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HORSESHOE MACHINE.

No. 179,997. Patented July 18, 1876.

Fig. 1

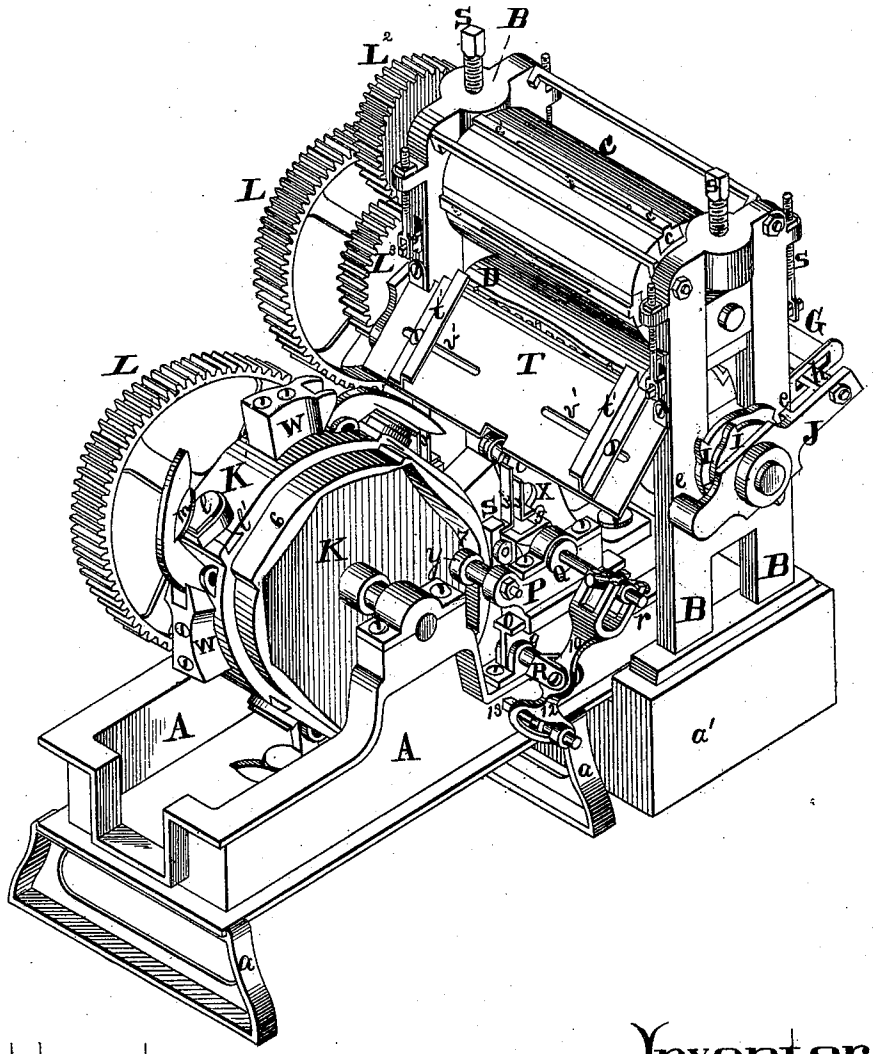

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Fig. 2

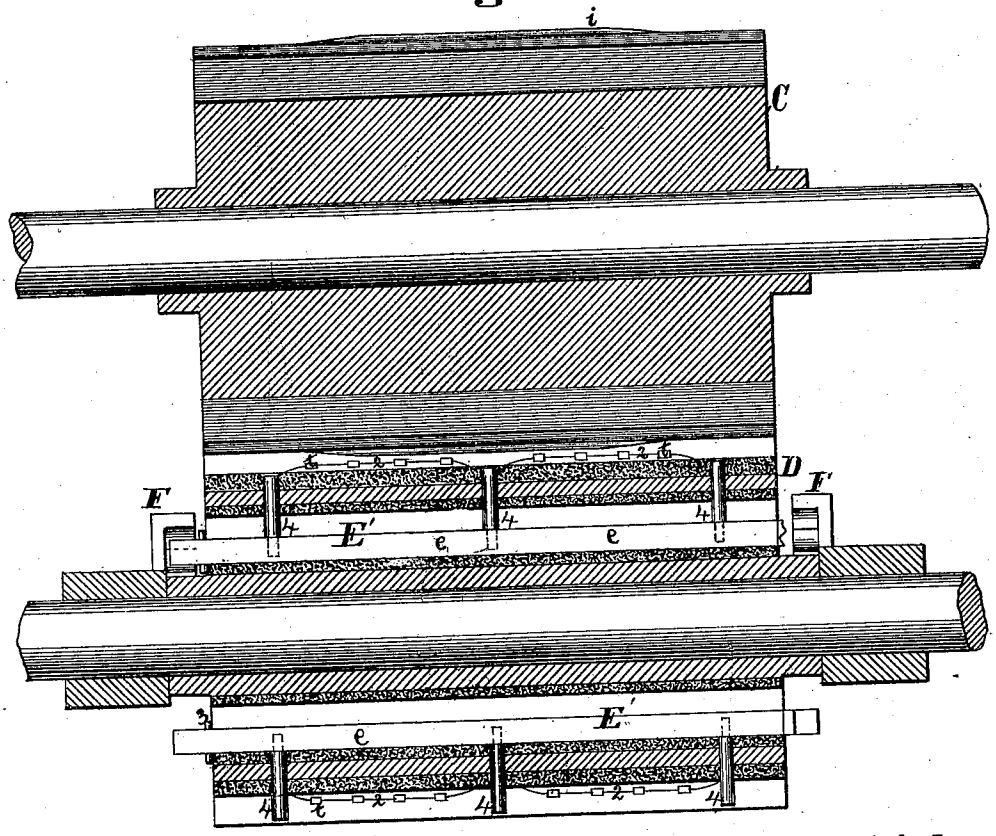

Fig. 3

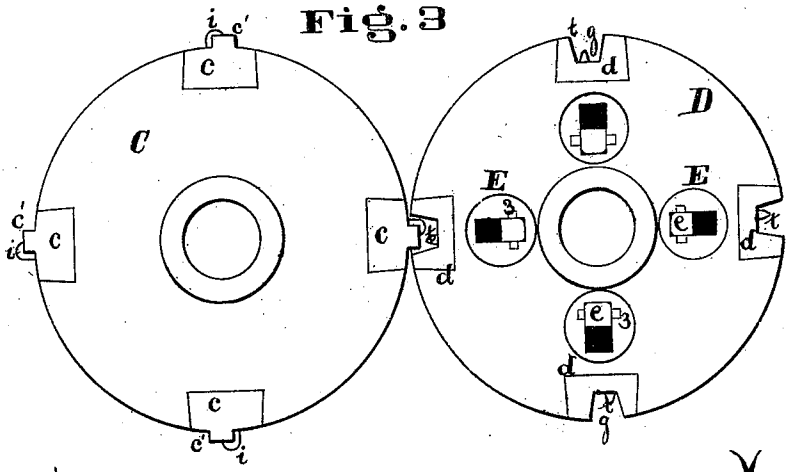

Fig. 4

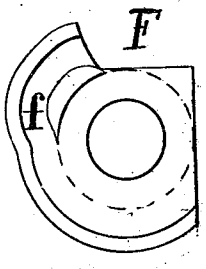

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Fig. 5

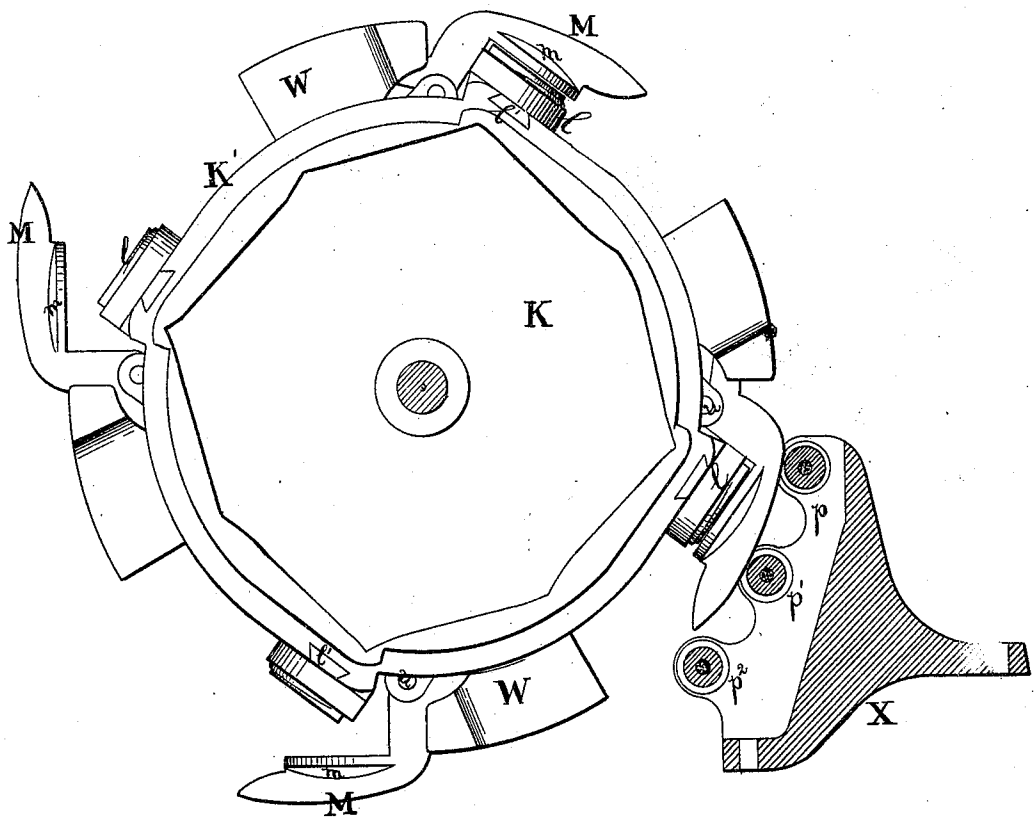

Fig. 7

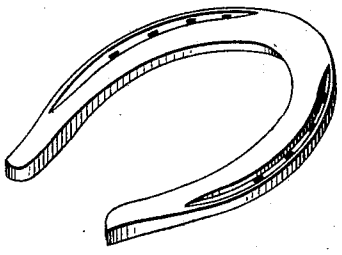

Fig. 6

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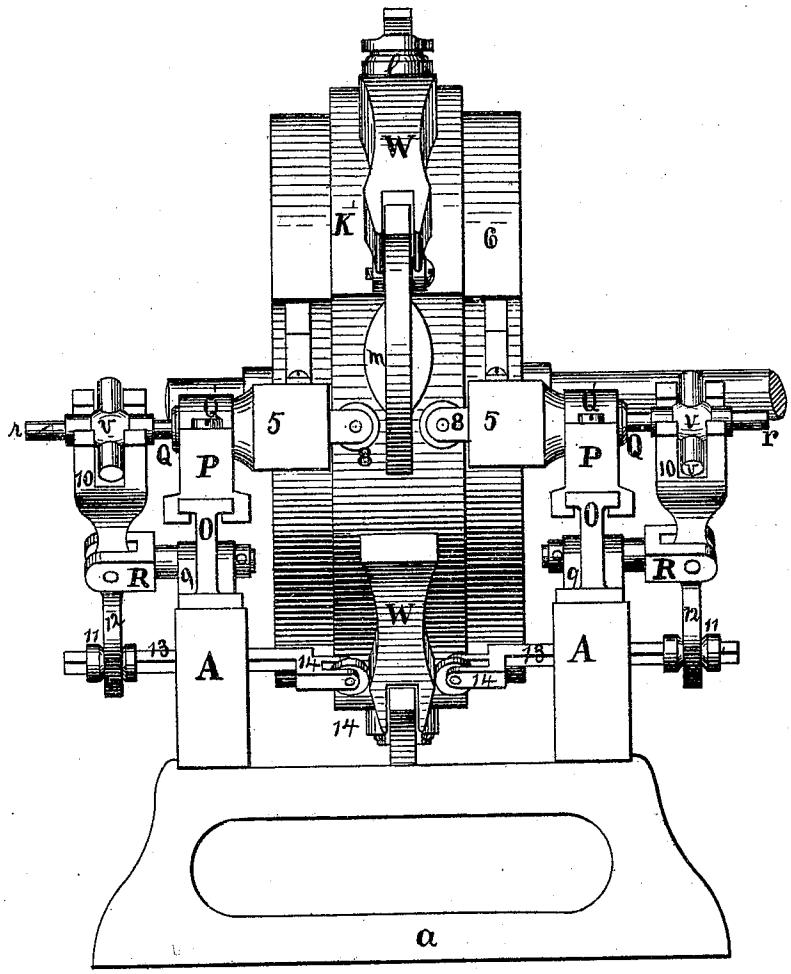
Fig. 8



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UNITED STATES PATENT OFFICE.

CHARLES BRIGGS, OF COVINGTON, KENTUCKY.

IMPROVEMENT IN HORSESHOE-MACHINES.

Specification forming part of Letters Patent No. **179,997**, dated July 18, 1876; application filed June 2, 1876.

To all whom it may concern:

Be it known that I, CHARLES BRIGGS, of Covington, in the county of Kenton and State of Kentucky, have invented certain new and useful Improvements in Horseshoe Machines, of which the following is a specification:

My invention relates to a new method of making blanks and bending the same into horseshoes.

The object of my invention is, first, to flatten, concave, crease, and punch nail-holes in a bar or blank, of a length sufficient for the shoe, by passing the same between shaping-rollers; second, to rapidly bend the said blank by automatic means into a horseshoe. The third object is to perform both operations of shaping and bending by only one heating of the iron or bar out of which the blank and shoe is made, all being cheaper and better than the operation by machines now in use.

My invention consists, first, in arranging rollers to shape a bar into a horseshoe-blank by passing the bar sidewise between two rollers of suitable configuration to form the blank ready for bending.

The second part of my invention consists in arranging one or more male and female dies to take the blank as it leaves the shaping-rollers, and carry it between two bending-rollers, to bend and finish the shoes in the dies.

Each of these two parts of my invention is accompanied by minor details, which will be fully understood by reference to the drawings and description thereof.

The details of my invention may be variously modified by mechanics of skill, and still retain either one or both of the two leading features, which I prefer to use in combination.

Figure 1 is a perspective view of my improvement. Fig. 2 is a vertical central section of the rollers, taken longitudinally through their axes; Fig. 3, an end view of the parts shown in Fig. 2; Fig. 4, plan of the cam for operating the bar in the lower roller; Fig. 5, a side elevation of a part of the bending mechanism; Fig. 6, a perspective view of the bar swaged by the rollers; Fig. 7, a perspective of the shoe made by the machine; and Fig. 8, a front perspective view of the finishing and bending mechanism.

A represents the base or bed frame of the machine; *a a*, standards for supporting the bed-frame; *a'*, cross-sill for supporting the frame-work of the front end of my machine; B B, slotted standards or posts for sustaining the rollers. These parts may be of iron, and should be of sufficient strength to withstand the strain of the machine.

C D represent the rollers, which, by compression, shape the blanks ready for bending and finishing, and are of sufficient length to receive any desired size of blank sidewise. One of these rollers is provided with four sets of shaping ribs or tongues, and the opposite roller with a similar number of grooves, the configuration of which determines the shape of the blank compressed by the rollers. Any desired number of ribs and corresponding grooves may be employed. These rollers C and D are mounted on shafts and hung in adjustable bearings properly affixed in the slots of the standards B. The drawings show the preferred plan of constructing and arranging the several parts of the machine.

c represents a steel bar, one face of which is a segment of the circle of the roller to which it is affixed, and the sides of which are flaring, forming a dovetail, fitting into a corresponding mortise or groove cut longitudinally in the outer face of roller C, as shown in Figs. 2 and 3, the bars *c* being introduced and removed endwise, and may be further secured by keys or set-screws.

d represents steel bars, whose exterior faces correspond with the bar *c*, and fit in corresponding grooves in rollers D.

g represents slots cut in the circular face of bars *d*, and *t* represents a series of teats for punching holes in the blank projecting from a creasing-rib (denoted by Fig. 2) in the bottom faces of the slots *g*, at appropriate places for forming creases and nail-holes in the blank for the horseshoe; but it is obvious that the creasing, punching, or concaving devices might be omitted, and those parts of the operation performed in the bending devices, but it would be an inferior modification. The width of the slot *g* should correspond to that of the blank *b*, (shown in Fig. 6,) narrow at the ends and wider at the center, such part from the center outward being the counterpart of the other.

c' represents a tongue or rib formed on the

ircular face of bar *c*, the bottom face of vhich is deeper at the center and less at the nds, to flatten the blank in the center and eave the ends thicker, as shown by the blank, ig. 6, the thickness of the blank at any oint being determined by the amount of projection on the face of rib *c'*, opposite thereof.

i represents a convex rib projecting from he surface of bar *c* and rib *c'*, as shown in Figs. 2 and 3, to make the upper and inner face of the shoe of a concave shape. The amount of concavity will be varied according to the shape and depth of rib *i*.

I prefer to flatten, concave, crease, punch the holes, and so shape the blank that after it passes to the bending mechanism little or no shaping is required by the finishing-dies. *e e* represent lifting-bars lying in slots placed in an axial plane of rollers D, and vertically under the slots *g*.

The preferred plan of constructing these slots is by making circular holes E, and fitting into them a steel rod or shaft having a rectangular slot, E', of about twice the depth of the lifting-bar *e*. 4 represents pins inserted into bar *e*, the ends of pins 4 passing through holes in roller D provided therefor. F represents cams placed on the shaft at each end of roller *d*; *f*, the camway. The end of bar *e* projects into groove *v*, so as to work in the cam, and so that as the rollers revolve the bar *e* has an intermittent rising and falling motion. The ends of the bar, passing up into slot *g*, force out the blank *b* compressed therein. The cam F is adjusted so as to discharge the blank *b* on the table T, as each one of the four series of lifting-bars successively operated by it arrive at that point. G represents a feeding-table, each end of which is provided with a slot, through which passes a clamping-bar, *h*. I I represent two series of revolving cams working on the shaft of roller D; J, a shaft having a slot equal in length to that in the end of table T, to give shaft J the requisite throw on the roller-shaft, and to which the feeding-bar *h* is fastened, and is provided with pins *l l'*, which bear against the series of cams.

Fig. 1 shows the mechanism at one end of the machine. The opposite end has the counterpart thereof. The cams I are so constructed and adjusted that the feeding-bar *h* is raised so as to admit of the blank to be placed lengthwise between the roller D, one edge being sidewise to the rollers, and the bar H is carried back by the opposite cam, forcing the bar between the rollers, the ends being kept parallel, so that the bar is acted upon throughout its entire length simultaneously by the shaping-rollers.

The parts should be made of metal, as the blank is wrought from heated bars of iron cut in proper length to form a shoe. An important advantage is derived by this mode of using the rollers C D and their shaping devices.

The bar is shaped and flattened by spreading the iron, the rollers first grasping and compressing one edge, the pressure progressing throughout the whole length simultaneously toward the opposite edge. The length of the blank is not materially changed by the operation of flattening the blank.

It is obvious that the roller mechanism can be used alone, and the blanks bent by hand or otherwise.

T represents a feeding-table; *t'*, adjustable ends; *v'*, slots through which bolts pass for securing parts *t'*. *u* represents guide-bars, which are automatically carried under the lower edge of table T, to receive the blank and hold it in position to be wrought by the bending mechanism. K represents a revolving disk, mounted on a shaft revolving in suitable bearings affixed to the frame A, the preferred form of which is shown in Fig. 1; K', a flange attached to disk K, upon the face of which is mounted a series of clamping dies; *l*, the male, and *m* the female, blocks. These dies conversely correspond to the shape of the horseshoe. Die *l* is attached to the disk K by a dovetail tenon, *l'*, or it may be secured by bolts or set-screws. Die *m* is rigidly attached to a hinged jaw, M, of the shape and form shown in Figs. 1 and 5, and arranged to open and close automatically as it revolves, the weight of the shoe or jaw acting alternately upon the pivot-joint, as shown in Fig. 5. O represents tramways, on which are mounted reciprocating saddles or carriages P; Q, a cylinder, and 5 a slotted bracket or hanger, rigidly attached to the inner end thereof. The cylinder Q turns in a bearing properly fixed on saddles P.

r represents shafts, having their axial bearings in cylinders Q, the inner ends of which are forked, and carry rollers 8, the faces of which are grooved to receive the exterior edges of the blank, and force the bending of the blank in the space or groove between the faces of dies *l* and *m*. Numeral 9 represents a bearing for forked shafts R. 10 represents forked levers bolted in fork R; 12, slots through which shaft 13 passes; 11, grooved collars, attaching shafts 13 to slots 12, so as to give the former a reciprocating motion, causing the vibration of yoke-lever 10. Shafts *r* have tappet-collars *v* working loosely thereon between the forks of yokes 10, so that a reciprocating motion will be imparted to rollers 8, converse to that of rollers 14 on shaft 13.

W represents a series of cams, mounted on the face of disk K, the vertical faces of which are of the proper shape to cause rollers 8, which receive the blank *b*, to press and bend the same edgewise around the face of die *l*, and to conform in their reciprocating movement to the form or contour of the bent shoe.

Rollers 14 are controlled by cams W, the motion being transmitted from cams W to shafts 13, from those to slotted levers 12, and the opposite forks 10 to tappets *v*, operating shafts *r*. As dies *l m* move in a circle, the bending must take place in an arc of this

circle. It is therefore essential that rollers 8 should move in parallel lines to that plane. This motion is given them as follows: 6 represents a series of cams made on the exterior of flange K′; S, a guide-block fastened to fork-shaft 5, bearing against them; and 7, a series of cams on the interior face of flange K′; *y*, a pulley, working on a stud projecting from saddle P, pressing against the cams 7, so that as the dies *l m* are carried by disk K′, the saddle P, carrying shaft *r* and bending-rollers 8, will be moved to and fro always in the plane occupied by the dies *l m*, moving in their circular path, shaft *r* being allowed to turn in its bearing, so that the bending-rollers 8 will always have the grooves opposite the circular groove, between dies *l* and *m*, where the blank is bent into a horseshoe. X represents a bracket; $p\,p^1$ p^2, a series of rollers with the peripheries arranged to come in contact with the exterior surface of shoe M. The toe of shoe M comes in contact with roller *p* at the moment the blank, which is held by guides *u u*, is brought into contact with the dies *l m*. Roller *p* allows the dies to be open, so that the blank *b* will readily enter the circular groove formed between their faces. p^1 has its periphery a little closer to the path of die *l*, so as to force dies *l m* a little closer together, p^2 being set so as to force the dies *l m* together, and completing the shaping of the bent shoe. When the bending-dies *l m* have passed the rollers the shoe M opens and lets the horseshoe fall out.

The machine, as shown, is constructed and adjusted to shape four shoes in one rotation of the rollers C D, and to bend four shoes at one revolution of the disk K. They should in such case be driven at the same speed as the rollers C D.

What I claim is—

1. The rollers C D, with tongues and grooves, adapted to receive a bar of iron flatwise, and shape the same into a blank for a horseshoe, substantially as described.

2. Rollers C D, adapted to receive a heated bar of iron sidewise, with ribs and grooves for shaping the blank ready for bending, substantially as described.

3. Rollers C D, adapted to receive a heated bar of iron flatwise, with device for flattening, creasing, and concaving the blank as it passes through the rollers, substantially as described.

4. The feeding mechanism, composed substantially of the clamping-bar *h*, slotted levers J, and cams I, in combination with rollers C D, substantially as described.

5. The roller D, provided with the discharging mechanism, consisting of cam F, lifting-bars *e*, and pins 4, arranged in relation to slot *g*, substantially as described.

6. The combination of the revolving or shoe dies *l m* with the bending-rollers 8 8, arranged in relation thereto, substantially as herein set forth.

7. In a horseshoe-machine, a series of revolving dies *l m*, in combination with the bending-rollers 8 8, arranged in relation thereto, substantially as herein set forth.

8. In a horseshoe-machine, the combination of the blank-forming mechanism with the bending mechanism, substantially as described.

9. The bending rollers 8 8, in combination with one or more compressing-rollers, *p*, and revolving dies, substantially as herein set forth.

10. The shaping-rollers C D, in combination with the automatic bending devices, constructed and arranged substantially as herein set forth.

In testimony whereof I have hereunto set my hand this 26th day of May, 1876.

CHARLES BRIGGS.

Witnesses:

JOHN O'GARA,

E. E. WOOD.