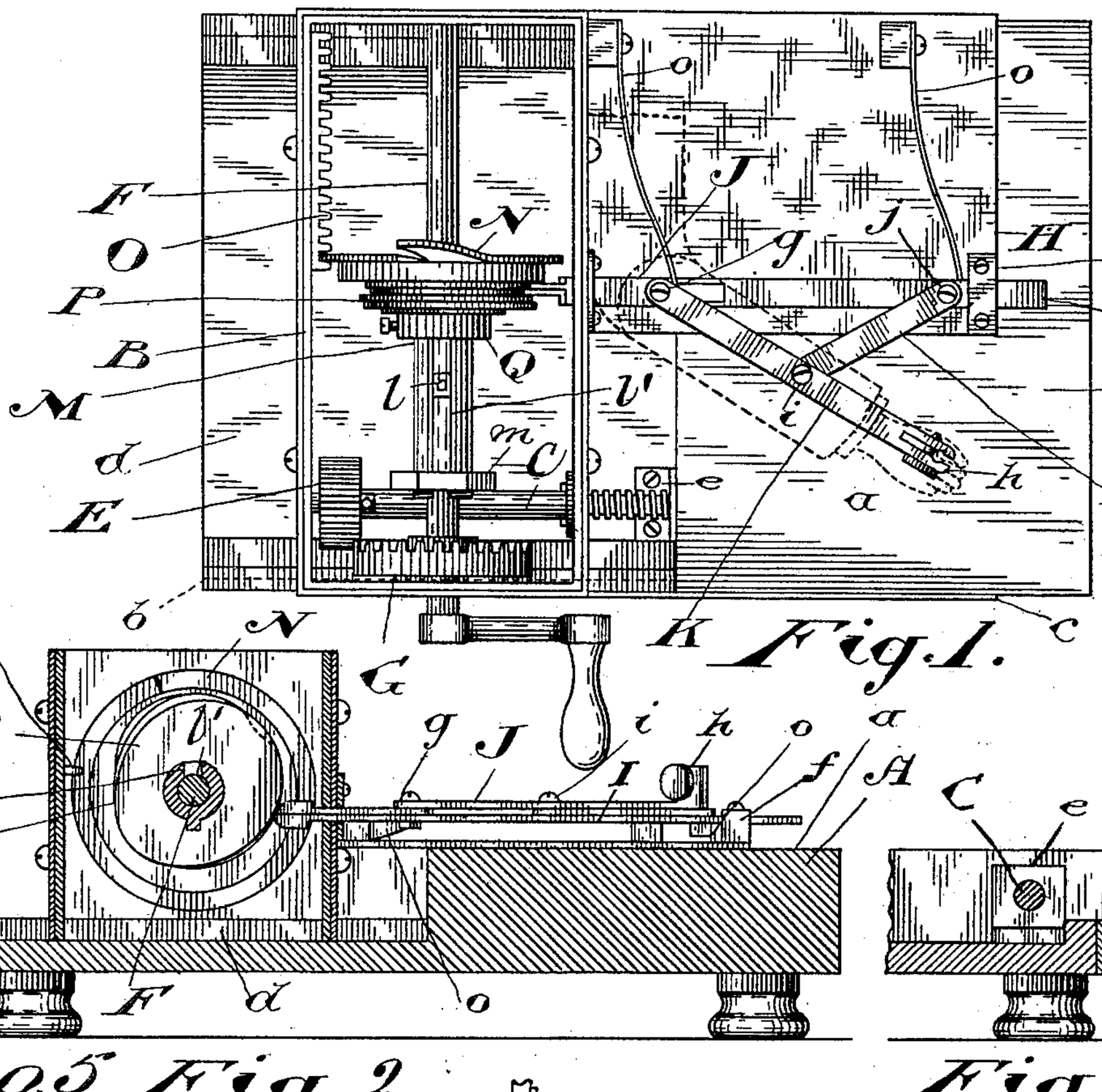

Fig. 1.

Fig. 5.

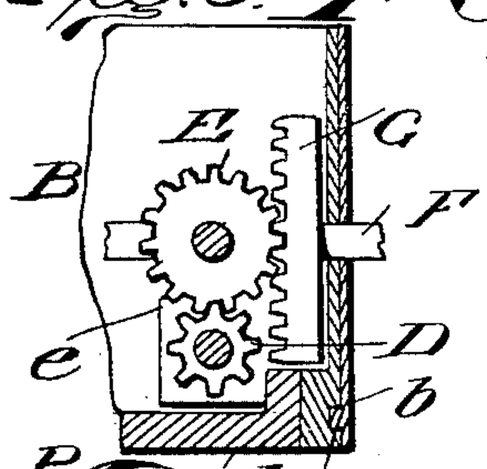

Fig. 2.

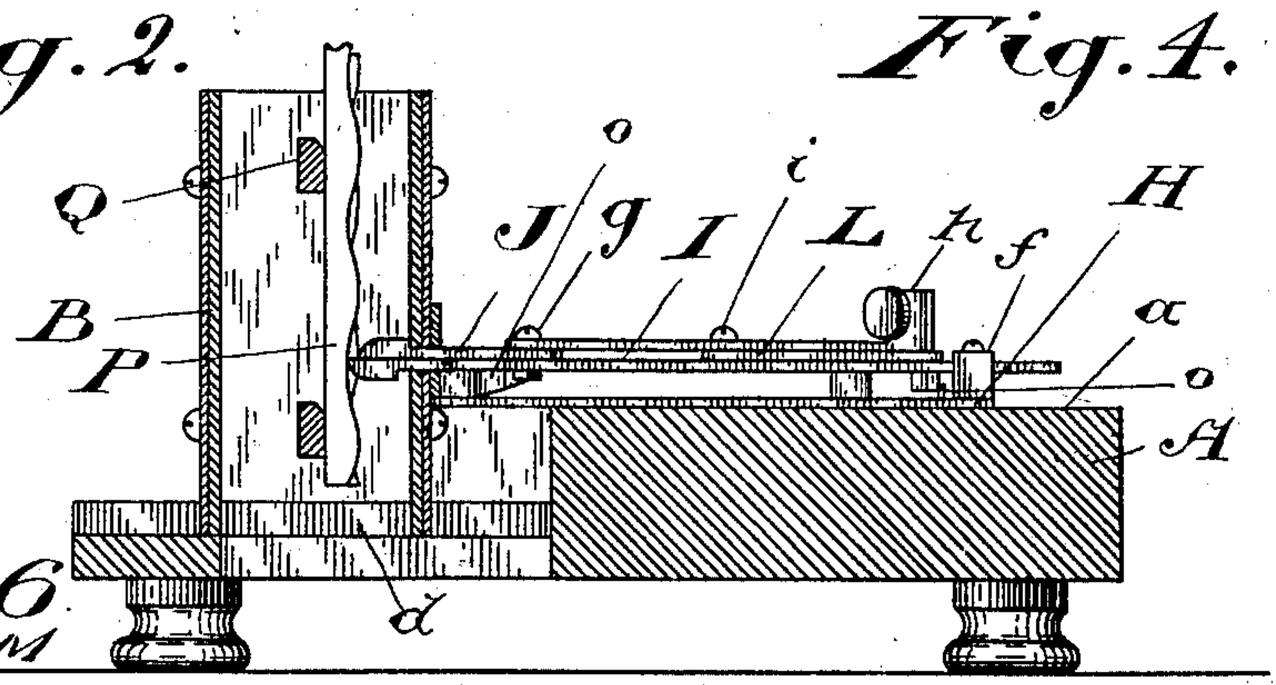

Fig. 4.

Fig. 6.

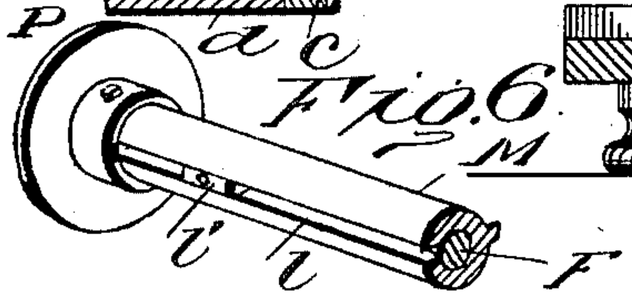

Fig. 3.

Witnesses

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WRITING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 686,775, dated November 19, 1901.

Application filed October 22, 1900. Serial No. 33,911. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM DOUGLAS SMITH, of the city of Chicago, in the State of Illinois, have invented certain new and useful Improvements in Writing-Machines, of which the following is a specification.

The object of my invention is to devise apparatus by means of which one or more predetermined symbols may be traced upon a recording-surface; and it consists, essentially, of a scribing-point capable of motion in two directions on a recording-surface, of mechanism for imparting such motions to the scribing-point either separately or simultaneously, of means, such as a cam-surface, controlling the said mechanism, and of means for shifting the relative position of the scriber and recording-surface, so that the symbols are recorded successively, the whole being constructed in detail substantially as hereinafter more specifically described.

Figure 1 is a plan view of my apparatus. Fig. 2 is a vertical sectional elevation of the same. Fig. 3 is a similar view showing a modification of the cam-surfaces and arranged to describe one symbol only. Fig. 4 is a detail showing the slides connecting the tablet of the recording-surface with the frame of the apparatus. Fig. 5 is a detail in vertical section. Fig. 6 is a perspective detail of the sleeve, showing the manner in which it is arranged upon its shaft.

In the drawings like letters of reference indicate corresponding parts in the different figures.

A is a tablet the upper surface *a* of which forms a recording-surface upon which symbols may be directly traced or upon which a sheet of recording material may be secured. This tablet is provided at opposite edges with the longitudinal slots *b*, with which are engaged the slides *c* of the frame B of the apparatus. The slots *b* are preferably extended throughout the length of the portion *d*, forming an extension of the tablet of less thickness than the main portion of the same. This gives length of bearing for the slides *c*.

In the body of the tablet A is formed or secured a nut *e*, with which is engaged the screw C, journaled in the frame B. Connected to this screw is the pinion D, meshing with the pinion E, journaled on the frame B. Journaled in the frame B at right angles to the screw C is the shaft F. Connected to this shaft is the crown-wheel G, meshing with the pinion E. Thus by the rotation of the shaft F the screw C may be operated to move the tablet A and the frame B relative to one another.

The plate H, forming a part of the frame B, extends out over the tablet A. On this plate is formed a guide *f*, through which passes the outer end of the slide I. The other end of this slide passes through a similar guide formed in the frame B.

J is a slide parallel with the slide I and preferably adjacent thereto. In the construction shown it lies on top of the slide I and moves through the same guide in the frame B. To steady it in its motion, I provide it with a bolt *g*, extending through a slot formed in the guide I.

K is an arm pivoted on the slide J by means of the bolt *g*. The end of this arm is provided with a socket *h*, in which may be carried a scribing-point.

L is a link pivotally connected with the arm K by means of the bolt *i* and with the slide I by means of the bolt *j*.

Upon the shaft F is placed a sleeve M, retained thereon by means of a feather-key *l'* and keyway *l*. Upon this sleeve is secured the screw-shaped flange N, adapted to engage the rack O. This screw is so shaped that once every revolution of the shaft F the sleeve is moved along the shaft the distance of one tooth of the rack O.

P represents a series of cam-disks slipped into place upon the sleeve M and held from rotating thereon by means of a feather-key engaging suitable keyways in the cam-disks. It will be noted that the keyway *l* is shown cut right through the sleeve, and I therefore screw on the end of the sleeve a nut *m* to prevent the sleeve from spreading. This construction, however, is not essential and may be widely varied.

The cam-disks are held in place by the collar Q, which is provided with a set-screw by means of which it may be clamped on the sleeve. The ends of the slides I and J, it will be noted, are arranged to bear against adjacent cam-disks, so that longitudinal motion is imparted to the slides by the rotation of

the disks. By means of the arm K and the link L longitudinal motion of the slides may be converted into any desired movements of the socket *h*, holding the scribing-point. Any curvilinear motion of the scribing-point is of course compounded of two separate motions—one transverse to the apparatus and the other lengthwise of the same. These two motions are imparted to the scribing-point either separately or simultaneously, and thus any desired symbol may be traced by means of the apparatus. The outlines of the cam-disks would of course vary according to the letters or symbols to be traced. As one pair of cam-disks is seldom likely to be sufficient for the writing of more than one symbol, means must be provided to shift another pair of cam-disks into action as soon as the first pair have done their work. This is effected, as described, by means of the screw-flange N. The motion of translation must necessarily take place at a point where the cam-surfaces are on the same level and the scribing-point at the finish of the letter. As means are provided for laterally shifting the relative positions of the scribing-point and the recording-surface, successive symbols are recorded on successive portions of the recording-surface, and a complete word or series of words or symbols may be described. At the point marked *n* in Fig. 2 the coincident places of equal throw of the cam-disks are indicated.

The screw C performs an important function. It will readily be understood that unless the tablet be moved the symbols will all be traced on the same spot on the recording-surface. By the employment of the screw, however, by the time one symbol has been traced the screw C has moved the tablet forward the space of one letter, so that the next symbol is traced upon a new spot. The effect of this motion on the shape of the slide-controlling cams is substantially as follows: The tablet is being moved toward the right, as shown in the drawings. This requires that parts of the cams intended to move the scribing-point to the right require to be a little more prominent than they otherwise would be, so as to throw the scribing-point a farther distance to the right to compensate for the moving of the recording-surface in that direction. On the contrary, portions of the cam intended to move the scribing-point to the left require to be cut away somewhat more than they otherwise would be, as they are moving the scribing-point against the motion of the recording-surface. When the scribing-point is moving across the direction of motion, similar provision has to be made in the cams to compensate for the movements of the recording-surface.

Instead of cam-wheels the cam-surfaces may be in the form of strips, as indicated in Fig. 3. These strips may be of any length and may be fed between the ends of the slides I and J and suitable guides Q, secured to the frame B of the machine. These controlling-strips are designed to be pushed through by hand, though of course other means might be devised for operating them, if desired; but no means are necessary for moving the tablet, as the device, as shown in this figure, is designed for producing but one symbol. When so arranged, the action of the apparatus is substantially the same as when the cam-disks are used.

o represents flat springs secured at one end to the plate H and bearing, respectively, against the bolt *g* of the slide J and the bolt *j* of the slide I. These springs thus tend to maintain the slides in contact with the cam-disks P.

In practice many changes may be made in the details of construction without departing from the spirit of my invention.

What I claim as my invention is—

1. In a writing-machine a movable recording-surface, a scribing-point capable of motion in two directions on said recording-surface; in combination with mechanism for imparting said motions to the scribing-point either separately or simultaneously; two suitably-supported slides controlling the said mechanism; and means for automatically operating the said slides to cause the scribing-point to trace a predetermined symbol, substantially as and for the purpose specified.

2. In a writing-machine, a movable recording-surface; and a scribing-point capable of motion in two directions on the said recording-surface; in combination with mechanism for imparting said motions to the scribing-point either separately or simultaneously; a suitably supported and driven cam-wheel controlling the said mechanism and shaped to cause the scribing-point to trace a series of predetermined symbols; and automatic means for shifting laterally the relative position of the recording-surface and scriber so that the symbols are recorded successively, substantially as and for the purpose specified.

3. In a writing-machine, a movable recording-surface, a scribing-point capable of motion in two directions on said recording-surface; in combination with mechanism for imparting said motions to the scribing-point either separately or simultaneously; two suitably-supported slides controlling the said mechanism; means for automatically operating the said slides to cause the scribing-point to trace a series of predetermined symbols; and automatic means for shifting laterally the relative position of the recording-surface and scriber so that the symbols are recorded successively, substantially as and for the purpose specified.

4. In a writing-machine, a recording-surface and a scribing-point capable of motion in two directions on the said recording-surface; in combination with mechanism for imparting said motions to the scribing-point either separately or simultaneously; two suitably-supported slides having their ends movably in contact with their actuating-cams and

controlling the said mechanism; a cam-shaft suitably journaled; cams on the said shaft adapted to engage the said slides and shaped to move the slides and cause the scribing-point to trace a predetermined symbol, substantially as and for the purpose specified.

5. In a writing-machine, a recording-surface and a scribing-point capable of motion in two directions on the said recording-surface; in combination with mechanism for imparting said motions to the scribing-point either separately or simultaneously; two suitably-supported slides controlling the said mechanism; a cam-shaft suitably journaled; a sleeve rotating with, but longitudinally movable upon, the shaft; sets of cams secured upon the said shaft and engaging the said slides; and means for shifting the said sleeve with its cams, along the shaft, the cams being provided on their faces with coincident places of equal throw at which the slides may pass from one set of cams to the next when the said sleeve is moved, substantially as and for the purpose specified.

6. In a writing-machine, a recording-surface and a scribing-point capable of motion in two directions on the said recording-surface; in combination with mechanism for imparting said motions to the scribing-point either separately or simultaneously; two suitably-supported slides controlling the said mechanism; a cam-shaft suitably journaled; a sleeve rotating with, but longitudinally movable upon the shaft; sets of cams secured upon the said sleeve and engaging the said slides; a rack secured to a stationary part; a screw-shaped flange upon the said sleeve engaging the said rack and adapted to shift the said sleeve with its cams at a given point of its revolution, the cams being provided on their faces with coincident places of equal throw at which the slides may pass from one set of cams to the next when the said sleeve is moved, substantially as and for the purpose specified.

7. In a writing-machine, a main frame; and a recording-surface or tablet made to slide one upon the other in combination with a screw-shaft journaled in the said frame; a nut in the said tablet or recording-surface with which the screw engages; a cam-shaft journaled in the frame; connecting-gearing between the two shafts; a scribing-point capable of motion in two directions on the said recording-surface; mechanism for imparting said motions to the scribing-point either separately or simultaneously; two suitably-supported slides controlling the said mechanism; a sleeve rotating with, but longitudinally movable upon, the cam-shaft; sets of cams secured upon the said sleeve and engaging the said slides; means for maintaining the slides in contact with the cams; a rack secured to a stationary part; a screw-shaped flange upon the said sleeve engaging the said rack and adapted to shift the said sleeve with its cams once a revolution, the cams being provided on their faces with coincident places of equal throw at which the slides may pass from one set of cams to the next when the said sleeve is moved, substantially as and for the purpose specified.

8. In a writing-machine a movable recording-surface, a scribing-point capable of motion in two directions on said recording-surface; in combination with mechanism for imparting said motions to the scribing-point either separately or simultaneously; a suitably supported and driven cam-surface controlling the said mechanism and shaped to cause the scribing-point to trace a predetermined symbol; and means for shifting laterally the relative position of the recording-surface and scriber so that symbols are recorded successively, substantially as and for the purpose specified.

9. In a writing-machine two suitably-supported slides; an arm pivoted at one end to one of the slides and adapted at its other end to carry a scribing-point; and a link pivotally connected to the arm and to the other slide in combination with suitably supported and driven cam-surfaces controlling the said slides, substantially as and for the purpose specified.

Chicago, Illinois, October 13, 1900.

WILLIAM DOUGLAS SMITH.

Witnesses:

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FAYETTE W. REED.