

E. & J. O. SILVA.

MACHINE FOR MAKING CEMENT BLOCKS.

APPLICATION FILED OCT. 13, 1904.

2 SHEETS—SHEET 1.

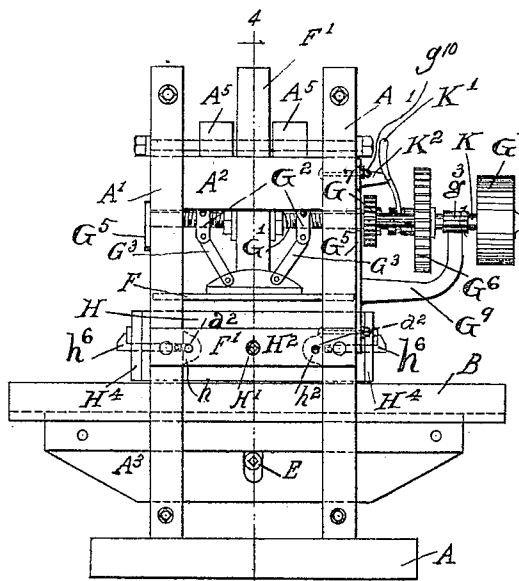


Fig. 2.

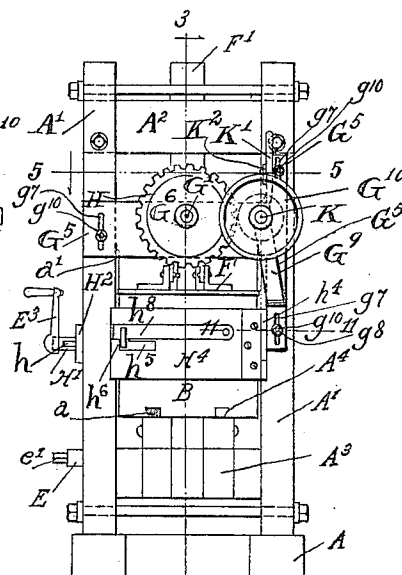


Fig. 1.

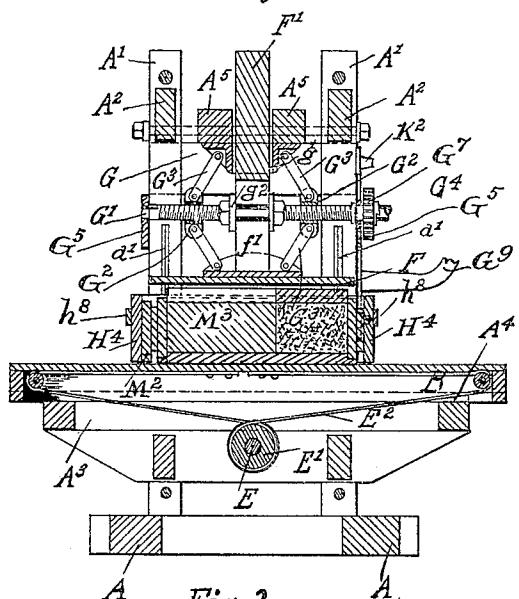


Fig. 3.

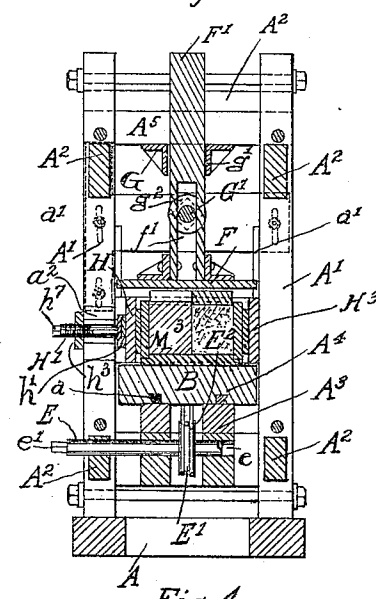


Fig. 4.

Witnesses

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No. 816,613.

PATENTED APR. 3, 1906.

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2 SHEETS—SHEET 2.

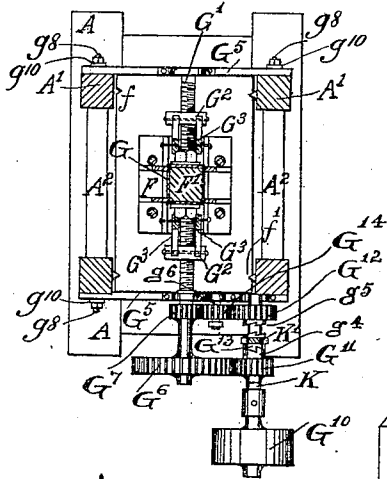


Fig. 5.

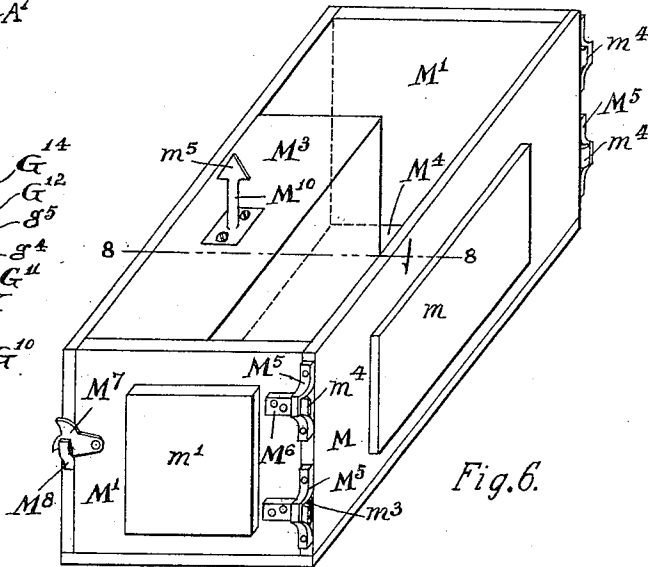


Fig. 6.

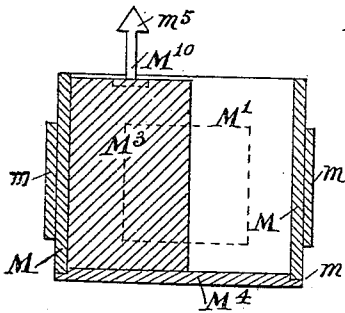


Fig. 8.

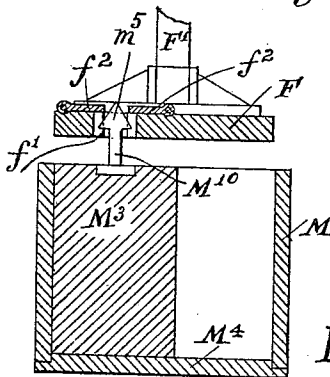


Fig. 9.

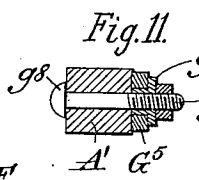


Fig. 11.

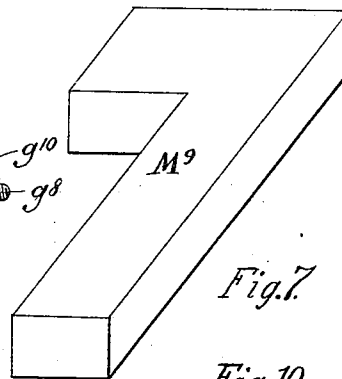


Fig. 7.

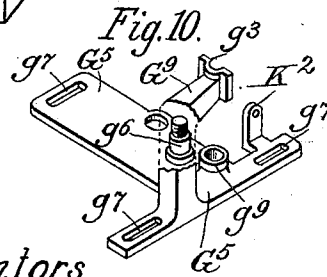


Fig. 10.

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UNITED STATES PATENT OFFICE.

EMANUEL SILVA AND JAMES O. SILVA, OF SPRINGFIELD, ILLINOIS.

MACHINE FOR MAKING CEMENT BLOCKS.

No. 816,613.

Specification of Letters Patent.

Patented April 3, 1906.

Application filed October 13, 1904. Serial No. 228,367.

To all whom it may concern:

Be it known that we, EMANUEL SILVA and JAMES O. SILVA, citizens of the United States, and residents of Springfield, Sangamon county, Illinois, are the first and joint inventors of certain new and useful Improvements in Machines for Making Cement Blocks, of which the following is such a full, clear, and exact description as will enable those skilled in the art to which it appertains to make and use our said invention.

The purposes of our invention are to provide in an apparatus of the class described a framework or main structure of novel and improved construction; a mold of improved construction; means for propelling said mold on the main structure; means for retaining the mold in position for pressure; means for applying pressure on the article contained in the mold, so as to produce an article of compact and homogenous structure; means to prevent spreading of the mold during the operation of pressing; means for guiding and adjusting the device which prevents spreading of the mold; means to facilitate the insertion and removal of the mold, and means for removing the core from the mold.

With these ends in view our invention consists in the novel features of construction and combinations of parts shown in the annexed drawings, to which reference is hereby made and hereinafter particularly described, and finally recited in the claims.

Referring to the drawings, in which similar reference letters and numerals designate like parts in the several views, Figures 1 and 2 are respectively an end elevation and side elevation of the complete machine. Fig. 3 is a vertical section on the line 3 3 of Fig. 1. Fig. 4 is a vertical section on the line 4 4 of Fig. 2. Fig. 5 is a horizontal transverse section on the line 5 5 of Fig. 1. Figs. 6 and 7 are respectively an enlarged perspective view of one form of the mold and the follower. Fig. 8 is a vertical transverse section through the mold on the line 8 8 of Fig. 6. Fig. 9 is an enlarged partial vertical section through the platen and the core-block and illustrates the position of the platen relative to the core-block before the descent of the platen. Fig. 10 is an enlarged isometric projection of the right-hand plate supporting the main shaft, the counter-shaft, and connected parts; and Fig. 11 is an enlarged horizontal transverse section on the line 11 11 of Fig. 1.

The main structure, which is preferably of

wood, though any other suitable material may be used, consists of a base or sill-pieces A, posts A', and cross-pieces A², connecting said posts. This main structure is of sufficient strength and rigidity for the use for which it is designed.

A bed A³, adapted to support a traveling platform B, is centrally secured on the main structure and extends a sufficient distance beyond the ends thereof to permit proper travel of the platform. On the upper side of the bed A³ are guide-rails A⁴, which fit in channels *a* on the under side of the bed B. The traveling platform B slides on and is guided by the rails A⁴ A⁴. A shaft E extends transversely across the main frame and turns in suitable bearings *e* on the frame. The shaft E has a squared part *e'* to accommodate a wrench or crank E³ for turning the shaft. A spool E' is secured on the shaft E. A cord E² has its center secured on the spool E and its ends secured on the under side of the platform B in such manner that when the spool is turned to the right the left-hand part of the cord winding on the spool will pull the platform to the right and when the spool is turned to the left the right-hand part of the cord winding on the spool will pull the platform to the left.

A platen F of suitable material and dimensions slides vertically between the posts A' and is guided by V-shaped guides *a'* on the posts, which fit in corresponding grooves *f* in the edges of the platen. A screw-threaded shaft G', one half of which has a right-hand thread and the other half of which has a left-hand thread, turns in bearings on plates G⁵, the plates being vertically slidable on the posts A'.

Parallel beams A⁵ extend across the upper end of the main frame and are secured on the cross-pieces A². A plate G, having a central opening *g'*, is centrally secured on the under side of the beams A⁵. A vertical bar F' is secured in a central position on the platen F and slides freely in the central opening *g'* of the plate G. Nuts G² on the shaft G' travel toward or away from each other according as the shaft G' is turned to left or the right. Toggle-arms G³ in pairs are pivotally connected with the plate G and the nuts G², and similar toggle-arms are pivotally connected with the platen F and the nuts G². When the screw-shaft G' is turned in one direction, the toggle-arms act to raise the platen and when it is turned in the opposite direction the

toggle-arms act to move the platen downward. The shaft G' extends through a slot f' through the bar F' , and the slot permits the bar to move vertically without striking against the shaft. Plates or washers g^2 , secured on the shaft G' on each side of the bar, guide the vertical movement of the bar. A spur-wheel G^6 and a spur-pinion G^7 are secured on the shaft G' . One end of a counter-shaft K , Fig. 5, turns in a bearing g^9 on the right-hand plate G^5 and its other end turns in a box g^3 at the upper end of a bracket G^9 integral with the same plate. In order that the shaft G' may have slight vertical movement to accommodate itself to the movement of the toggle-arms, the plates G^5 , on which the shaft is mounted, are connected with the posts A' , so that the plates may slide vertically to permit proper vertical movement of the shaft. The plates G^5 may be connected to the posts by any suitable means which will permit vertical movement of the plates—such, for example, as bolts g^8 , passing through the posts A' and through washers g^{10} , which have elongated hubs fitting loosely in the slots e' , so that the plates will slide on the hubs of the washers. A pulley G^{10} is secured on the counter-shaft K and carries a belt by which the machine is driven. Spur-pinions G^{11} and G^{12} , Fig. 5, are loose on the shaft K and have clutch members g^4 and g^5 , respectively, which are alternately engaged by a double clutch member G^{13} , which slides on a feather on the shaft.

A forked lever K' is mounted on a bracket K^2 . Its lower end fits in a circumferential groove around the central clutch member G^{13} , and by shifting the lever K' the clutch member may be slid to the right or the left to engage the clutch members g^4 or g^5 to turn the wheels G^{11} or G^{12} , as may be desired. A spur-pinion G^{14} is mounted to turn on a stud g^6 on the right-hand plate G^5 . The cog-pinion G^{14} intermeshes with the cog-wheel G^{12} and the cog-pinion G^7 . When the clutch member G^{13} is engaged with the clutch member g^4 , the spur-pinion G^{11} turns with the shaft K and meshes with and drives the spur-wheel G^6 on the shaft G' , thereby turning the shaft G' and causing the toggle-arms to operate to push the platen F downward. If the lever K' be then shifted to disengage the clutch member G^{13} from the clutch member g^4 and engage it with the clutch member g^5 , the pinion G^{11} will run loose on the shaft and the spur-wheel G^{12} will turn with the shaft and drive the pinions G^{14} and G^7 to turn the screw G' in a direction opposite to that in which it first turned and cause the toggle-arms to operate to raise the platen. It will be seen then that the movement of the platen may be reversed at any time merely by shifting the lever K' .

A laterally-movable clamping-plate H has parallel horizontal guide rods or stems h se-

cured at right angles to the plate at suitable distances apart. A plate h' , secured on the plate H midway between the horizontal guide-rods h , connects the plate-adjusting screw H' with the plate H . A bar H^2 , secured on the main frame, is pierced by transverse holes h^2 , through which the guide-rods h move freely, and also has a centrally-screw-threaded hole h^3 , in which the screw H' fits. The screw H' turns in the hole h^3 and the plate H may be pushed inward or drawn outward by turning the screw to the right or left, as the case may be. The screw H' has a squared part h^7 , on which a crank E^3 fits for turning the screw. In practice the squared parts of the shaft E and the screw H' are of the same size, so that a single crank may be used for turning both. The guide-rods h pass through and slide in guides a^2 on the main frame. A plate H^3 is secured on the main frame opposite and parallel to the movable clamping-plate H . The plates H and H^3 are slightly above the platform B and are so situated that the plates will bear on the thickened parts of the sides of the mold, as hereinafter explained. At the ends of the plate H^3 are gates H^4 , which are connected with the plate by suitable hinges h^4 . The gates have L-shaped slots h^5 , which accommodate latches h^6 , which are connected with the ends of the plate H . When the plate H has been slid outward to its full limit, the latches h^6 on the plate occupy such a position that if the gates H^4 be then closed the latches h^6 will enter the vertical members of the slots h^5 . Pivoted locking-bars h^8 , mounted on the gates H^4 , engage with the hooked ends of the latches h^6 , which project through the slots h^5 and secure the gates in their closed position. When the gates are closed, the screw H' may be turned to slide the plate H inward, so as to cause the plate to press against the side of the mold and prevent rupture or breaking of the sides of the mold, which might occur if the mold were not suitably strengthened or reinforced. When the plate H is slid inward or outward, the latches h^6 travel in the horizontal members of the slots h^5 , thus permitting free adjustment of the plate H relative to molds of different widths.

The mold in its preferable form consists of a rectangular wooden box having separable sides, ends, and bottom. The sides M and the ends M' , respectively, have reinforcements m and m' . When the mold is in position in the machine, the reinforcement m' of one end piece lies in contact with one of the gates H^4 . A block M^2 of suitable dimensions bears against the reinforcement m' of the other end plate and against the other gate when the last-named gate is closed. The closing and securing of the gates H^4 press the block against the end piece of the mold, so as to hold the mold firmly and prevent spreading

or longitudinal movement thereof between the gates. When the clamping-plate H is moved inward by the turning of the screw H', the plate H bears firmly on the reinforcement *m* on one side of the mold and the plate H³ bears on the reinforcement *m* on the other side of the mold, so as to hold the mold firmly and prevent lateral spreading thereof. A core-block M³ of suitable form and dimensions placed within the mold adapts the mold for forming a corner-block. To make a rectangular block filling the whole of the mold, the core-block M³ may be omitted. Hollow blocks of different forms may be made by using correspondingly different core-blocks. The bottom plate M⁴ has an integral ledge *m*² extending entirely around the plate. The lower edges of the sides M and the ends M' are supported on the ledge *m*² of the bottom M⁴. Plates M⁵, having eyes *m*³, are secured on the side pieces M at both ends of one side piece and at one end of the other. Plates M⁶, which have curved lugs *m*⁴, fitting in the eyes *m*³, are secured on the end pieces M'. A latch M⁷, pivoted on one of the end plates M', fits in a plate M⁸, secured on one of the side pieces M, and serves to connect the side pieces with the end pieces. The follower M⁹, of suitable form and dimensions, fits in the upper part of the space of the mold in which the block is to be formed, and the platen presses on the follower.

In Fig. 7 of the drawings we have illustrated a follower consisting of an L-shaped block adapted to be employed in making a corner-block in a mold such as is shown in Fig. 6. It is obvious, however, that the form of the mold and the form of the follower may be varied at pleasure, it being essential only that the follower shall conform to the shape of the block to be made in the mold with which it is used.

In assembling the mold the bottom M⁴ is first placed on the platform B. The side pieces and end pieces are then hooked together and placed on the ledge of the bottom and are then secured by the latch M⁷.

In order to expedite the manufacture of the cement blocks, it is desirable to withdraw the core-blocks coincidentally with the raising of the platen. We accomplish this result by means which we will now describe. A vertical stem M¹⁰ is secured in a central position on the core-block M³ and has at its upper end a spear-head *m*⁵. Doors *f*², hinged on the platen F, overlie a cross-shaped opening *f*³. When the platen descends, the dart *m*⁵ raises the doors *f*² and the doors then gravitate to their original position. When the platen is raised, the upper sides of the doors engage with the under side of the dart *m*⁵ and pull on the stem to raise the core-block out of the mold. To detach the core-block from the platen, it is only necessary to turn the core-

block at right angles to its first position, 65 when the dart may be withdrawn through the space between the doors *f*² and through the cross-shaped opening *f*³.

The operation of the apparatus is as follows: The mold being in position on the platform, as described, is filled with cement, concrete, or other suitable material to a desired depth, but not to the full depth of the mold, some space being left to place the follower partly in the mold and on top of the material contained therein. The shaft E is then turned to move the platform B, carrying the mold into a position under and central to the platen F. The gates H⁴ are then closed and latched, a suitable block being placed between one of the gates and one end of the mold to prevent longitudinal movement of the mold between the gates. The screw H' is then turned to move the clamping-plate H inward until it presses firmly against one side of the mold, so as to hold the mold securely between the plates H and H³. The screw-shaft G' is then turned to cause the toggle-arms to move the platen downward and press the follower against the material in the mold, so as to produce suitable compression thereof. After the material in the mold has been compressed and the platen has been raised and the core-block has been withdrawn the screw H' may be turned to move the plate H outward and release the mold. One of the gates may then be opened and the shaft E may be turned to move the platform B to the right or left, as the case may be, so as to entirely withdraw the mold from under the platen F. The mold containing the compressed article may then be removed from the platform and another mold substituted, which may be in like manner filled and pressed, and so on as long as the machine continues in operation. When the mold containing the compressed material has been deposited where the block or other article is to remain to harden, the latch M⁷ may be raised, and the sides and ends of the mold may then be easily separated, so as to leave the block on the bottom.

A number of interchangeable bottoms are provided for use with each mold, so that the same side pieces and end pieces may be used over and over again.

Having fully described our invention, what we claim as new, and desire to secure by Letters Patent, is—

1. In an apparatus of the class described, the combination of a main structure having a bed, a platform traveling on said bed, means for propelling said platform, a stationary plate alongside of said platform, gates connected with said stationary plate, a clamping-plate parallel to said stationary plate, means for moving said clamping-plate relative to said stationary plate and means for

connecting said gates with said clamping-plates so as to permit movement of said clamping-plate between said gates, as set forth.

2. In an apparatus of the class described, the combination of a main structure, a movable platform on the main structure, a fixed plate alongside of said platform, a movable clamping-plate parallel to said fixed plate, means for moving said clamping-plate, gates mounted on said fixed plate and detachably connected with said clamping-plate, a mold fitting between said fixed plate and said clamping-plate and between said gates, means for holding said mold against movement between said gates and means for applying pressure to the contents of said mold, as set forth.

3. In an apparatus of the class described, the combination of a main frame, a bed on the main frame having longitudinal guides, a shaft transverse to said bed, a spool secured on said shaft, a platform slidable on said bed, cords connecting said platform with said spool, a mold-containing device mounted above said platform, a mold in said mold-containing device, means for applying lateral pressure to said mold, and means for applying pressure to the contents of said mold, as set forth.

4. A mold-containing device, consisting of a fixed member, a movable member parallel to said fixed member and movable toward or away from said fixed member, means for moving said movable member, gates at the end of said mold-containing device and latches connecting said gates with the movable member of said mold-containing device so as to permit transverse movement of said movable member; in combination with a mold-supporting device, a mold, and means for applying pressure on the material contained in said mold, as set forth.

5. In a mold-containing device, the combination of a stationary side piece, a transversely-movable side piece parallel to said stationary side piece, gates mounted on said stationary side piece and having L-shaped slots, latches mounted on said gates, hooks secured on said movable side piece and projecting through and slidable in the L-shaped slots through said gates, said latches engaging with said hooks, to secure said gate, as set forth.

6. In an apparatus of the class described, the combination of a main frame, a mold-containing device mounted thereon and having a clamping-plate movable relative to the mold, guide-rods secured on said clamping-plate at right angles thereto, stationary guides in which said guide-rods travel, and a screw connected with and adapted to move said clamping-plate inwardly or outwardly, as set forth.

7. In an apparatus of the class described, the combination of a main frame, a platform traveling on the main frame, a mold-containing device above said platform, a screw-shaft mounted on the main frame, nuts traveling on said screw-shaft, a slidable platen, toggle-arms connecting said platen with said nuts, a vertical bar secured centrally on said platen, a stationary plate supported on the main frame and guiding said bar, toggle-arms connecting said stationary plate with said nuts, and means for turning said screw-shaft, as set forth.

8. In an apparatus of the class described, the combination of a main frame, a platform traveling on the main frame, a mold-containing device above said platform, a slidable platen, a vertical bar secured on said platen, a stationary plate guiding said bar, a screw-shaft having right-hand and left-hand threads and mounted to turn in bearings on the main frame, nuts traveling on said screw-shaft, toggle-arms connecting said nuts with said platen and said stationary plate, a cog-wheel and a cog-pinion secured on the screw-shaft, a rotating counter-shaft supported on the main frame and a pulley supported on said counter-shaft, cog-pinions loose on said counter-shaft and having clutch members, a clutch member slidable on the counter-shaft and engaging with the clutch members of said pinions, and an intermediate pinion intermeshing with a cog-pinion on the counter-shaft and the cog-pinion on the screw-shaft, as set forth.

9. A core-lifting device consisting of a stem having a spear-head, in combination with a core-block on which said stem is secured, a vertically-movable platen having an opening accommodating said spear-head, and doors mounted on said platen and operated by said spear-head, as set forth.

10. In an apparatus of the class described, the combination of a mold, a core-block usable with said mold, a stem secured on said core-block and having a spear-head, a slidable platen having an opening accommodating the head of said stem and gravitating doors mounted on said platen above the opening through said platen and separated a suitable distance to permit the withdrawal of the spear-head between said doors and through the opening in the platen when the core-block is turned at right angles to its original position, as set forth.

In witness whereof we have hereunto subscribed our names, at Springfield, Illinois, this 17th day of September, 1904.

EMANUEL SILVA.
JAMES O. SILVA.

Witnesses:

GEO. H. CRAFT,
ED. H. HEISBERGER.