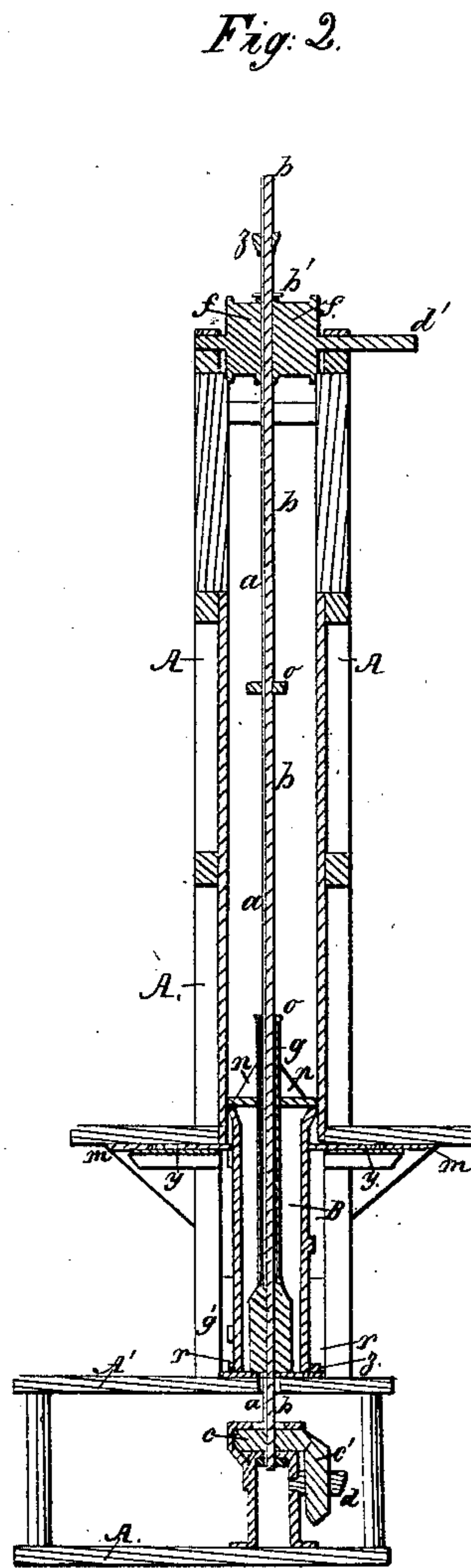
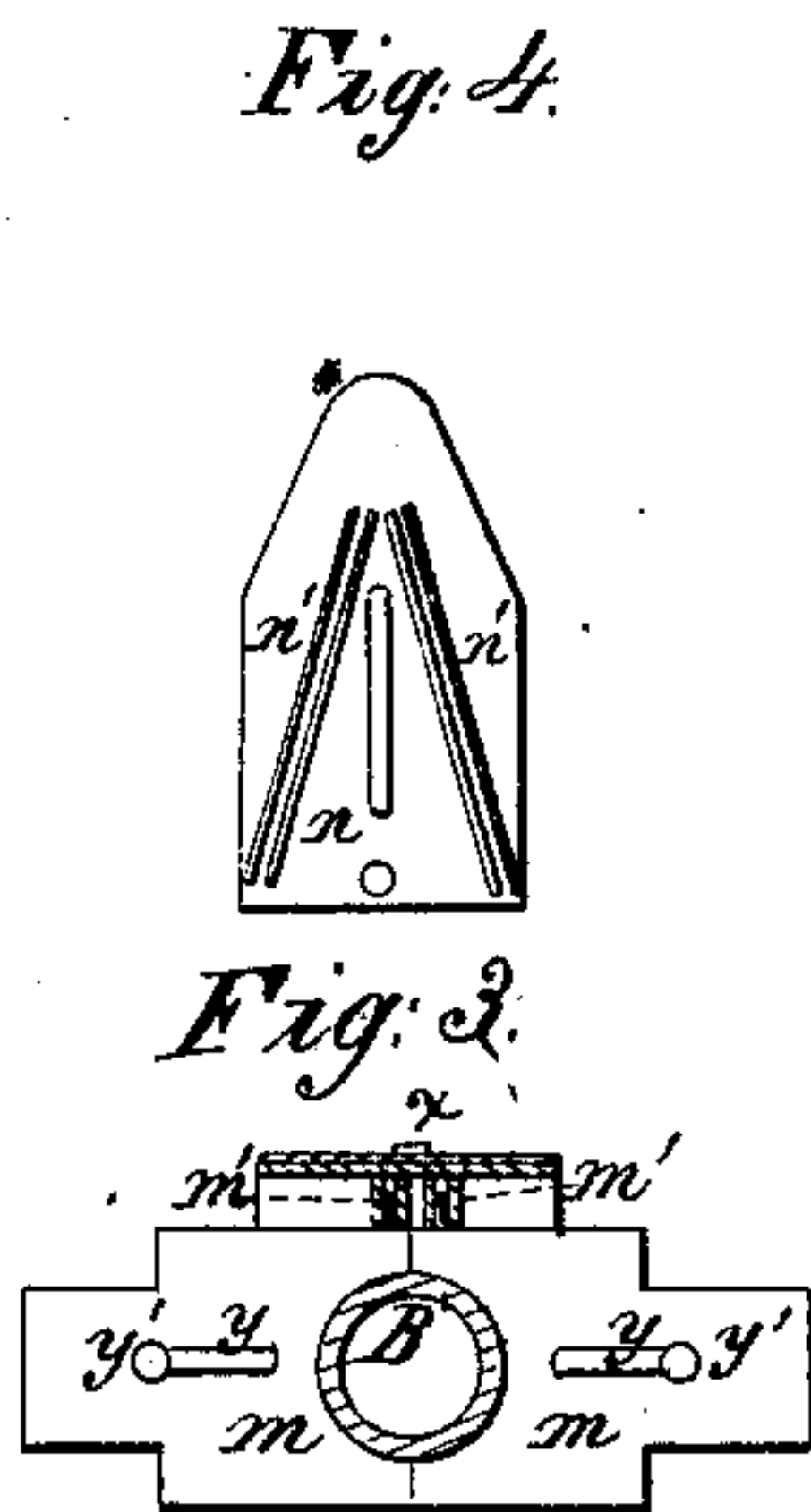
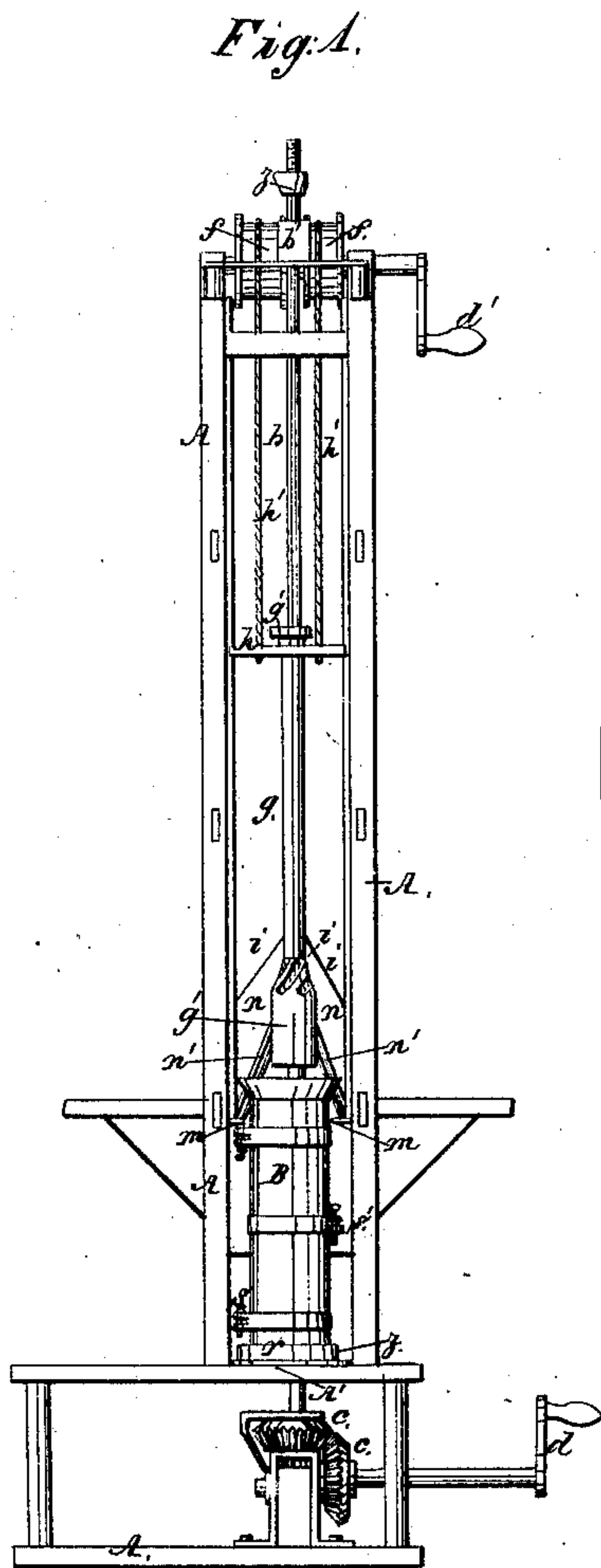


W. Smith,
Molding Pipe,
No. 69,854, *Patented Oct. 15, 1867.*



Witnesses:
W. D. Lewis
A. B. Cushing

Inventor:
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United States Patent Office.

WILLIAM SMITH, OF PITTSBURG, PENNSYLVANIA.

Letters Patent No. 69,854, dated October 15, 1867.

IMPROVED MACHINE FOR MOULDING PIPE.

The Schedule referred to in these Letters Patent and making part of the same.

TO ALL WHOM IT MAY CONCERN:

Be it known that I, WILLIAM SMITH, of the city of Pittsburg, in the county of Allegheny, and State of Pennsylvania, have invented a new and useful Improvement in Pipe-Moulding Machine; and I do hereby declare the following to be a full, clear, and exact description thereof, reference being had to the accompanying drawings, making a part of this specification, in which—

Figure 1 is a side elevation of my improved machine for making pipe-moulds,

Figure 2 is a vertical section thereof, and

Figures 3 and 4 show separate views of the devices by which the moulding flask is held in position.

Like letters of reference in the different figures indicate corresponding parts.

Moulds for casting metal pipe have heretofore been made chiefly by hand, by packing the sand in a flask and around a core, against which is formed the inner face of the mould. Such process is slow, tedious, and expensive, particularly in making moulds in lengths suitable for water pipe and other similar uses. The expensiveness of this mode of manufacture is still further increased by the difficulty of packing the sand uniformly on all sides and in all parts involving the employment of considerable skilled labor for that purpose.

The nature of my invention consists in the construction of devices by which to make such moulds, so as to obviate almost wholly the necessity of employing labor of any kind, and more particularly in making such moulds by a mechanical force acting outward from the axis of the proposed mould. The work of packing the sand and shaping the mould is by my invention done wholly by machinery.

To enable others skilled in the art to make and use my invention, I will proceed to describe the construction of the machine and its mode of operation.

A framework, A, of any desirable construction, contains and supports the devices employed, the lower end of the frame A to the height of the upper end of the flask B, usually being, for convenience sake, placed in a pit excavated in the ground. Running vertically from the upper to the lower end of the frame A, of such length as may be necessary, is a guiding-shaft, *b*, grooved at its lower end, and for the greater part or the whole of its length, as at *a*, fig. 2, its upper end passing loosely through a guide, *b'*, and adjusted at any desirable point by a nut, *z*, and its lower end passing loosely through the axis of a bevel gear-wheel, *c*, and so keyed thereto by a feather playing in the groove *a* as to revolve therewith, and at the same time play up and down, when desired, through the guide *b'*, as hereinafter to be described. The bevel gear-wheel *c* is operated by the gear-wheel *c'*, which receives motion from a crank, *d*, or by band or gear-wheel, or other similar known device, at pleasure. At the upper end of the frame A, and operating in the usual way, is a pair of revolving drums, *f*, which are operated by a crank, *d'*, or by band or gear-wheels, or are so geared to the corresponding devices *d* at the lower end of the frame A, that by power communicated to either they both receive the proper motions. On the shaft *b*, and keyed thereto by a feather working in the groove *a*, is a hollow shaft, *g*, operating as a sleeve, of length equal, or about equal, to the length of the mould to be made. Its lower end carries a packer, *g'*, of an exterior diameter equal to the interior diameter of the desired mould. The upper end of the packer *g'* is bevelled off to the shape of the frustum of a cone, and its conical face has a series of spiral grooves, *i*, running from the top downwards in a direction opposite to that of the revolving motion to be given to it. At the upper end of the hollow shaft *g* is a collar, *o*, by which, while resting on the cross-bar *h* through which the hollow shaft *g* passes, the latter is raised and lowered by means of pulley-ropes *h'* *h''* passing over and coiling around the drums *f*. An adjustable collar, *o'*, is attached to the guiding-shaft *b*, by which the shaft *b* is also raised and lowered in the same manner as is above described. B is a moulding-flask, made of any material usually employed for such purposes, and of any convenient shape, and in such a way as to be taken apart or opened for the purpose of removing the mould when made. As shown in the drawings, it is of cylindrical shape, is divided longitudinally, and its two halves fastened together by hinges *s* and eyes and bolt *s'*. It stands vertically on the floor A', or on a plate, *l*, attached thereto, by which, or in other convenient way, its lower end is partially or wholly closed so as to keep the sand when thrown into the flask from falling through. The upper end of the flask B I usually make of a hopper shape for convenience in filling. I hold the flask B steadily and firmly in position, and so that the guiding-shaft *b* shall pass along its axis by carefully centering its lower end inside an annular flange, *r*, on the plate *l*, by which or in other convenient way it is prevented from moving laterally, and

enclosing its upper end between sliding clamps m , a plan view of which is given in fig. 3. The inner ends of these clamps m are cut out so as to enclose tightly the flask B when pushed forward, as in figs. 2 and 3, and to release it when slid back, as in fig. 1. These clamps m operate in slides of suitable construction, and if necessary, in order to secure their direct action, are slotted as at y , and guided by projecting pins y' . At suitable points on either edge of both I attach lugs m' which play in inclined grooves $n'n'$ in the vertical slide n , an inner face view of which is given in fig. 4. Then by lowering the slide n , (the button x answering as a handle for that purpose,) the clamps m are made to enclose tightly the flask B, and by raising the slide n , the reverse. In this way I provide a convenient and effective device for holding the upper end of the flask B in its place while the mould is being made, and for releasing it when it is ready to be removed.

With the devices described, my mode of operation is as follows: The lower end of the guiding-shaft b being keyed in its seat in the gear-wheel c , and the hollow shaft g , with its packer g' , being lowered to the bottom of the flask B, which latter is carefully centred in the manner above set forth, I commence filling the sand for the mould into the flask B. As soon as a sufficient quantity is fed in to pack readily, I apply power to the crank d , which is communicated along to the shafts b and g and packer g' . The revolution of the packer g' in the sand forms the inner face of the mould, and gives it a smooth surface. Motion is also applied to the crank d' , whereby the hollow shaft g and its packer g' are slowly raised while revolving with the shaft b . The conical grooved head of the packer g' then acts as a wedge in forcing the sand, which is vertically above it, outward toward the walls of the flask B. In this way, that is, by a force pressing outward from the axis of the mould, I form a pipe-mould of any desirable length, of a smooth inner face, and of the required compactness. As soon as the packer g' has cleared the upper end of the flask B, the cross-bar h engages the collar o' , and carries the guiding-shaft b upwards till it also is clear of the flask. Then, the sliding clamps m being thrown back, the mould with its flask is removed to be baked or otherwise prepared for use, or used in the usual way.

I include in my invention the packer g' when its head or upper end has other shapes than that described. It may be of the shape of the frustum of a cone, as set forth, or of the frustum of a pyramid of any desirable number of sides, or it may be spherical, or of other convex, or even of a concave shape. The grooves i may extend down the inclined surface, either spirally, as described, or vertically, or, when the head is of pyramidal shape, may be slightly inclined on one or more of its faces. Projecting blades or flukes may take the place of the grooves i , and extend vertically, spirally, or obliquely down the face or faces of the head.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. A revolving packer, g' , tapering at or toward its upper end, and provided on the face or faces of such taper with grooves i , or projecting flukes in lieu thereof, constructed and operated substantially as and for the purposes hereinbefore set forth.
2. The revolving hollow shaft g carrying a packer, g' , in combination with the guiding-shaft b and flask B, arranged and operating substantially as and for the purposes above set forth.
3. The drums f , ropes h' , and cross-bar h , in combination with the collar o' , for the purpose of elevating the hollow shaft g while the mould is being formed, substantially as above set forth.
4. The gear-wheel c bored in the line of its axis for a seat for the guiding-shaft b , and keyed thereto, in combination with drums f , and the apparatus h and h' to engage the collar o' , for the purpose of imparting to the shaft b revolving and vertical motions, substantially as set forth.
5. The vertically moving slide n , with its converging grooves n' , in combination with the laterally moving clamps m having lugs m' arranged and operated substantially as described.

In testimony whereof I, the said WILLIAM SMITH, have hereunto set my hand.

WILLIAM SMITH.

Witnesses:

A. S. NICHOLSON,
G. H. CHRISTY.