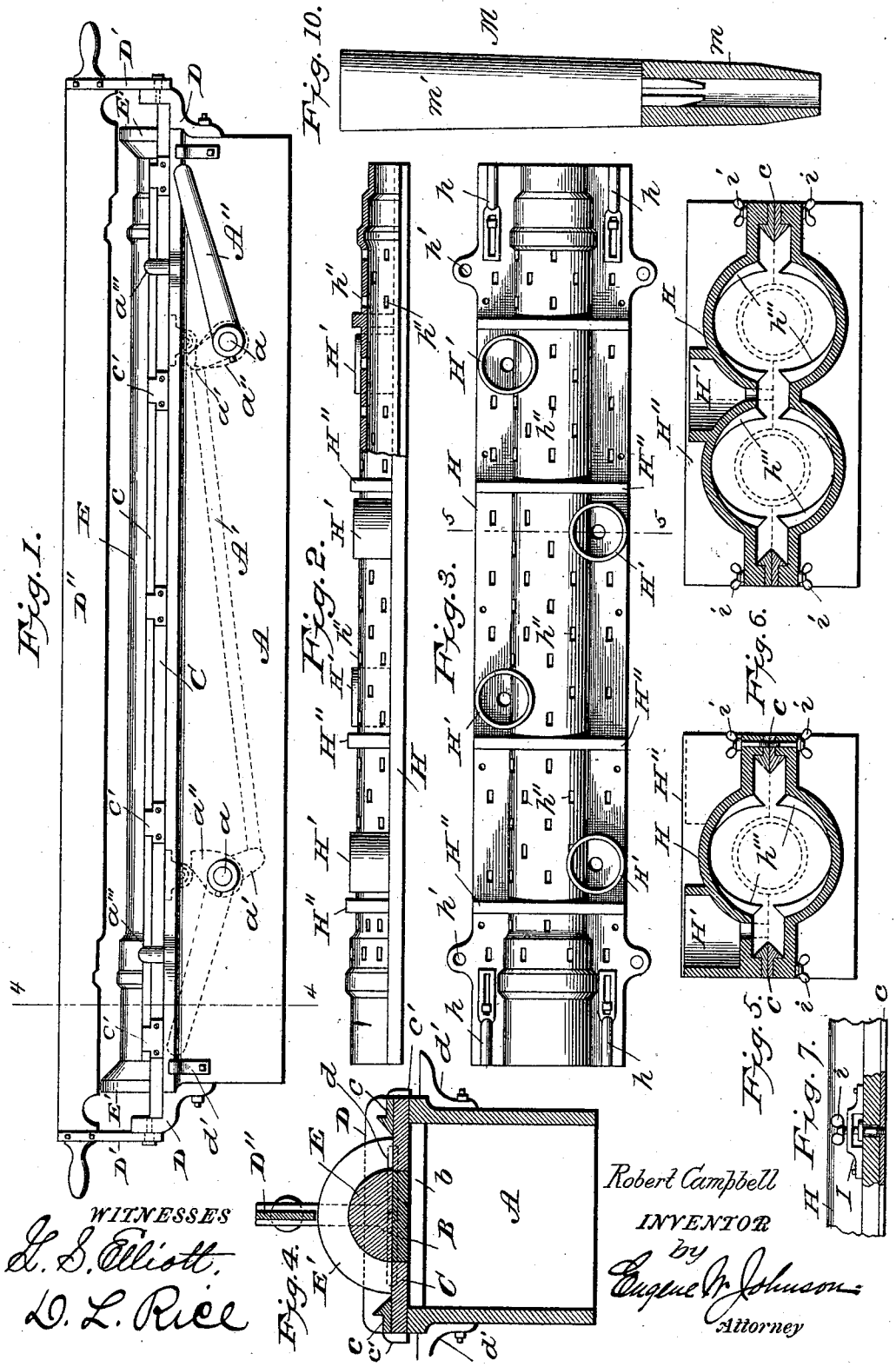
(No Model.) 2 Sheets—Sheet 1.

R. CAMPBELL.

APPARATUS FOR MANUFACTURING SOIL PIPES.

No. 590,823. Patented Sept. 28, 1897.



WITNESSES
L. S. Elliott.
D. L. Rice

Robert Campbell
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THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

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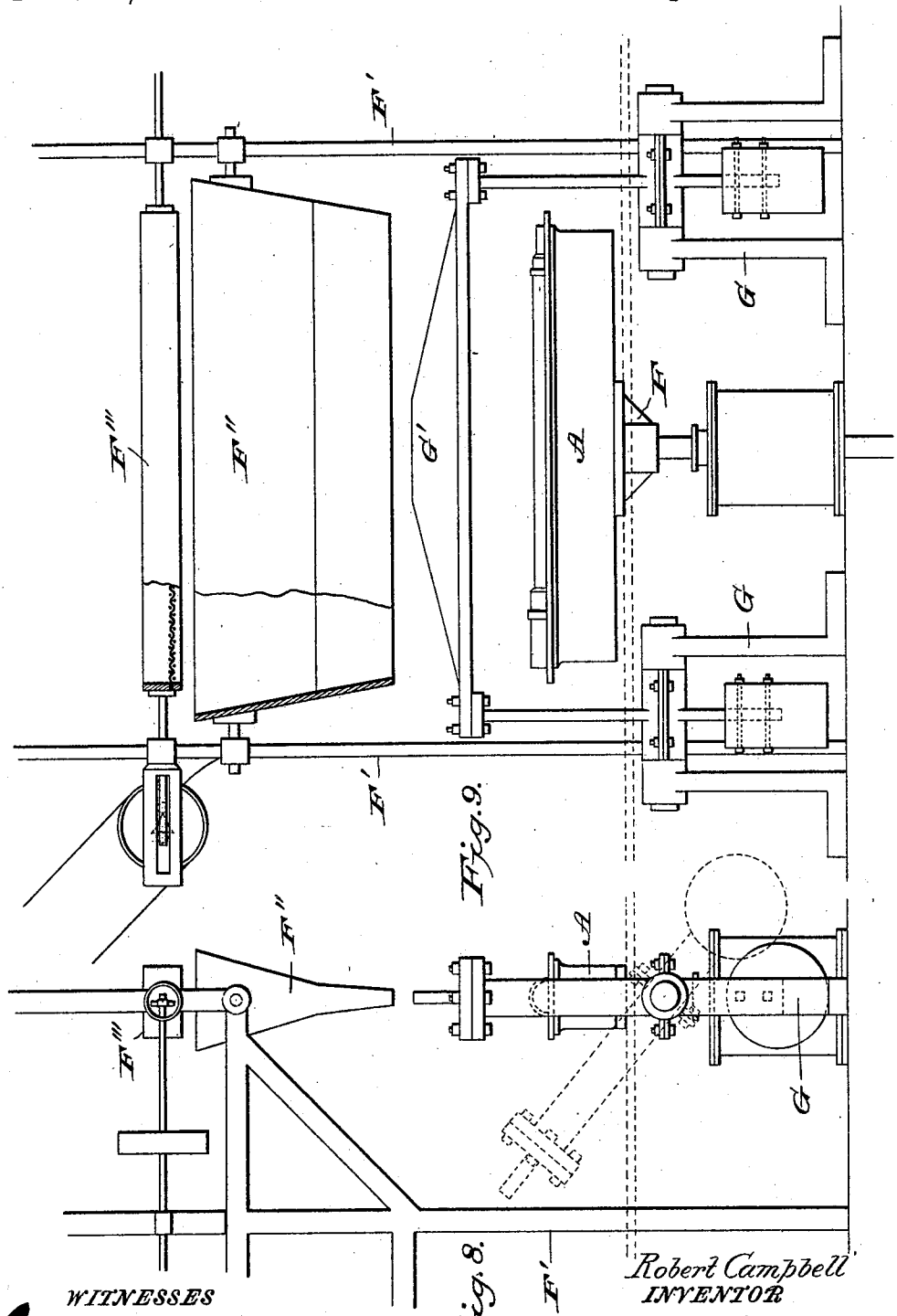


Fig. 9.

Fig. 8.

WITNESSES

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UNITED STATES PATENT OFFICE.

ROBERT CAMPBELL, OF GADSDEN, ALABAMA, ASSIGNOR OF ONE-HALF TO WILLIAM H. WELLER, OF SAME PLACE.

APPARATUS FOR MANUFACTURING SOIL-PIPES.

SPECIFICATION forming part of Letters Patent No. 590,823, dated September 28, 1897.

Application filed February 4, 1897. Serial No. 622,020. (No model.)

To all whom it may concern:

Be it known that I, ROBERT CAMPBELL, a citizen of the United States of America, residing at Gadsden, in the county of Etowah and State of Alabama, have invented certain new and useful Improvements in Apparatus for the Manufacture of Soil-Pipes; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to letters of reference marked thereon, which form a part of this specification.

This invention relates to an improved apparatus for the manufacture of cast-metal soil-pipes or analogous hollow ware which can be cast in flasks supported in a horizontal position.

One of the objects of my invention is to dispense as far as possible with hand-labor, such as shoveling, sifting, and ramming the sand, and also with skilled labor in forming the mold and substitute therefor mechanical devices which operate to deliver the sand upon the pattern, shape it thereon by a mechanically-guided strike, after which the sand is compressed to form a section of the mold, the means employed being for the purpose of manufacturing cast-metal soil-pipes from green-sand molds.

My invention, with the above ends in view, relates to means for preparing green-sand molds for casting purposes, which will be compressed so as to produce a mold-body in which the sand is of uniform density throughout.

In the accompanying drawings, Figure 1 is a side elevation of the pattern-frame, showing the pattern upon its support, movable bed-plate, operating mechanism therefor, and the sand-strike. Fig. 2 is a side elevation, partly in section, of the cope or upper section of the casing or flask. Fig. 3 is a plan view of the flask. Fig. 4 is a vertical sectional view taken through the line 4 4 of Fig. 1. Fig. 5 is a sectional view taken through the line 5 5 of Fig. 3. Fig. 6 is a vertical sectional view showing a flask or casing for molding two pipes. Fig. 7 is a detail sectional view showing the set-screws which connect the sand-strips to the casings or flasks. Fig. 8 is a side elevation showing means for delivering sand to the mold and compressing the same upon the pattern. Fig. 9 is a front elevation of such mechanism; and Fig. 10 is a side elevation, partly in section, of the gate-pin.

In the accompanying drawings, A refers to the pattern-frame, the construction of which is modified to meet the requirements of the compressor, said pattern-frame and the parts carried thereby, with the exception of certain novel features, being shown and described in my patent dated July 18, 1893, No. 501,824.

The frame A carries shafts a, having arms a', connecting-rods A', cams a'', and operating-handles A'', which are connected to the shafts.

B refers to the pattern-support, to which the pattern is secured, said support being rigidly attached to cross-bars b, which are connected to the frame, and said pattern-support lies in an opening in a movable bed-plate C, which when lowered rests upon the upper edge of the frame A, said frame having upwardly-projecting guide-pins a''' for engagement with guide-openings in the flask.

D refers to brackets, which are carried by the ends of the frame and are provided with horizontal slots d for engagement with bolts or pins carried by arms D', to which the said strike D'' is secured, said holder or strike having adjacent to its ends projecting handles, as shown. The frame A also carries suitable brackets d', which serve as supports for the strike when lowered.

Upon the longitudinal upper edges of the movable bed-plate C are positioned sand-strips c, the edges thereof adjacent to the pattern-support being beveled, so as to provide vertical shoulders which serve as guides for the flask, and the movable bed-plate has upwardly-projecting lugs c', against which the outer edges of said strips abut.

The pattern E is attached to the fixed pattern-support B in any suitable manner, and said pattern carries at its ends guides E' for the strike, which guides may be a part of the movable bed-plate or attached thereto. The lower edge of the sand-strike conforms to the contour of the pattern and is held so that it

is about one inch and a half above the pattern to provide a mold, which before it is compressed is of that thickness throughout.

The movable bed-plate C is provided with perforations or holes, which are positioned to correspond with the openings in the gate-pockets of the cope, and these perforations are adapted to receive the lower hollow section of the gate-pin. (Shown in Fig. 10.)

In making a mold with the parts of my improved molding-machine hereinbefore described I use an apparatus which embodies a table or support F for the pattern-frame A, which when lowered is positioned slightly above the floor-line, and it is suitably connected with mechanical means for raising and lowering, which means may be a cylinder with piston and piston-rod, the cylinder being connected with a source of power, either steam, water, or compressed air.

F′ refers to supports, which carry an oscillating hopper F″, which has its delivery in a vertical line with the pattern and a considerable distance above the same, so that the sand will fall with sufficient impact on the pattern. Above the hopper there is located a sand screen or sifter F‴, into which the sand is delivered, preferably, by an endless carrier of any suitable construction. The sifter can be provided with a stirrer or it can be reciprocated by any suitable mechanism.

Below the floor of the foundry, and preferably on each side of the cylinder, are supports G G, and between each pair of supports are journaled trunnions, having depending arms which carry heavy counterweights, and upwardly-projecting-arms to which are bolted the press-head G′, such construction providing means for moving the press-head out of line with the pattern when it is desired to deposit sand thereon, its position when out of line with the pattern being shown in dotted lines in Fig. 8.

In connection with the appliances hereinbefore described for use in the manufacture of soil-pipe, flasks of ordinary construction are not applicable, and the improved flask which I use in carrying out my invention consists of a cope and drag of novel construction, which may be termed a "compression-casing." The cope H, or upper part thereof, is similar in construction to the drag, the only substantial difference being that the cope has gate-pockets, so that the same description and reference-letters are applicable to each part, and it is only necessary to describe the construction of the cope, in which H′ refers to the gate-pockets, and *h* the handles, which are connected to the ends of the cope, so that they can be moved inwardly when not in use, they being connected to the cope by bolts which pass through slots in the handles, the outer ends of the handles being rounded to provide grasping portions, while the inner ends are flattened, said flattened portions having the slots formed therein.

H″ refers to transverse ribs, which extend across the cope and are slightly higher than the gate-pockets. Projections with perforations *h′* are also provided for engagement with the guide-pins *a‴* in the bed-plate.

h″ refers to the vent-holes in the flask, which provide for the escape of gas from the green sand in casting.

The cope and drag of the compression casing or flask are provided with sand-ribs *h‴*, which are positioned so as to be about four inches from each other and materially assist in holding the sand in place when the flask is lifted away from the pattern. Perforations are also provided adjacent to the longitudinal edges, through which pass set-screws *i* of less diameter than the perforations, said set-screws being retained in place by means of plates I, through which the upper ends of the screws pass, and beneath said plates the screws carry collars. The sand-strips *c* have beveled edges and vertical shoulders, which shoulders abut against the depending portion of the lower edge of the cope and upwardly-projecting portion of the drag, the planed edges of said strips abutting when the parts of the flask are brought together, and are retained in place by the set-screws. Sufficient movement is provided for by the loosely-fitting set-screws to allow for expansion and contraction of the strips with relation to the flask.

If desirable, a double flask, as illustrated in Fig. 6, may be used.

The gate-pin M (shown in Fig. 10 of the drawings) is in two parts, and the lower member *m* being hollow and of such relative size that when placed in the holes therefor in the bed-plate it will not project above the upper surface of the sand, and before compressing the sand the upper member *m′* thereof is placed in the opening at the base of the gate-pocket, said pocket being then filled with sand. After compression and prior to casting both parts of the pin may be removed as one piece, so as to leave a gate or way for the passage of the metal, which connects with channels which are formed in the usual manner.

By providing a gate-pin having a hollow lower section the sand that may find its way into the hollow portion of the pin is not compressed, so that no material resistance is offered to the insertion of the dowel which is formed on the upper part of the pin.

The cores are made and set in the usual manner, and when the lower half or drag of the mold is completed and set in its place in the molding-room the core or cores are then set in that part of the mold, and the top half is then molded and placed thereon.

In operation the pattern-frame, which is secured to a power-operated and vertically-movable table, is lowered so as to be positioned at a suitable distance above the floor-level, the press-head being swung to one side and secured, so as to be out of line with the pattern and other parts carried by the frame.

Green sand properly prepared is then carried to the sieve and falls into the hopper and therefrom upon the pattern with considerable impact. As the sand falls the sand-strike is moved over the pattern, and when struck to the required form the strike is drawn along the slot and placed upon one of its supporting-brackets. Previous to letting sand fall on patterns and striking the sand the lower ends of the gate-pins have been placed in position in the movable bed-plate, as well as the sand-strips which rest upon the same. The next operation or step is to set one of the parts of the flask over the sand which is now on the pattern. The inner part of the flask touches the sand snugly throughout its entire length and is guided in place by the pins and lugs, which insure a direct vertical movement thereof. The upper sections of the gate-pins are placed in the gate-pockets, so that the split dowel-pins will engage with the hollow lower section thereof, the upper ends of which may be flush with the upper edge of the base of the gate-pockets, while the upper end is flush with the upper edge of said pockets, which are filled with sand before compression. The mold being ready, the pressing is accomplished by moving the press-head into a vertical position, when steam, water, compressed air, or other power suitably directed is employed to raise the pattern-frame. The braces or ribs of the casing or flask, contacting with the press-head, compress the sand one-half of an inch, more or less. Before compression the thickness of the sand is about one and one-half inches, the flask or drag then resting upon the sand-strips so as to abut against the lugs thereof. After compression of the mold the sand-strips are secured to the part of the flask by the set-screws and virtually become a part thereof and assist, with the sand-ribs, in holding the sand in the casing or flask.

To remove the mold and flask, the pattern-frame is lowered and the press-head swung out of line thereof. The handles connected to the shafts of the pattern-frame support are depressed, which operates the cams and throws them in contact with the rollers in the movable bed-plate, which is lifted, and separates the mold from the pattern more readily and effectively than can be done by the usual methods. The part of the flask, with the completed part of the pipe-mold, is then further moved by hand or otherwise and set in place in the molding-room and the casting done in the usual manner.

By this method of making pipe the art is greatly simplified and the cost of manufacture reduced. A better article is also furnished, as the molds are uniform.

The means herein described and illustrated are designed especially for use in the production of that style of cast-iron pipe which is styled in the trade "soil-pipe."

I do not wish to limit myself to any particular means of power for compression, as said feature of my improvement may be modified and many different styles of presses may be used, and when so used for the purpose set forth will be within the scope of my claims.

It is also obvious that changes may be made in the form of the flask without departing from the spirit of my invention.

The hopper F″ is swung loosely on trunnions, so that it may move backward or forward over the face of the patterns. The sand in falling from it will strike the pattern, beginning at one side and finishing at the opposite side, the sand-strike following the sand as it falls.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a molding apparatus, the combination with a pattern-frame having upwardly-projecting pins, a movable bed-plate with guide-lugs, a pattern carried by a pattern-support, of sand-strips which engage with the bed-plate and lugs thereof, a casing or section of a flask having side flanges with guide-openings through which the projecting pins of the pattern-frame pass, and means for connecting to the casing the sand-strips for the purpose set forth.

2. In a molding apparatus for forming green-sand molds in which the article is cast, the combination with the molding and compressing means substantially as shown, of a cope having a raised portion above the pattern and side flanges, said raised portion and side flanges having vent-holes, a series of transverse braces with straight upper edges and a series of gate-pockets the upper edges of which are disposed so as to be below the upper edges of the transverse braces for the purpose set forth.

3. In an apparatus for preparing green-sand molds, the combination with a vertically-movable pattern-support, a press-head supported so as to be swung in and out of line therewith, a pattern carried by the pattern-support, a sand-strike connected to the pattern-support and movable manually over the pattern, sand-strips carried by a bed-plate, the sections of the flask having a series of transverse braces with straight upper edges, and means for connecting the sand-strips to the edges of the section of the flask substantially as shown.

4. In a molding apparatus, the combination of a vertically-movable frame, a pattern carried thereby, a press-head mounted so as to be swung in or out of line with the pattern-support, a hopper mounted above the pattern-support and a sand-sifter above the hopper to provide means for delivering sand upon the pattern; together with a compression-casing which forms a part of a flask, said compression-casing having transverse braces for engagement with the press-head and projecting portions upon the edges thereof together with sand-strips which are carried by the bed-plate of the pattern-support and means for

connecting the aforesaid sand-strips to the compression-casing, substantially as shown and for the purpose set forth.

5. In combination with a pattern-frame having a movable bed-plate, and a fixed pattern-support, of a sand-strike carried by the frame, arms for guiding the same over the pattern, said arms being connected to the support to permit the strike being moved below and to one side of the bed-plate, substantially as shown.

6. In combination with a suitably-supported pattern-frame, a pattern carried thereby and provided with guides, of a sand-strike connected to the frame so as to be movable, pivotally and laterally, with respect to the pattern, and brackets attached to the frame to support the strike, substantially as shown.

7. The combination with a pattern-frame and pattern supported thereon, of a horizontally-slotted bracket; strike-holders which engage with said bracket and a strike pivotally carried by the holders, substantially as shown.

8. In combination with a frame having a fixed pattern-support, plates with horizontal slots secured to the end of the frame, and side projecting brackets, of a strike carried by holders which engage with the slots in the plates, substantially as shown and for the purpose set forth.

9. In a molding-machine, the combination of a fixed pattern-support, of a movable bed-plate provided with an opening for the pattern and having at intervals upwardly-projecting lugs, together with sand-strips carried by the bed-plate to one side of the pattern so that the outer edges thereof, will abut against the projecting lugs, substantially as shown.

10. In combination with a flask or compression-casing provided with side flanges having perforations therein, of set-screws carried loosely by said flanges together with sand-strips having threaded apertures with which the set-screws engage for the purpose set forth.

11. The combination with a compression-flask having a gate-pocket of a gate-pin constructed as shown, said pin having a tubular and longitudinally-tapered lower section, and an upper section which carries a spring-dowel for engagement with the bore of the lower section of the pin.

12. In an apparatus for molding soil-pipe, the combination with compressing mechanism upon which a pattern-frame and pattern are mounted, of a hopper and sieve positioned above the same, a press-head movable in and out of line with the pattern-frame, together with a sand-strike carried by the pattern-frame, a flask or compression-casing adapted to engage with the press-head, and means carried by the pattern-frame to raise the compression casing or flask and mold from the pattern, the parts being organized substantially as shown.

13. A cope or part of a compression-casing having a central convex portion and side flanges, each part having a series of vent-holes, a series of transverse braces with straight upper edges and gate-pockets between the braces, the upper edges of which are below the upper edges of the braces, the side flanges having depending portions on their under sides which form shoulders and means for connecting thereto sand-strips, having shoulders and beveled inner ends, the inner sides of the convex portions having sand-ribs which project on a line with the shoulders on the lower edge of the under sides of the casing, substantially as shown.

In testimony whereof I affix my signature in presence of two witnesses.

ROBERT CAMPBELL.

Witnesses:
O. R. GOLDMAN,
L. SMITH.