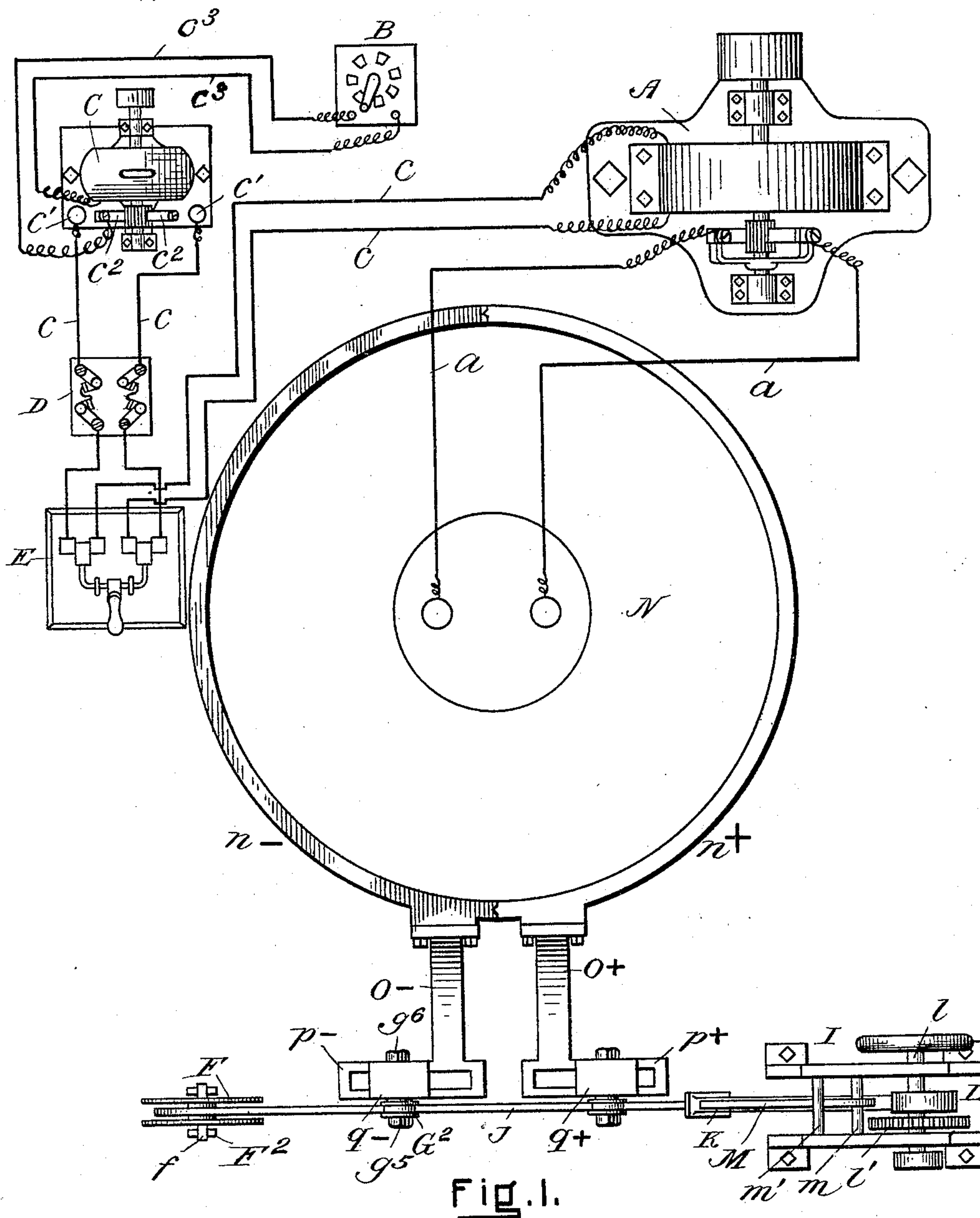


G. D. BURTON.
ELECTRICAL METAL WORKING APPARATUS.

No. 486,818.

Patented Nov. 22, 1892.



WITNESSES.
E. Le Roy
C. Reed

INVENTOR
Geo. D. Burton
By *J. C. Somes*
Attorney

(No Model.)

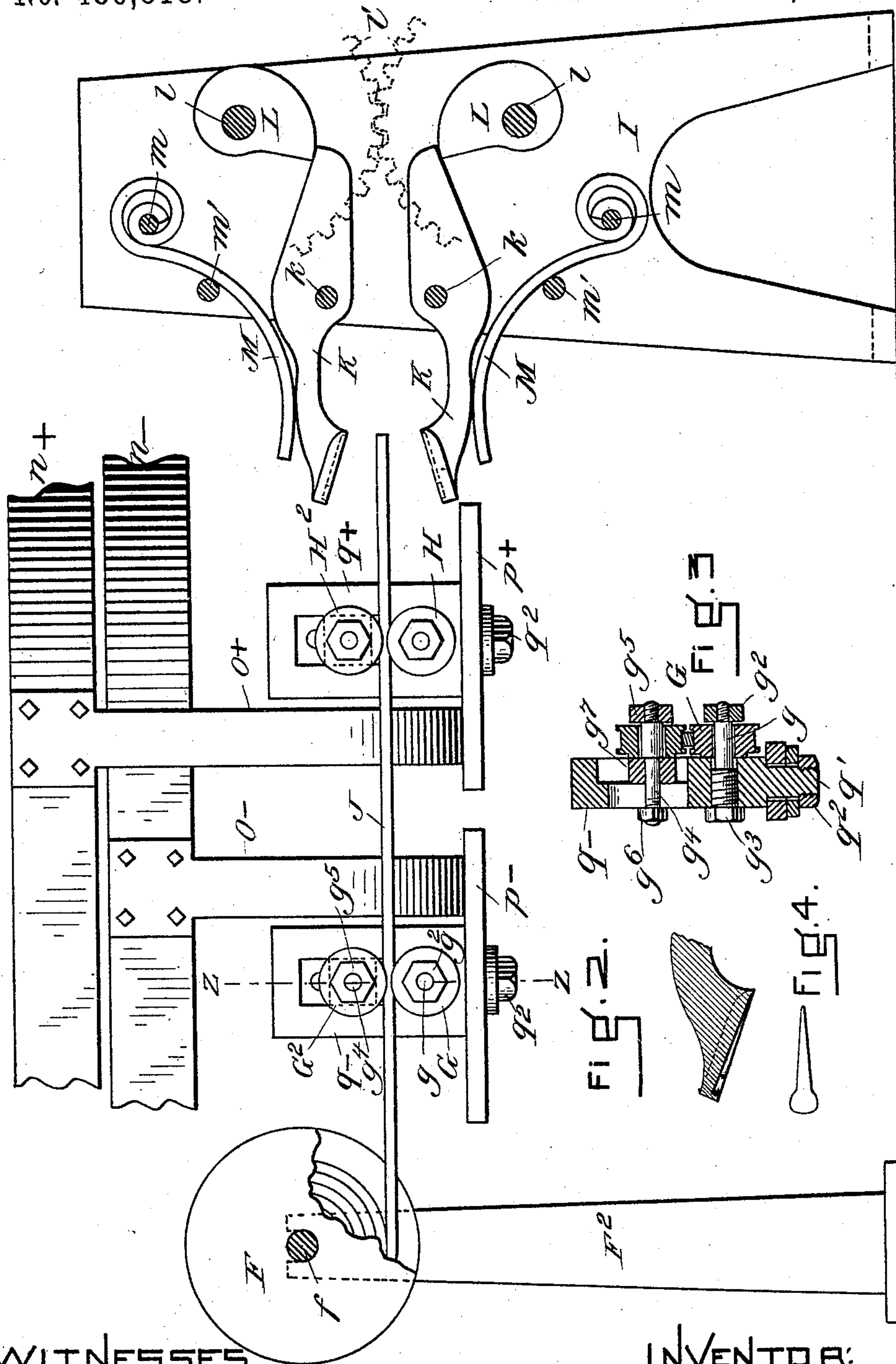
2 Sheets—Sheet 2.

G. D. BURTON.

ELECTRICAL METAL WORKING APPARATUS.

No. 486,818.

Patented Nov. 22, 1892.



WITNESSES.

E. de Puy
C. Weed

INVENTOR:

Geo. D. Burton
By J. C. Somes
Attorney

UNITED STATES PATENT OFFICE.

GEORGE D. BURTON, OF BOSTON, MASSACHUSETTS, ASSIGNOR TO THE
ELECTRICAL FORGING COMPANY, OF SAME PLACE.

ELECTRICAL METAL-WORKING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 486,818, dated November 22, 1892.

Application filed October 26, 1891. Serial No. 409,896. (No model.)

To all whom it may concern:

Be it known that I, GEORGE D. BURTON, of Boston, in the county of Suffolk and State of Massachusetts, have invented a new and useful Improvement in Mechanism for Heating and Working Metals by Electricity, of which the following is a specification.

My improvement relates to mechanism for heating and working metals by electricity; and it consists in certain new and useful constructions and combinations of the several parts thereof, substantially as hereinafter described and claimed.

In the drawings, Figure 1 is a top plan view of the several electrical appliances for producing a heavy electric current of low electro-motive force with these several appliances for feeding and working the metal as fast as the same is brought to the proper heat. Fig. 2 is a side elevation of a portion of the converter-rings, the electrodes, and the mechanism for heating and working the metal. Fig. 3 is a vertical section on the line $z z$ through the electrodes and bar being fed through them to be heated. Fig. 4 represents a vertical longitudinal section through one of the hammer-heads, showing the form of the die-face of the same which shapes the heated metal, and also represents a nail formed by the dies.

My invention relates especially to the location and construction of a feeding-reel and spring-die hammers to the electrodes and of the latter to the strip of metal, so as to readily and rapidly forge small articles—such as horseshoe-nail blanks—from the bar without unduly heating the dies.

A is the dynamo which produces the alternating current which supplies the primary circuit to the converter N over the circuit a . The field-coils of this converter are excited by an electric current from the exciter C over the circuit c , leading from the points $c' c'$ on the exciter-frame, which are in electrical connection with the armature-brushes $c^2 c^2$. The exciter has a shunt-circuit c^3 , leading from one of the brushes c^2 through its field-coils back to the other brush c^2 . In this circuit the rheostat B is located, which regulates the current delivered by the exciter, and in turn this regulates the amount of primary current

delivered to the converter by the dynamo A. In the circuit c is located the cut-out D and the switch E.

The converter N is of the ordinary construction, with an annular core and the primary circuit a passing around the same in the usual manner. Its secondary coils are connected in parallel in the usual manner to the outer conducting-rings $n-$ and $n+$, all the negative terminals being attached to the former and all the positive terminals to the latter. All of the above-described mechanism is of the usual construction and will be readily understood without further description.

From the conducting-rings $n+$ and $n-$, respectively, the conducting-arms $o+$ and $o-$ extend outward and carry the stands $p+$ and $p-$ at their outer ends in line with each other. These stands are slotted lengthwise and support the uprights $q+$ and $q-$, which are attached to the stands by bolts q' and nuts q^2 , securing them in proper position in the stands rigidly when the converter is in use. The uprights have the electrodes mounted on them in the same way, as follows: The stand $q-$, for example, has the electrodes formed of the copper wheels $G G^2$. The lower one G is mounted upon a horizontal spindle g , on which it is secured by the nut g^2 . This spindle extends horizontally through a hole in the upright $q-$ and has a screw-thread and nut g^3 on its rear end. By adjusting this nut the electrode G may be allowed to revolve or may be fixed in its place rigidly. The electrode G^2 is secured to the upright $q-$ by the stud g^4 , having on its front end the nut g^5 and passing through a vertical slot in the upright, with the nut g^6 on its rear end, which draws a shoulder on the bolt against the collar g^7 and allows the electrode to revolve on the stud. These electrodes, as well as their uprights and stands and the arms $o+$ and $o-$, are preferably made of copper or some similar good conducting material.

K K are the forging-hammers, having their die-faces formed to the shape of the article to be forged. They are suspended on the pivots $k k$ on the face of the stand I in such a position that they move toward and away from

the metal bar J in planes approximating the longitudinal direction in which the rod travels between them from the electrodes H H². These electrodes are mounted on their upright 5
 5 q+ in a similar manner to those already described and in line with the latter. Hammers K K have each a spring M, bearing upon the outside of it to impel it violently against the iron bar J.
 10 L L are two cams mounted upon the shafts l l in such a position as to bear upon the tail ends of the hammers K K and lift them off of the metal rod and then release them suddenly to strike the blow as the cams rotate.
 15 Both of the cams act simultaneously in releasing the hammers, so that the latter shall strike the opposite sides of the metal at the same time. The shafts l l are journaled in the stand I and are geared together by the
 20 pinion-wheels l' l' on their other ends from the cams L L, and one of them is provided with a belt-pulley outside of its pinion-wheel l' to drive it from any suitable counter-shaft. The springs M M are secured to the stand I by
 25 having their ends coiled around the studs m m and by being supported against the hammers by the studs m' m'. These studs are set firmly in the stand I.

F is a reel carrying the strip of metal J, 30
 30 coiled around it, and the strip is slowly unwound from it as it passes between the electrodes. This reel is supported and turns on the stud f, which projects outward from the stand F², so as to bring the reel in line with
 35 the electrodes G G² H H².

The advantage of having the hammers K K move approximately in planes passing through the bar J is that they can be brought to strike a blow lengthwise of the iron, which compresses much harder on the outer end of the 40
 40 bar, nearer to the pivots k k, than at their outer ends, and so tends to draw the metal down and out in the forging process; also, by having them strike on opposite sides of
 45 the bar at the same time the electrodes H H² are not strained or disturbed by the forging

process, while both surfaces are fashioned to the form desired, no matter how irregular it may be.

The operation of the mechanism is as follows: The bar J being drawn through the electrodes is heated by the electric current from the converter. It is then drawn along to the position shown in the drawings. By then rotating the shafts l l the hammers K K are set 55
 55 at work and the end of the bar forged into the desired shape and cut off by the dies of the hammer-heads. The bar J is then drawn along the proper distance with a pair of tongs and the next piece forged and cut off in like 60
 60 manner. It will be observed that the electrical current flows through the bar J in the direction of its length, thus enabling a sufficient heat to be given to the bar and afterward maintained to accomplish the forging very readily. The 65
 65 bar should be heated to a higher degree internally than on its surface, which enables it to hold the heat for a long time at the forging-point on its surface by radiation from the interior. The rapid blows of the hammers prevent them from becoming heated unduly by 70
 70 contact with the heated metal.

In case it is desired to work the bar J into any form or shape without cutting it off it can be fed continuously through the space between the hammers K K without interfering 75
 75 with their continued operation.

What I claim as new and of my invention is—

The combination of an electric converter 80
 80 provided with two exterior rings of opposite polarity, conductive arms attached to said rings, electrodes mounted on said arms and provided with contact-rolls, a feed-reel disposed adjacent to one of said electrodes, a 85
 85 pair of forging-hammers disposed adjacent to the other electrode, and means for actuating said hammers.

GEO. D. BURTON.

Witnesses:

CHESTER MARR,
 E. F. PHILIPSON.