March 10, 1931. C. KORGE 1,795,564

ELECTRICAL DEVICE FOR MARKING PAPER

Filed July 5, 1927 3 Sheets-Sheet 1

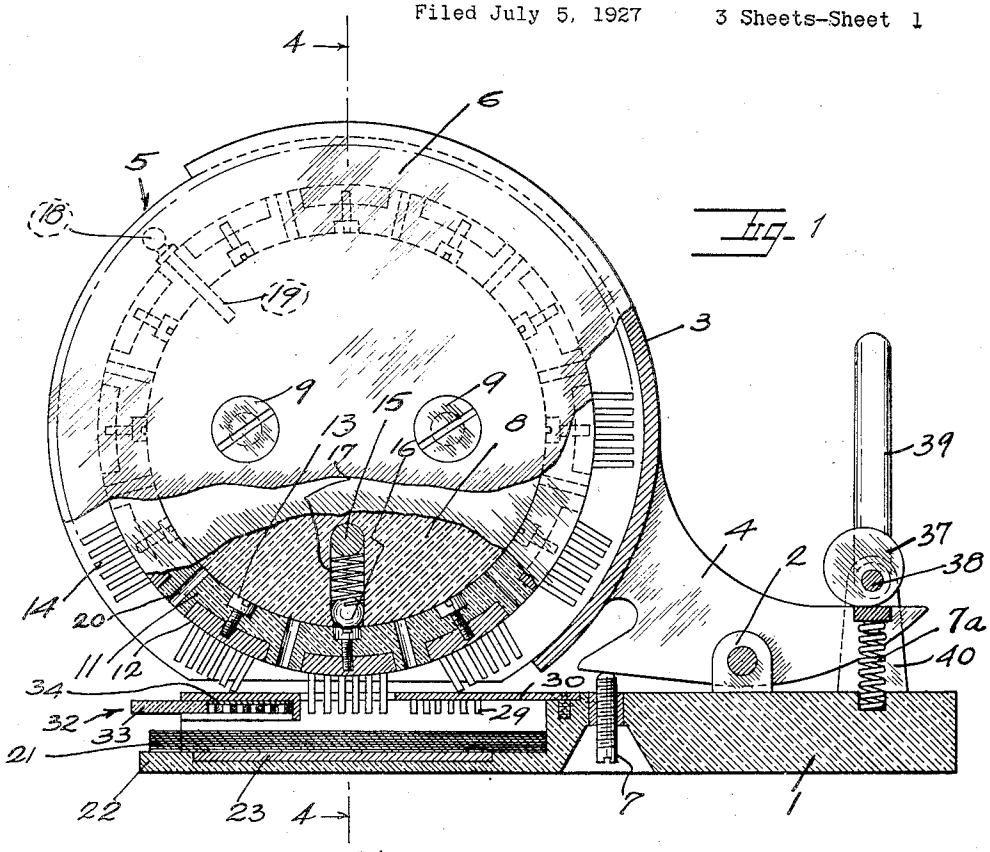


Fig. 1

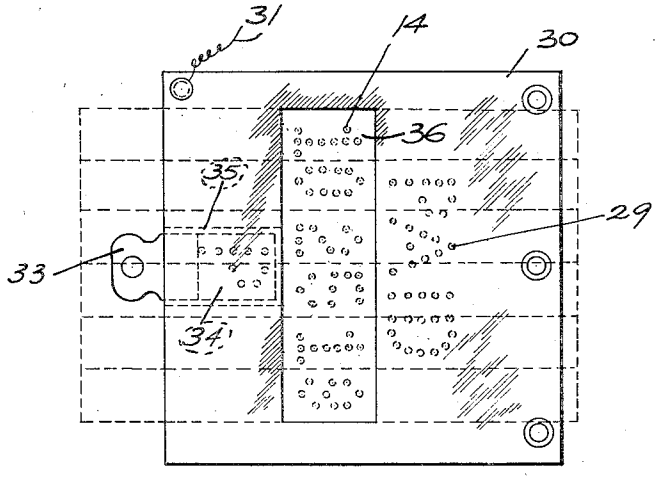


Fig. 2

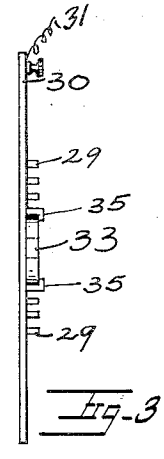


Fig. 3

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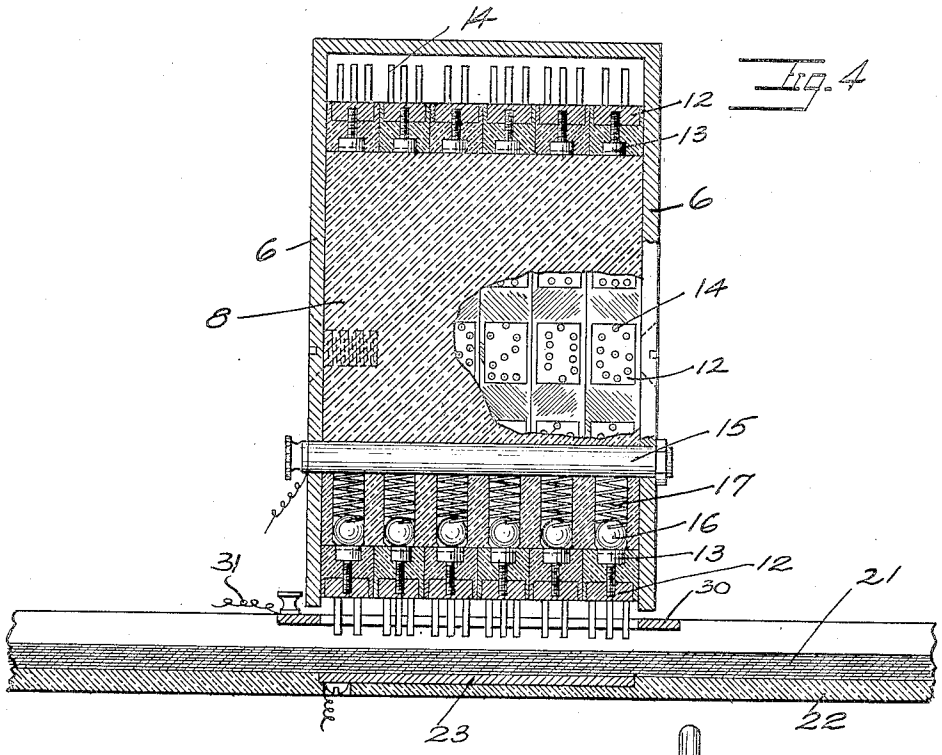


Fig. 4

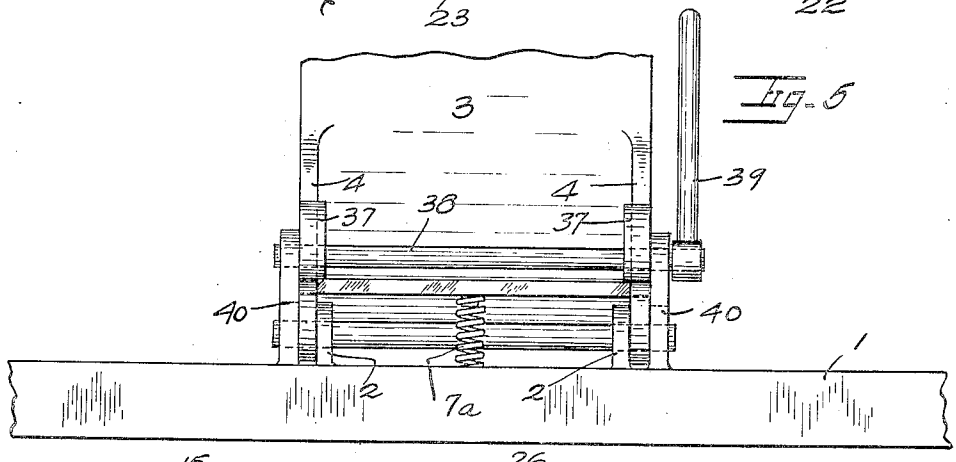


Fig. 5

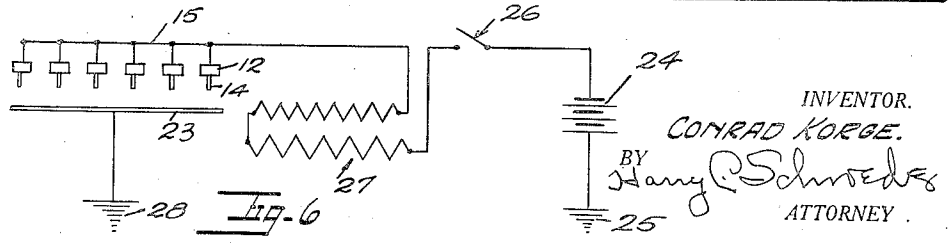


Fig. 6

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ELECTRICAL DEVICE FOR MARKING PAPER

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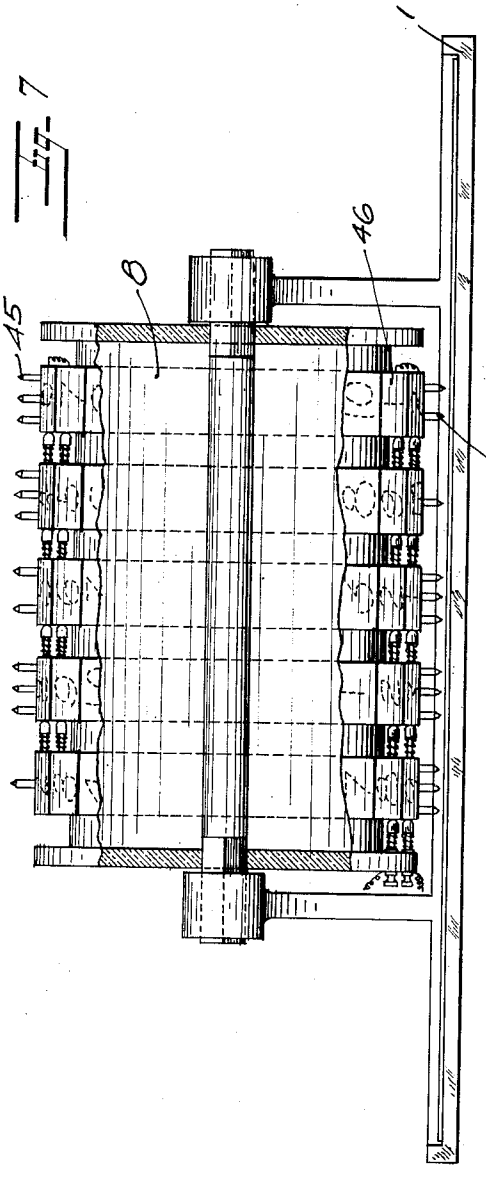


Fig. 7

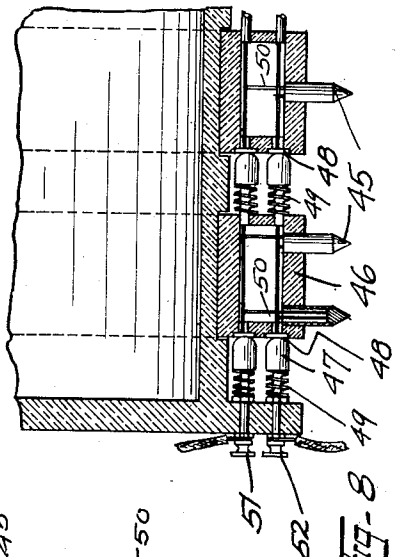


Fig. 8

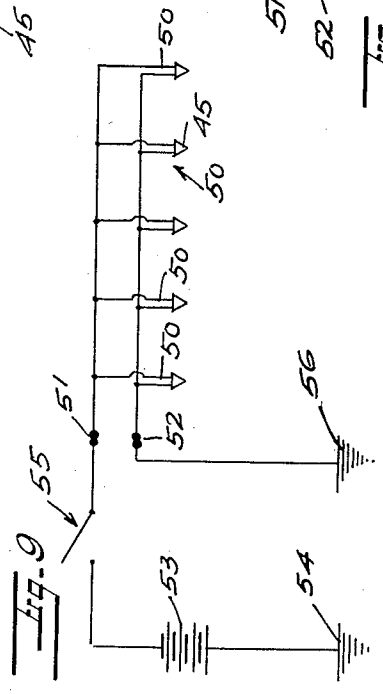


Fig. 9

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UNITED STATES PATENT OFFICE

CONRAD KORGE, OF OAKLAND, CALIFORNIA

ELECTRICAL DEVICE FOR MARKING PAPER

Application filed July 5, 1927. Serial No. 203,418.

The invention forming the subject matter of this application relates to electrical devices for marking paper, particularly to devices used to perforate invalidated documents, such as cancelled checks.

At present mechanically or manually operated perforating or punching machines are used to perforate the required marks on the cancelled documents. The operation of any punching machine requires considerable power and a large number of moving parts, therefore, it is dangerous to handle.

The object of the present invention is to provide an electrical device for perforating the required mark on a paper by means of an electric spark, thereby to eliminate the large number of moving parts generally used in perforating machines at present, and to substitute, therefor, a device in which the machine parts are relatively stationary when the device is in operation.

Another object of the invention is to provide a device to perforate a mark into an object by breaking down the dielectric resistance of said object by means of an electric discharge controlled by a circuit breaker.

A further object of the invention is to provide a device which employs a group of electrodes to penetrate the object by means of a group of sparks discharged therefrom, thereby to burn a group of holes through the object, said electrodes to be so grouped as to form the outline of any selected character.

A still other object of the invention is to provide a marking device employing groups of electrodes to produce a spark through the paper said groups to be arranged so that each group represents a different character in a dotted outline. The character may be a letter of the alphabet or a numeral or any sign generally used for marking paper or other objects. Said group of electrodes are so disposed and related to each other that they may be alternately brought into operating position thereby permitting the selection of the character to be perforated on an object.

A still other object of the invention is to provide a marking device in which stationary groups of electrodes are employed to perforate an object, said electrodes to be permanently in an operative position. The construction of said permanently fixed group of electrodes is such that it permits the cooperation thereof with the interchangeable group of electrodes to be used alternately in connection with said permanent electrodes.

Still another object of the invention is to provide a device in which groups of perforating electrodes representing different characters may be combined to perforate any word or date desired by means of sparks discharged therefrom.

Another object of the invention is to provide a device which is adapted to mark only one face of the paper by scorching the same, employing a group of hotpoints electrically heated, said hotpoints to represent any selected character.

With these and many other objects in view, which will more readily appear as the nature of the invention is better understood, the same consists in the novel construction, combinations and arrangements of parts which will hereinafter be more fully described, illustrated and claimed.

In the accompanying three sheets of drawings,

Figure 1 is a side elevation, partly in section, showing the electrical perforating device,

Figure 2 is a detailed plan view of the plate carrying the stationary or permanently fixed electrodes representing the characters to be permanently used for marking the paper,

Figure 3 is a side elevation of the plate shown in Fig. 2.

Figure 4 is a sectional view of the device taken along the line of 4—4 of Figure 1,

Figure 5 is a fragmentary rear elevation of the device showing the eccentric elevating mechanism,

Figure 6 is a wiring diagram of the perforating machine,

Figure 7 is a sectional view of a hotpoint marking machine,

Figure 8 is a sectional detail of the electri-

cally heated point for marking one face of the paper,

Figure 9 is a wiring diagram of the hot point marking machine.

The numeral 1 indicates the frame of the marking or perforating device, having bearings 2 thereon. Said frame is made of non-conductor or insulating material. A bracket 3 is pivotally supported in the bearings 2 by means of the projections 4, extending from the opposite ends of the bracket 3. Said bracket is cylindrical in shape, a portion thereof on the opposite side to said projections 4 is cut away as at 5 for the purpose to be hereinafter described. End plates 6 terminate the opposite ends of the bracket 3. The bracket rests on a set screw 7 threaded into the frame 1, and is pressed against said set screw 7 by a spring 7ª disposed on the frame 1 at the opposite end of the projection 4.

A drum 8 made of non-conducting material is secured into the bracket 3 between the end plates 6 by means of screws 9 threaded into said end plates. Annular rings 11 disposed side by side surround the drum 8. The rings also are made of non-conducting material and are rotatable on the drum 8, independently of each other. Metal blocks 12 are secured into the outside periphery of the rings 11 by means of screws 13, the head of the screws 13 being in alignment with the inside periphery of the ring 11. Electrodes 14 protrude radially from the blocks 12 and are so grouped thereon as to form a dotted outline of a character such as a numeral or a letter of the alphabet or a sign as it is illustrated in Figures 2 and 4. Said electrodes may be insulated all around except at the points thereof.

In order to obviate any danger of an electrical shock to the operator of the device it is advisable to limit the extent of the electric charge to the blocks 12 which are in an operative position. A selected block on each ring 11 is in operative position all the time. The blocks selected are in alignment and are separately connected to an electrical conduit 15 by means of a ball 16 to be pressed against the head of the screws 13 by a spring 17 said spring bears against the conduit 15 thereby completes the electrical connection from the conduit 15 to the electrode 14. It is possible to insert a wire from the conduit 15 to the ball 16 thereby effecting a direct connection therebetween, or the electrode pins may be connected individually and directly to the conduit.

While the rings 11 are rotatable on the drum 8 means are provided to lock the ring in a predetermined position, when the desired block 12 is in operative position. Said means consists of a pin 18 to fit in a hole 19 radially disposed in the drum 8. Holes 20 extend through the rings 11 between the blocks 12 and are so spaced that when a block is in an operative position one of said holes 20 is in registry with the hole 19, thereby permitting the pin 18 to be passed therethrough into the hole 19 and to lock the ring 11 in position. A number of sheets of paper in the illustration checks 21 are placed upon the table portion 22 of the frame 1. A terminal plate 23 is secured in the table 22 below the paper 21. When the block 12 is in an operative position it is disposed opposite the plate 23 and holds the group of electrodes or pins 14 in a spaced relation to the plate 23. The spacing between the electrodes 14 and the plate 23 may be adjusted by the set screw 7. The turning of the set screw 7 results in the raising or lowering of the bracket 3 moving the electrodes 14 therewith. Said space must be so adjusted as to permit an electric discharge between the electrode 14 and the plate 23, the spark to be of sufficient strength to burn a perforation through the check 21. The electric charge producing the spark is created and conducted by the electrical instruments illustrated in the wiring diagram in Figure 6. The source of the electric charge is represented in the diagram by a battery 24 grounded at 25. The current then flows to a circuit-breaker 26 to be in turn connected to a transformer 27. The conduit 15 is connected to the high tension coil of the transformer 27 and the current is transmitted therefrom to the block 12 and electrodes 14 by means of the resilient ball contact 16, or directly to the individual electrodes. The plate 23 is grounded as at 28. When the circuit breaker 26 is closed the current flows to the transformer 27 and is transformed thereby to a sufficient voltage to break down the dielectric resistance of the paper 21 disposed between the electrode 14 and the plate 23. The breaking down of the dielectric resistance of the air and of the paper between each electrode 14 and the plate 23 results in a discharge or spark therebetween, said sparks burn or perforate a group of holes through said paper, then pass to the plate 23 and to the ground connection 28 thereof.

When a check is cancelled there are certain marks or characters perforated therethrough regardless of the date of the cancellation, said marks are very seldom changed, and there are also certain marks or characters which change every day so as to indicate, for instance, the date of cancellation. In the illustration of the device, it is assumed that the word "paid" is perforated on every cancelled check, therefore, the electrodes outlining the word "paid" are permanently and fixedly secured to the frame 1. Said electrodes 29 protrude from a supporting plate 30 secured at one end thereof to the frame 1, the other end thereof overhangs freely, parallel with the table 22. The plate 30 is made of conducting material and it is electrically con-

nected to the conduit 15 through the wire 31. The electrodes 29 are somewhat shorter than the electrodes 14, to provide an equal spacing between the ends of all electrodes and the plate 23 and permitting a simultaneous discharge or spark therebetween.

In the present banking system it is desirable to provide another group of electrodes to describe a key letter, for instance, to indicate the initial or sign of the person who operates the machine and cancels the checks. A key 32 consisting of an insulating handle 33 has a metal contact plate 34 attached thereto, carrying electrodes similar to electrodes 29 representing the dotted outline of the desired letter or sign. The contact plate 34 is slidable in the guides 35 of the supporting plate 30 and detachably secures the keys to the plate 30 and holds the electrodes thereon in alignment with the electrodes 14 and 29. To change the key letters the key is detached and another key representing the required character is substituted therefor.

A slot 36 is provided in the plate 30 for the purpose of receiving the electrodes 14 in order to permit the adjustment of the electrodes 14 in alignment with the electrodes 29. When one group of the electrodes 14 must be substituted by a new group of electrodes it is necessary to rotate the rings 11 in order to bring another block 12 and another group of electrodes 14 in operating position. The rotation of the ring 11 would be hindered because the electrodes 14 do not clear the edges of the slot 36, therefore, the electrodes 14 are raised out of the slot 36 by raising the whole bracket 3 by means of the eccentric cams 37. Said eccentric cams are rotated with a shaft 38 by a handle 39, said shaft to be rotatably supported in the bearings 40 extending above the frame 1. When the eccentrics 37 are rotated a downward pressure is exerted on the end of the projections 4 against the tension of the spring 7^a thereby raising the bracket 3 around the pivot in the bearings 2, so as to elevate the electrodes 14 therewith out of the slot 36 and to permit the rotation of the ring 11. The key 34 is in contact with the supporting plate 30 said plate in turn is connected to the conduit 15, therefore, when the circuit breaker 26 is closed the current passing through the conduit 15 causes a discharge or spark from all the electrodes to the plate 23 thus perforating through the paper the dotted outline of all the characters as shown in Figure 2.

It is preferable to employ a rapid action circuit breaker to cause a momentary discharge only, although the size of the hole may be regulated by the period of discharge. The longer the discharge lasts the larger the perforated holes become. The size of the perforation may also be regulated by the electric pressure or capacity of the discharge.

When the characters or blocks 12 are changed to represent a new date or sign the bracket 3 is elevated by means heretofore described then the pins 18 are removed from the drum 8 and the rings are permitted to rotate and are manually rotated, the electrodes 14 moving in the cut away or open section of the bracket 3. After the required numeral is brought opposite the slot 36 the ring 11 is again secured in position by inserting the pin 18 into the hole 20 registering with the hole 19. After the rings 11 are adjusted and secured the bracket 3 is lowered by the eccentric cam 37 thereby bringing the electrodes 14 into alignment with the electrodes 29. Now the closing of the circuit breaker 26 results in the electric spark from the electrodes thereby perforating the checks 21.

Another form of the electric paper marking device is shown in Figure 7. Sometimes it is desired to mark only one face of the paper by scorching a dotted outline of the required mark thereon by a group of hot points 45 spacedly disposed on the periphery of the rings 46. The rings 46 are rotatable on the drum 8 and are supported in an operative relation to the frame 1 as previously described.

Contacts 47 are secured in pairs in the end plates 6 and in the rings 46 at one side thereof and are pressed against the contact disks 48 of the adjacent rings 46 by means of springs 49. The pair of contacts 47 connects the electrical conduits in the ring with each other and completes the circuit through the conduit opposite hot points which are adjusted in an operative position. Filaments 50 are parallelly connected to the conduit and extend into the hot points 45. When a group of hot points 45 representing the required numerals or letters are brought in an operative position relative to the paper to be marked, said group is automatically connected to the adjacent group of hot points and to terminals 51 and 52.

In the wiring diagram in Figure 9 the source of the electric current is a battery 53 connected to the ground 54 and at the other terminal thereof to a circuit breaker 55. When the circuit breaker is closed it completes the circuit between the battery to the terminal 51 through the conduits and contacts of the rings 46 then to the terminal 52 and to the ground. The hot point filaments 50 are connected in parallel connection to the conduit therefore when the circuit breaker is closed a current flows through filaments and heats all the filaments thereby heating the points 45 sufficiently to cause dots or lines to be scorched on the face of the paper. The rapidity of the action of the circuit breaker determines the quality of the mark.

It is evident that the present invention permits the handling of a large number of

checks to be perforated simultaneously. The checks are placed on the table of the machine and the operator turns a switch or closes an automatic circuit breaker thereby closing the electric circuit and producing a spark to perforate or scorch the required characters through a large number of checks or a number of sheets of paper or other similar objects. The operation of the device is not only simple, but it eliminates all danger to the operator on account of the elimination of all the moving parts. The device is readily adapted for many different purposes not described, because it may be made of such a small size as to be used by any layman on any desk. As the number of parts required for its construction is very small, it may be manufactured at a small cost and could be distributed widely enough to be used at any place where paper or other objects are marked by perforation or scorching. Therefore, while I have shown and described only the preferred embodiments of my invention, I do not desire to be limited thereto, but seek to cover in the appended claims all those embodiments and modifications therefor that fall within the true spirit and scope of my invention.

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

1. An electrical device for marking paper comprising a base, an adjustable bracket pivotally secured thereto, screw threaded means for adjusting the bracket, a drum supported by the bracket, rings rotatable upon the drum, pins removably secured to the rings, a table spaced from the pins and means for supplying an electric current to the pins.

2. An electrical device for marking paper comprising a base, a bracket pivotally related to the base, a cam faced disc for rocking the bracket upon its pivot, a drum secured within the bracket, adjustable rings rotatable upon the drum, means for securing the rings in adjusted position upon the drum, pins carried by the rings and means for contacting the pins with a source of electrical energy.

3. An electrical paper marking device comprising a base, a bracket pivotally mounted on the base, means for rocking the bracket on its pivot, an adjusting screw intermediate the base and the bracket, means for urging the bracket toward the adjusting screw, a drum non-rotatably secured to the bracket, rings rotatable upon the bracket, pins extending from the rings and resilient means for establishing contact between the pins and a source of electrical energy.

4. An electrical paper marking machine comprising a base, a bracket pivotally related to the base, a drum supported within the bracket, rings rotatable upon the drum, removable blocks secured in the rings, pins extending from the blocks and beyond the face of the rings and resilient means for contacting the pins with a source of electrical energy.

5. An electrical paper marking device comprising a base, a spring controlled bracket pivotally related to the base, a cam faced rotatable disc for rocking the bracket on its pivot, a drum non-rotatably secured to the bracket, rings rotatable upon the drum, pins extending from the rings, a table spaced from the lower ends of the pins, a plate having pins depending therefrom and spaced from the table, means for contacting the pins of the plate and the pins of the rings with a source of electrical energy.

6. An electrical paper marking device comprising a base, a bracket pivotally related to the base, a drum secured to the bracket, rings rotatably related to the bracket, a plurality of spaced apart pins carried by the rings, apertures in the drum, apertures through the rings and adapted to register with the apertures in the drum, pins passing through the apertures in the rings and into the apertures of the drum, a table spaced from the ends of the pins, means for adjustably spacing the ends of the pins with relation to the table and means for establishing an electric current through the pins.

7. An electrical device for marking paper comprising a base, a bracket pivotally related to the base, a drum affixed to the bracket, rings rotatable upon the drum, pins extending from the rings, a table spaced from the pins, an electric conductor passing through the drum, spring actuated ball bearing contacts in circuit with the conductor and the pins and means for supplying an electric current to the conductor.

8. An electrical paper marking device having a base, a table supported by the base, a bracket pivotally related to the base, a drum secured to the bracket, rings rotatable on the drum, pins extending from the rings, a fixed plate having depending pins spaced from the table, a plate having depending pins and removably secured to the base and means for supplying an electric current to the pins carried by the rings, the pins carried by the fixed plate and the pins carried by the removable plate.

In testimony whereof I affix my signature.

CONRAD KORGE.