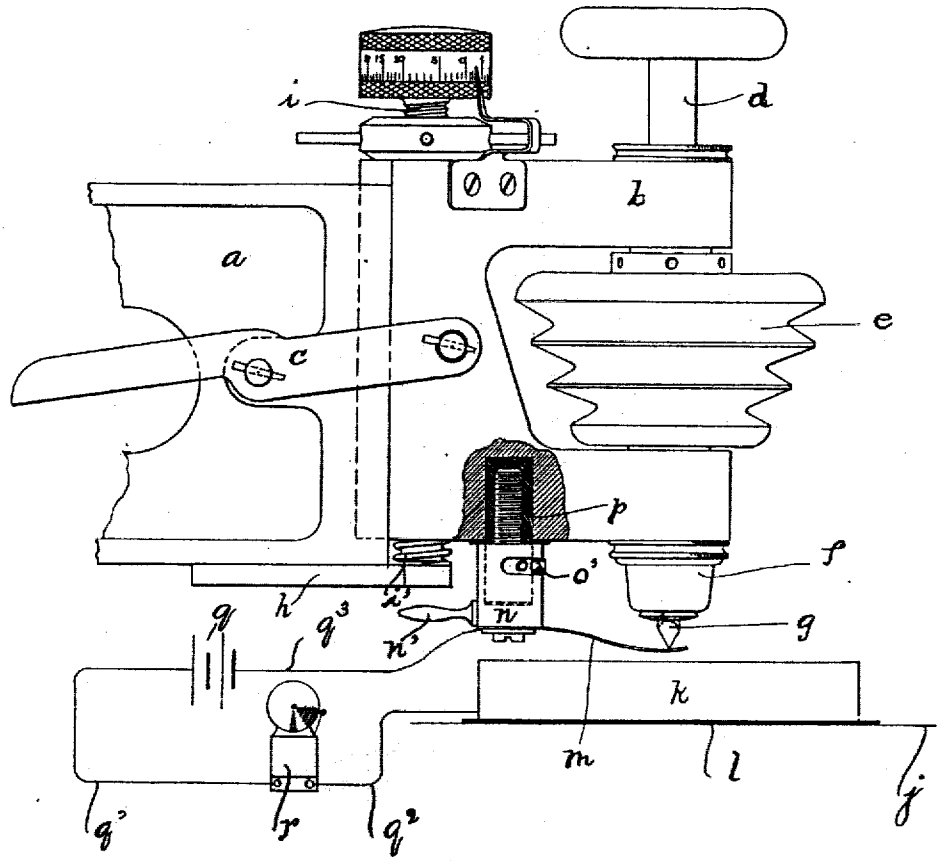
No. 816,307. PATENTED MAR. 27, 1906.

W. S. EATON.

ENGRAVING MACHINE.

APPLICATION FILED AUG. 23, 1905.



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WILLIAM S. EATON, OF SAG HARBOR, NEW YORK.

ENGRAVING-MACHINE.

No. 816,307. Specification of Letters Patent. Patented March 27, 1906.

Application filed August 23, 1905. Serial No. 275,348.

To all whom it may concern:

Be it known that I, WILLIAM S. EATON, a citizen of the United States, residing at Sag Harbor, in the county of Suffolk and State of New York, have invented certain new and useful Improvements in Engraving-Machines, of which the following is a specification, reference being had therein to the accompanying drawings, which form a part thereof.

My invention relates to engraving-machines, and more particularly to an attachment therefor for establishing the relative position of the cutting or routing tool and the work as a basis for the adjustment of the tool to regulate the depth of cut.

The main object of the invention is to provide an attachment of this character wherein the relative position of the tool and the work as a definite and uniform basis for the subsequent feed of the tool for regulating the depth of cut may be established through an electrically-actuated annunciator, either audible or visible, without subjecting the point of the tool to the injurious effects of that spark which is incidental to devices wherein the tool itself forms a part of the electrical circuit.

A further object is to provide an attachment of this character wherein the opposed contacts will present substantially flat engaging surfaces, thus tending to minimize the spark-gap, thus both avoiding undue sparking and rendering the attachment capable of determining more accurately the relative position of the tool and the work.

A still further object is to provide an attachment of this character wherein the current is used intermittently solely for the purpose of establishing a basis for the regulation of the feed of the tool, having a movable contact-piece opposed to the work or other contact, which is interposed between the work and the tool and normally spaced away therefrom and is capable of being moved or swung so as to present a clear field for the advancement of the tool in the regulation of the depth and the taking of the cut and the subsequent operation of the cutter-head and its tool.

The invention consists, primarily, in embodying in an engraving-machine a normally open electrical circuit including therein a movable contact of known thickness arranged adjoining the tool, a contact opposed thereto, and an annunciator, said movable contact being normally spaced away from said opposed contact and adapted to be interposed between the tool and said opposed contact and to be actuated by the adjustment of the tool, and in such other novel features of construction and combination of parts, as are hereinafter set forth and described, and more particularly pointed out in the claims hereto appended.

In the accompanying drawing I have shown the application of my invention to the type of engraving-machine patented to me in and by Letters Patent of the United States No. 728,556, dated May 19, 1903. In said drawings, *a* indicates the support for the cutter-head or spindle-carrier *b*, which is movable in ways in said support through the lever *c* and a treadle-and-link system. (Not shown.)

The cutter-head *b* carries a spindle *d*, driven by means of the stepped pulley *e*, and carries a chuck *f* for the tool *g*. The extent of feed of the cutter-head is controlled by a plate *h* on the support *a* and an adjustable micrometer-stop *i*, adapted to engage the said plate, said head being normally supported through said stop, said plate, and a spring *i'*.

Mounted beneath the cutter-head is a universally-movable work-bed (indicated at *j*) upon which the plate to be engraved, as *k*, is mounted and secured.

A detailed description of the foregoing mechanism is not entered into, as such forms no part of the present invention, and this particular type of machine is shown merely as illustrating one application of the invention.

The plate *k* is insulated from the work-bed by a sheet *l*, of paraffined paper, glass, vulcanite, or other similar material, or other means are employed to insulate the plate or its support or other opposed contact from the rest of the machine.

Arranged adjoining the cutter-head *b* and the tool *g*, carried thereby, and normally spaced away from the plate *k* or other opposed contact is a flat spring-steel contact-piece *m* of known thickness, which is movable relative to said tool, so as to be capable of being interposed between it and the plate *k* in a manner to cause the tool to force it into engagement with the said plate or other opposed contact and to permit it to be moved or swung to one side to give a clear field for the subsequent advancement of the said head and tool. Preferably this movable contact is mounted on the cutter-head *b* by means of a rotary sleeve *n* and a stud *o*, carried by said head and insulated therefrom

by a block p of porcelain, vulcanite, fiber, or similar material. Said sleeve n is slotted, as shown, to limit the movement thereof through a pin o', carried by the stud o, and is provided with a handle n' to facilitate the operation thereof.

Preferably the contact m is shaped so as to project considerably below the sleeve n, and that portion thereof directly beneath the tool g is curved to insure an engagement thereof with the plate k or other opposed contact at a point directly beneath said tool.

The plate k or other opposed contact and the spring m are arranged in circuit with a battery q through the terminal wires q' q^2 q^3, which circuit also includes therein an annunciator r of any desired form, preferably an ordinary electric bell, the circuit being normally open by reason of the spring m being spaced away from the plate k except in setting the tool. A low-tension current is preferably used as tending to avoid a spark-gap of sufficient width to materially affect the accuracy of the attachment. This attachment is designed for use more especially on an engraving-machine for making plates for under-surface printing, wherein great accuracy is required to insure the cutting of all the letters and characters on a plate at the same depth throughout to secure the retention of the ink in proper quantities after the plate has been wiped to avoid a mottled appearance of the imprint therefrom. In such a machine the variance of a thousandth part of an inch is material and may destroy an entire plate. The operation of the attachment will be described with relation to such a machine, an effectively-designed type of which is shown in my aforesaid patent and in part in the accompanying drawing.

The plate k having been secured in any desired manner on the work-bed j, with the insulation l in place, as shown, it is placed in circuit with the annunciator r, battery q, and contact m by placing the wire q^2 in electrical connection therewith in any desired manner. The sleeve n is turned upon the stud o, bringing the spring-contact m under the tool g, said spring being flexed slightly to pass thereunder and upon being released springs upwardly into engagement with the tool, being out of contact with the plate k.

The entire cutter-head is then brought downward toward the plate k through the lever c and against the tension of the spring i', normally supporting said head, the micrometer-stop i being withdrawn proportionately with the advance of the cutter-head to an extent to permit the tool to force the contact m into engagement with the opposed contact—the plate k—thus closing the circuit from the battery q through the wire q^3, the spring m, the plate k, the wire q^2, the annunciator r, and the wire q' to the other battery-pole, actuating said annunciator to apprise the operator of the relative position of the tool and the work, such being distant from each other the thickness of said contact m, which, as stated, is of a known thickness. With this known distance as a basis for the subsequent adjustment of the tool g with relation to the work the head is permitted to be returned to its former position by the spring i', thus breaking the circuit. The micrometer-head is then set at zero to indicate this basis for subsequent adjustment and the stop i further withdrawn to the extent of the cut desired to be taken plus the known thickness of the spring-contact m. The machine is then ready to begin the engraving process, except that the spring-contact m still projects into the operative field of the tool. This contact having performed its sole funtion is therefore swung laterally by means of the handle n', leaving a clear field for the advance of the tool and preventing the closing of the circuit thereby.

It will be observed that the flexibility and the slight curve of the said spring-contact permits its use with tools of different lengths and insures the presentation downwardly of a flat portion directly beneath said tool, thus avoiding a contact thereof with its opposed contact when the tool is distant from the contact-surface of the work more than the thickness of said spring. The extended contact-surface of said spring also minimizes the spark-gap in making contact, thus insuring slightly greater accuracy than is possible when pointed tools form a part of the circuit.

It will be further observed that with a contact member interposed between the tool and the work-plate there can be no sparking at the point of the tool with resulting injury thereto, inasmuch as this member must be removed from the field of the tool before the initial cut, no convection occurring between the tool and the work-plate during the routing out of the latter.

It is not my intention to claim, broadly, the use of an electrical circuit for accurately determining the relative position of opposed contacts in instruments of precision, such being well known in the arts, nor is it my intention to limit the invention to the precise details of construction and combination of parts shown in the accompanying drawings, it being apparent that such may be varied without departing from the spirit and scope of the invention.

Having described the invention, what I claim as new, and desire to have protected by Letters Patent, is—

1. In an engraving-machine, means for establishing a basis for the adjustment of the tool comprising a normally open electrical circuit including therein a movable contact of known thickness arranged adjoining the tool, a contact opposed thereto, and an annunciator, said movable contact being normally

spaced away from said opposed contact, and adapted to be interposed between the tool and said opposed contact whereby movement of the tool will force said contact into engagement with said opposed contact to close the circuit and actuate said annunciator.

2. In an engraving-machine, means for establishing a basis for the adjustment of the tool comprising a normally open electrical circuit including therein a movable flat spring-metal contact of known thickness arranged adjoining the tool, a contact opposed thereto, and an annunciator, said movable contact being normally spaced away from said opposed contact and adapted to be interposed between the tool and said opposed contact whereby movement of the tool will force said contact into engagement with said opposed contact to close the circuit and actuate said annunciator.

3. In an engraving-machine, means for establishing a basis for the adjustment of the tool comprising a normally open electrical circuit including therein a movable flat spring-metal contact of known thickness having a curved end and arranged adjoining the tool, a contact opposed thereto, and an annunciator, said movable contact being normally spaced away from said opposed contact and adapted to have the curved end thereof interposed between the tool and said opposed contact whereby movement of the tool will force said contact into engagement with said opposed contact to close the circuit and actuate said annunciator.

4. In an engraving-machine, means for establishing a basis for the adjustment of the tool comprising a normally open electrical circuit including therein a movable contact of known thickness mounted on the cutter-head and insulated therefrom, adjoining the tool, a contact opposed thereto, and an annunciator, said movable contact being normally spaced away from said opposed contact and adapted to be interposed between the tool and said opposed contact whereby movement of the tool will force said contact into engagement with said opposed contact to close the circuit and actuate said annunciator.

5. In an engraving-machine, means for establishing a basis for the adjustment of the tool comprising a normally open electrical circuit including therein a movable contact of known thickness pivotally mounted on the cutter-head and insulated therefrom, adjoining the tool, a contact opposed thereto, and an annunciator, said movable contact being normally spaced away from said opposed contact and adapted to be interposed between the tool and said opposed contact whereby movement of the tool will force said contact into engagement with said opposed contact to close the circuit and actuate said annunciator.

6. In an engraving-machine, means for establishing a basis for the adjustment of the tool comprising a normally open electrical circuit including therein a movable flat spring-metal contact of known thickness pivotally mounted on the cutter-head and insulated therefrom, adjoining the tool, a contact opposed thereto and an annunciator, said movable contact being normally spaced away from said opposed contact and adapted to be interposed between the tool and said opposed contact whereby movement of the tool will force said contact into engagement with said opposed contact to close the circuit and actuate said annunciator.

7. In an engraving-machine, a cutter-head, a tool carried thereby, a stud thereon and insulated therefrom, a work-support, an insulated rest for the work thereon, a sleeve pivotally mounted on said stud, means whereby said sleeve may be turned on said stud, a flat spring-metal contact-piece carried by said sleeve and having its free end curved, of means establishing a basis for the adjustment of said tool comprising a normally open electrical circuit including therein said contact-piece, a contact on said rest, opposed thereto, and an annunciator, whereby movement of said tool will force said contact-piece into engagement with said opposed contact to close the circuit and actuate said annunciator.

In witness whereof I have hereunto affixed my signature, this 16th day of August, 1905, in the presence of two witnesses.

WILLIAM S. EATON.

Witnesses:
F. T. WENTWORTH,
GEORGE P. BRECKENRIDGE.