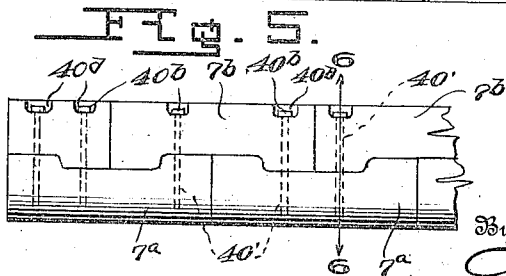
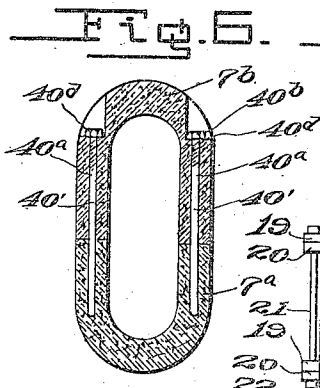
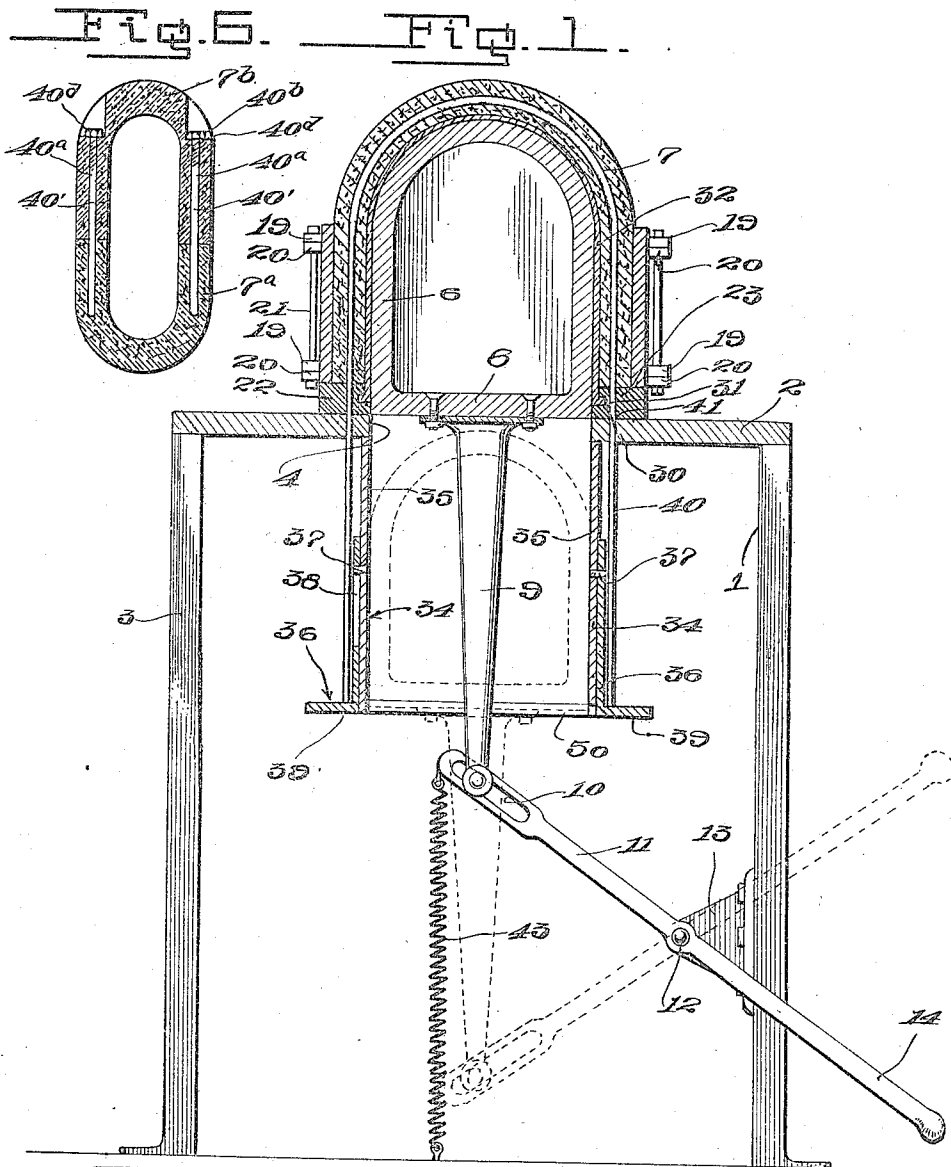


L. H. HOUCK.  
 MACHINE FOR FORMING CONCRETE CONDUITS.  
 APPLICATION FILED JULY 2, 1919.

1,302,370.

Patented Apr. 29, 1919.  
 2 SHEETS—SHEET 1.



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 his Attorney

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Fig. 2.

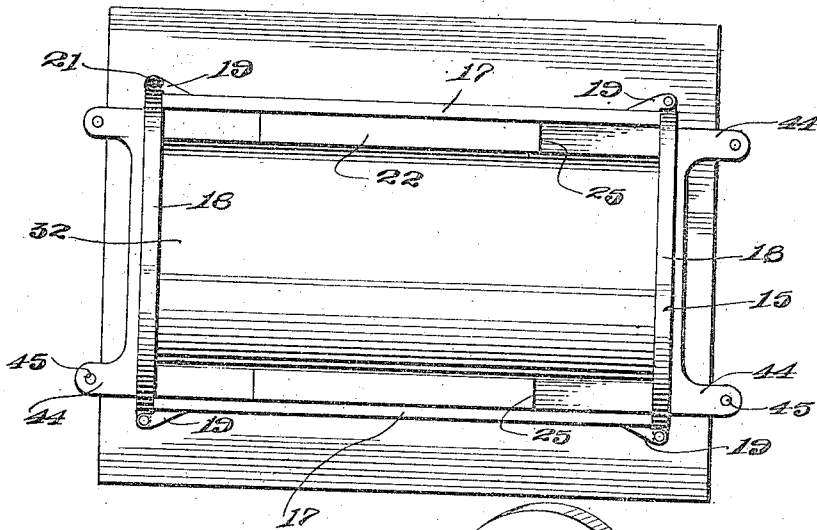


Fig. 3.

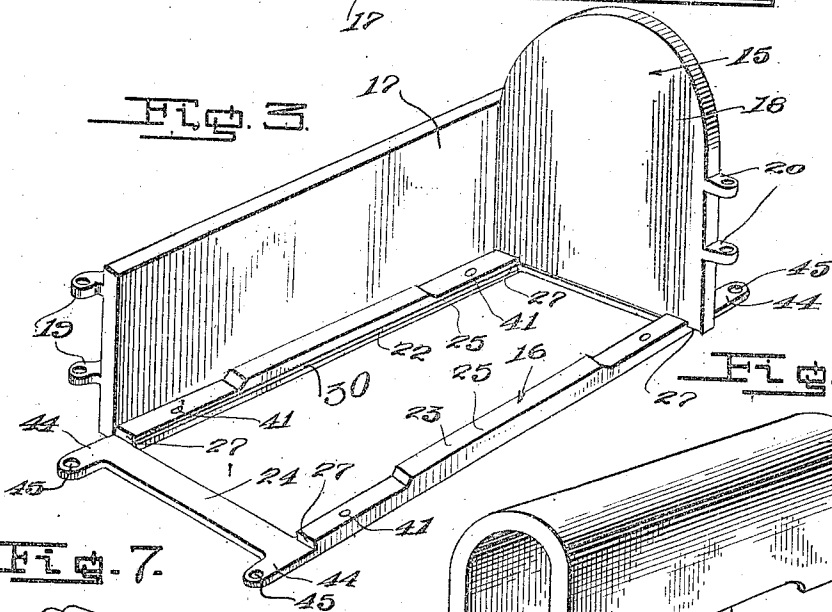


Fig. 4.

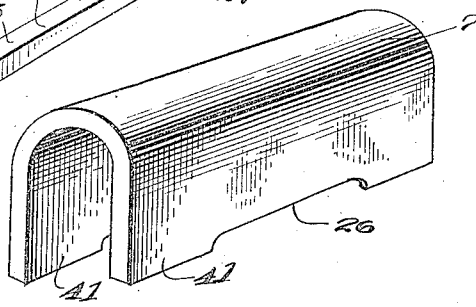
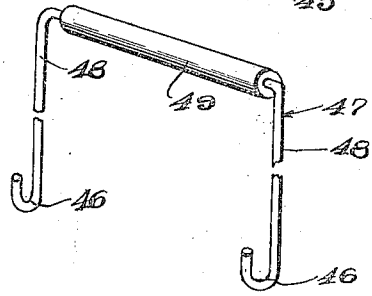


Fig. 7.



Inventor  
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# UNITED STATES PATENT OFFICE.

LEO H. HOUCK, OF WENATCHEE, WASHINGTON.

MACHINE FOR FORMING CONCRETE CONDUITS.

1,302,370.

Specification of Letters Patent. Patented Apr. 29, 1919.

Application filed July 2, 1918. Serial No. 243,063.

*To all whom it may concern:*

Be it known that I, LEO H. HOUCK, a citizen of the United States, and a resident of Wenatchee, in the county of Chelan and State of Washington, have invented certain new and useful Improvements in Machines for Forming Concrete Conduits, of which the following is a specification.

This invention relates to a machine particularly designed for forming conduits of cementitious material and an object of the invention is to provide a machine of this nature comprising a vertically movable core which is foot operated through the medium of a pivotally mounted lever for shaping the interior of a conduit.

A further object of the invention is to provide a mold for use in connection with the vertically movable core or plunger which comprises a rectangular base having side and end walls associated therewith, in such manner that after the conduit has been formed these side and end walls may be removed from about the conduit while the latter is in its "green" state, and also to provide carrying hooks which may be connected to the base of the mold structure for carrying the base together with the "green" conduit section, to a suitable dry shed or house, thereby providing a machine as specified wherein only one mold is necessary, dispensing with the necessity of the provision of a plurality of molds and eliminating the expense contingent with the same as well as providing a machine which is simple in construction, durable, and one which can be manufactured at a relatively small cost, and by means of which sectional concrete conduits may be manufactured at a minimum expense.

Another object of the invention is to provide an adjustable support for carrying or supporting bracing rods which are embedded in the conduit, upon formation thereof, forming reinforcements for the concrete conduits and also providing means for connecting various sections of the conduit to form a continuous conduit when in use.

A still further object of the invention is to provide a false core which is detachably carried by the base structure of the mold, and engages the inner surface of the conduit section, for bracing the same, during the hardening of the latter.

Other objects of the invention will appear in the following detailed description, taken

in connection with the accompanying drawing, forming a part of this specification, and in which drawing:

Figure 1 is a vertical section through the machine showing the form in place and illustrating a concrete conduit section therein.

Fig. 2 is a top plan view of the machine.

Fig. 3 is a fragmentary perspective view of the frame or mold.

Fig. 4 is a perspective view of the finished product.

Fig. 5 is a side elevation of a plurality of the conduit sections connected to form a conduit.

Fig. 6 is a vertical section on the line 6—6 of Fig. 5.

Fig. 7 is a perspective view of a carrying handle used in connection with the removable base of the mold.

Referring more particularly to the drawing, 1 designates the supporting structure of the machine, as an entirety which structure comprises a table 2 supported by suitable legs 3 and provided with a centrally disposed longitudinally extending opening 4. The core 6 of the machine is shaped to conform to the inner configuration of the conduit sections, one of which is illustrated at 7 in Fig. 1 of the drawing and which conduit sections are arch-shaped, when completed as illustrated in Fig. 4 of the drawing. The core 6 has a base or bottom portion 8 to which a vertical operating arm 9 is attached in any suitable manner. The arm 9 is connected, by means of a pin and slot connection as at 10 to a lever 11. The lever 11 is pivotally supported at 12 upon a suitable bracket 13 carried by one of the supporting legs 3 and its operating end 14 projects outwardly beyond the supporting structure 1 of the machine so that it may be conveniently reached and operated by the foot of the operator.

The mold structure which is generically indicated by the numeral 15 is placed upon the upper surface of the table 2 and it comprises a base 16 and sides and ends 17 and 18 respectively. The sides 17 are provided with outwardly extending offset hinge sections 19 at their ends which are provided for co-action with ears or hinge sections 20 formed upon the ends 18, to pivotally connect the sides 17 and the ends 18. One of the sides 17 is connected to one of the ends 18 through the medium of the ears 19 and 20 and a removable pin 21, to permit dis-

connection of this side and end to allow the removal of the sides and ends of the form 15 from about a molded conduit section. The sides 17 terminate at the beginning of the curvature of the upper portion of the conduit section, as clearly shown in Fig. 1 of the drawing and the ends 18 are provided with arcuate portions which extend above the upper edges of the sides to act as guides in the formation of the outer surface of the curved portions of the conduit sections.

The base 16 comprises side rails 22 and 23 which are connected near their ends by cross bars 24. The side rails 22 and 23 are provided with relatively thick central portions 25 which form indents or cut-out portions 26 in the lower edges of the conduit sections 7 and with shoulders 27 near their ends against which shoulders the end plates 18 of the mold structure abut when they are positioned properly about the base frame 16.

The side rails 22 and 23 of the base frame structure are provided with longitudinally extending grooves 30 in their inner sides which grooves receive the interned lower edges 31 of a false core 32. The false core 32 is constructed of relatively thin sheet metal and is shaped to snugly fit about the outer surface of the core 6. This false core 32 is provided for supporting the "green" conduit section, after it has been formed, and until it becomes "set" or hardened after which it may be easily removed by bringing the lower ends thereof inwardly toward each other to remove their angled portions 31 from the longitudinal grooves 30 which are formed in the side rails 22 and 23.

The table top has a reinforcing rod supporting structure 34 carried thereby which comprises a pair of depending plates 35, having their inner faces flush with the walls of the opening 4 and they form guides for the movement of the core 6. The depending plates 35 have angled plates 36 adjustably connected to their outer surfaces, by means of suitable screws 37 which are carried by the plates 35 and engage through slots 38 formed in the angled plate 36. The faces 39 of the angled plates 36 form supports for the lower end of the reinforcing rod 40. In Fig. 1 of the drawing, the reinforcing rod 40 is shown as being U-shaped, extending through suitable openings 41 formed in the side bars 22 and 23 of the base, and being embedded within the conduit section 7 when the latter is formed for reinforcing the same and also providing means for connecting a pair of the sections to form a conduit as shown in Fig. 5 of the drawing.

In Figs. 5 and 6 of the drawing, a modified form of the reinforcing and connecting rod are shown. In these figures the rods 40' are straight, one being inserted in each side

of the conduit section 7<sup>a</sup> and extend through openings 40<sup>a</sup> formed in the companion section of the conduit. The upper end of the rods 40' are threaded, and nuts 40<sup>b</sup> are mounted upon these threaded ends, clamping against shoulders which are formed in the section 7<sup>b</sup>, to accommodate the nuts and for connecting the various sections to form a conduit as shown in Fig. 5. When the various sections are connected to form a conduit, the depending portions 41 engage in the depression 26 of the companion section.

A spiral contractile spring 43 is connected to the inner end of the lever and to the support upon which the machine is mounted, for returning the lever to its normal downward position upon the release of pressure from the end 14 of the lever 11.

The base frame 16 has longitudinally extending ears 44 formed upon its ends which project short distances beyond the ends of the table 2. The ears 44 are provided with openings 45, for receiving the hooked ends 46 of the carrying handle structure 47. The carrying handle structure 47 comprises the leg portions 48 upon the lower ends of which the hooks 46 are formed and the hand grip 49.

In the formation of a conduit section of cementitious material, the mold, comprising the base frame 16, the sides 17 and ends 18 with the sides and ends in proper place about the frame, and carrying the false core 32 is positioned upon the table 2 and the core 6 is forced upwardly to the limit of its upward movement by the depression of the operating end 14 of the lever 11. After the core has been properly placed, the cementitious mixture, or concrete is placed within the space between the side boards 17, and boards 18 and the false core 32, shaping the side portions of the conduit sections and a quantity of the material is placed over the upper portion. A suitable tool, is then drawn over the top of the concrete, which scrapes off any surplus concrete not necessary for the proper formation of the conduit section and which also shapes the arch or curved portion of the section of conduit. After the conduit section has been properly formed, the removable pin 21 is removed from the opening in the various ears 19 and 20, and is withdrawn to permit the swinging movement of the ends 18 and sides 17 of the mold away from the formed conduit section. The core 6 is lowered by relieving pressure from the operating end 14 of the lever 11 and by the action of the spring 43 and a pair of the carrying hooks 47 are connected to the ends of the base frame 16 after which this frame is removed from the table 2 and carried to a suitable dry shed or place where the "green" conduit section remains while drying and setting or har-

dening. Suitable bars or strips 50 may be provided for limiting the downward movement of the core 6, if it is so desired.

From the foregoing description and drawing, it will be apparent that in forming concrete conduit sections, with the improved machine therein disclosed, it will be unnecessary to employ separate molds, it only being necessary to provide a number of the base sections 16 in relation with which the sides and ends 17 and 18 may be employed in the formation of the conduit section.

Having thus fully described the invention, what is claimed is:

1. In a machine for forming concrete conduit sections, the combination, of a supporting structure including a table provided with a centrally disposed opening, a mold comprising side and end walls resting upon said table about said opening, a vertically reciprocable plunger adapted for projection through said opening into said mold, said plunger having its upper portion curved and adapted for projection above the upper edges of the mold, the end walls of said mold projecting above the side walls and having their projecting portions shaped to conform to the curvature of the outer surface of said plunger.

2. In a machine for forming concrete conduit sections, the combination, of a supporting structure, a mold mounted upon said supporting structure and comprising a substantially rectangular base including side rails and cross braces, side plates for the mold, end plates hingedly connected to said side plates, and shoulders formed upon said base and adapted for engagement against the inner surfaces of said end plates and at their lower edges to regulate the position of the sides and ends of the mold with respect to the base.

3. In a machine for forming concrete conduit sections, the combination, of a supporting structure, a mold mounted upon said supporting structure and comprising a substantially rectangular base including side rails and cross braces, side plates for the mold, end plates hingedly connected to said side plates, and shoulders formed upon said base and adapted for engagement against the inner surfaces of said end plates and at their lower edges to regulate the position of the sides and ends of the mold with respect to the base, and perforated ears formed upon and projecting longitudinally from the end of said base.

4. In a machine for forming concrete conduit sections, the combination, of a supporting structure, a mold mounted upon said supporting structure and comprising a substantially rectangular base including side rails and cross braces, side plates for the mold, end plates hingedly connected to said

side plates, shoulders formed upon said base and adapted for engagement against the inner surfaces of said mold and at their lower edges to regulate the position of the sides and ends of the mold with respect to the base, perforated ears formed upon and projecting longitudinally from the end of said base, a vertically reciprocable plunger for projection into said mold, said plunger having its outermost surface rounded and adapted to extend above the outer edges of the sides of the mold, the upper portions of the ends of the mold being shaped to conform to the curvature of the outer surface of the plunger.

5. In a machine for forming concrete conduit sections, the combination, of a supporting structure including a table provided with a centrally disposed opening, a mold resting upon said table about said opening, a vertically reciprocable plunger adapted for projection through said opening into said mold, said plunger having its upper portion convexly curved and adapted for projection above the upper edges of the mold, said mold comprising a base and pivotally connected sides removably mounted about said base, said base including side rails having longitudinally extending grooves in their inner surfaces, a false mold, right angularly disposed flanges formed along the edge of said false mold and seated in said grooves for detachably connecting the false mold to the base of the mold.

6. In a machine for forming concrete conduit sections, the combination, of a supporting structure including a table provided with a centrally disposed opening, a mold resting upon said table about said opening, a vertically reciprocable plunger adapted for projection through said opening into said mold, said plunger having its upper portion convexly curved and adapted for projection above the upper edges of the mold, said mold comprising a base and pivotally connected sides removably mounted about said base, said base including side rails having longitudinally extending grooves in their inner surfaces, a false mold, right angularly disposed flanges formed along the edge of said false mold and seated in said grooves for detachably connecting the false mold to the base of the mold, and a pair of adjustable reinforcing bar supports attached to and depending from said table, said support forming guides for the vertical movement of said core.

7. In a machine for forming cementitious conduit sections, the combination, of a supporting structure, a mold carried by said supporting structure and comprising a base, side walls, end walls pivotally connected to said side walls, one of said end walls being detachably connected to the adjacent end of one of the side walls to permit the removal

of the side and end walls from about a section formed in the mold, said base comprising side rails provided with longitudinally extending grooves in their inner faces, a false core, right angularly disposed flanges formed along the base faces of said false core and removably seated in the grooves formed in said side rails.

8. In a machine for forming cementitious conduit sections, the combination, of a supporting structure, a mold carried by said supporting structure and comprising a base, side walls, end walls pivotally connected to said side walls, one of said end walls being detachably connected to the adjacent end of one of said side walls to permit removal of the side and end walls from about a section formed in the mold, said base including side bars provided with longitudinally extending grooves in their inner faces, a false core formed of sheet metal and bent substantially arch-shaped, right angularly disposed flanges formed along the edges of the base portions of said false core and seated in said grooves for detachably connecting the false core to the base, and a reciprocable plunger adapted for projection into said false core.

9. In a machine for forming cementitious conduit sections, the combination, of a supporting structure, a mold carried by said supporting structure and comprising a base, side walls, end walls pivotally connected to said side walls, one of said end walls being detachably connected to the adjacent end of one of said side walls to permit removal of the side and end walls from about a section formed in the mold, said base including side bars provided with longitudinally extending grooves in their inner faces, a false core formed of sheet metal and bent substantially arch-shaped, right angularly disposed flanges formed along the edges of the base portions of said false core and seated in said grooves for detachably connecting the false core to the base, and a reciprocable plunger adapted for projection into said false core, a pair of adjustable reinforcing rod supports carried by and depending from said supporting structure and adapted to form guides for said plunger.

10. In a machine for forming cementitious conduit sections, the combination, of a supporting structure including a table provided with an opening therein, a mold mounted upon said table about said opening and comprising a substantially rectangular base including side rails and cross braces, side plates for the mold, end plates hingedly connected to said side plates, shoulders formed upon said base and adapted for engagement against the inner surfaces of said mold at their lower edges to regulate the position of the sides and ends of the mold with respect to the base, said side rails provided with longitudinally extending grooves, a

false core constructed of sheet metal and substantially arch-shaped, and right angularly disposed flanges formed along the base portions of said false core and seated in the grooves in said side rails to detachably connect the false core to the mold base.

11. In a machine for forming cementitious conduit sections, the combination, of a supporting structure including a table provided with an opening therein, a mold mounted upon said table about said opening and comprising a substantially rectangular base including side rails and cross braces, side plates for the mold, end plates hingedly connected to said side plates, shoulders formed upon said base and adapted for engagement against the inner surfaces of said mold at their lower edges to regulate the position of the sides and ends of the mold with respect to the base, said side rails provided with longitudinally extending grooves, a false core constructed of sheet metal and substantially arch-shaped, right angularly disposed flanges formed along the base portions of said false core and seated in the grooves in said side rails to detachably connect the false core to the mold base, and a pair of adjustable reinforcing rod supports attached and depending from said table upon each side of said opening adapted to support reinforcing rods for embedding in a cementitious conduit section formed in said mold.

12. In a machine for forming concrete conduit sections, the combination, of a supporting structure including a table provided with a centrally disposed opening, a mold resting upon said table about said opening, a vertically reciprocable plunger adapted for projection through said opening, said mold comprising a base and sides removably mounted about the base, said base including side rails having longitudinally extending grooves in their inner surfaces, a false mold, right angularly disposed flanges formed along the edges of said false mold and seated in said grooves for detachably connecting the false mold to the base of the mold structure.

13. In a machine for forming cementitious conduit sections, a mold comprising a base and sides removably mounted about said base, said base including side rails having longitudinally extending grooves in their inner surfaces, a false mold, right angularly disposed flanges formed along the edges of said false mold and seated in said grooves for detachably connecting the false mold to the base of the mold structure.

14. In a machine for forming cementitious conduit sections, the combination, of a supporting structure including a table provided with a centrally disposed opening, a mold resting upon said table about said opening, a vertically reciprocable plunger adapted for projection through said opening into said mold, a false mold, means for connecting

said false mold to said first named mold, and a pair of adjustable reinforcing wire supports attached to and depending from said table, said supports forming guides for the vertical movement of said core. 15

5 15. In a concrete conduit forming machine, the combination, of a supporting structure including a table provided with a centrally disposed opening, a mold resting upon said table about said opening, a vertically reciprocable plunger adapted for projection through said opening into said mold, a false mold, means for connecting the false mold to said first named mold. 20

LEO H. HOUCK.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."