

(No Model.)

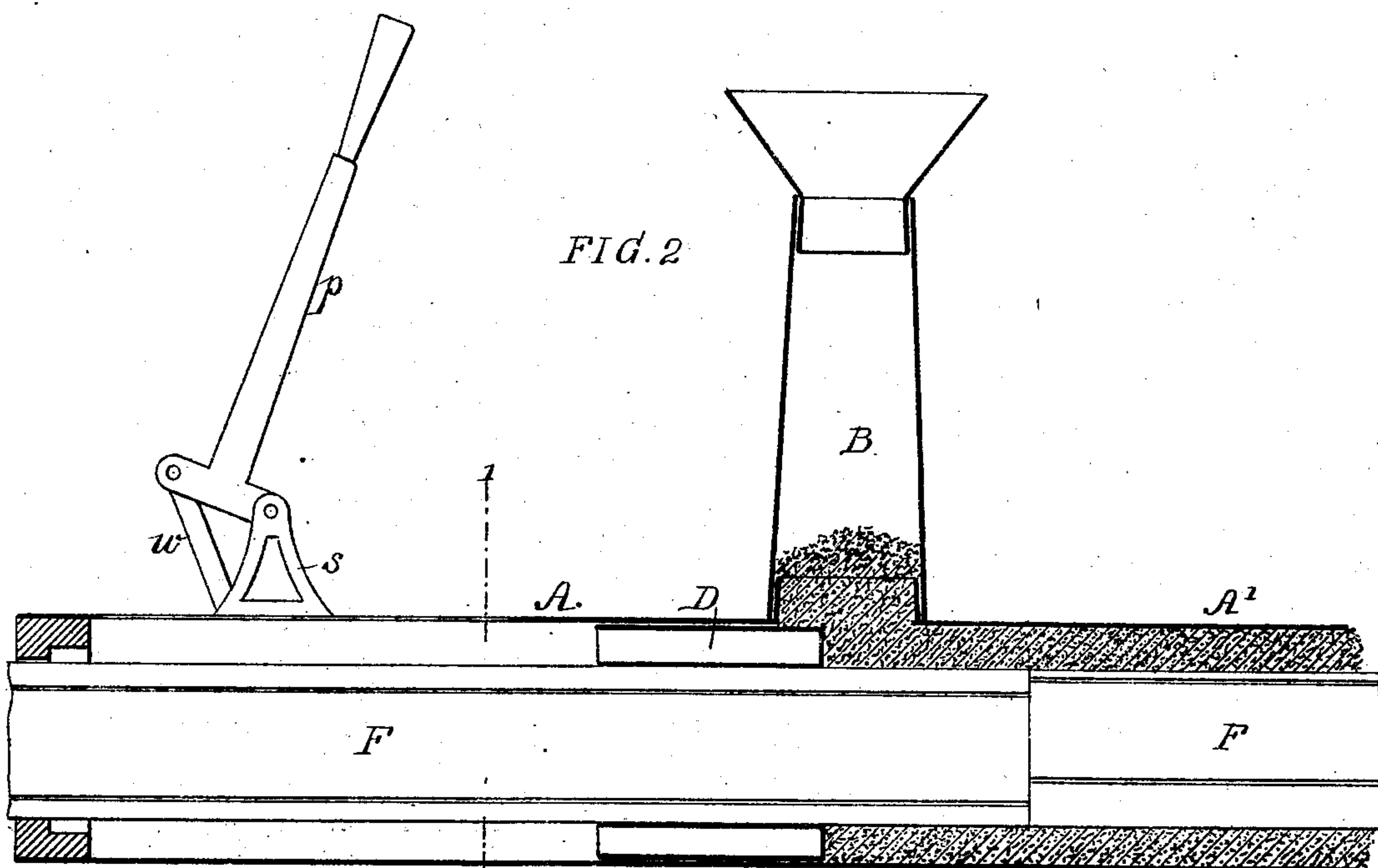
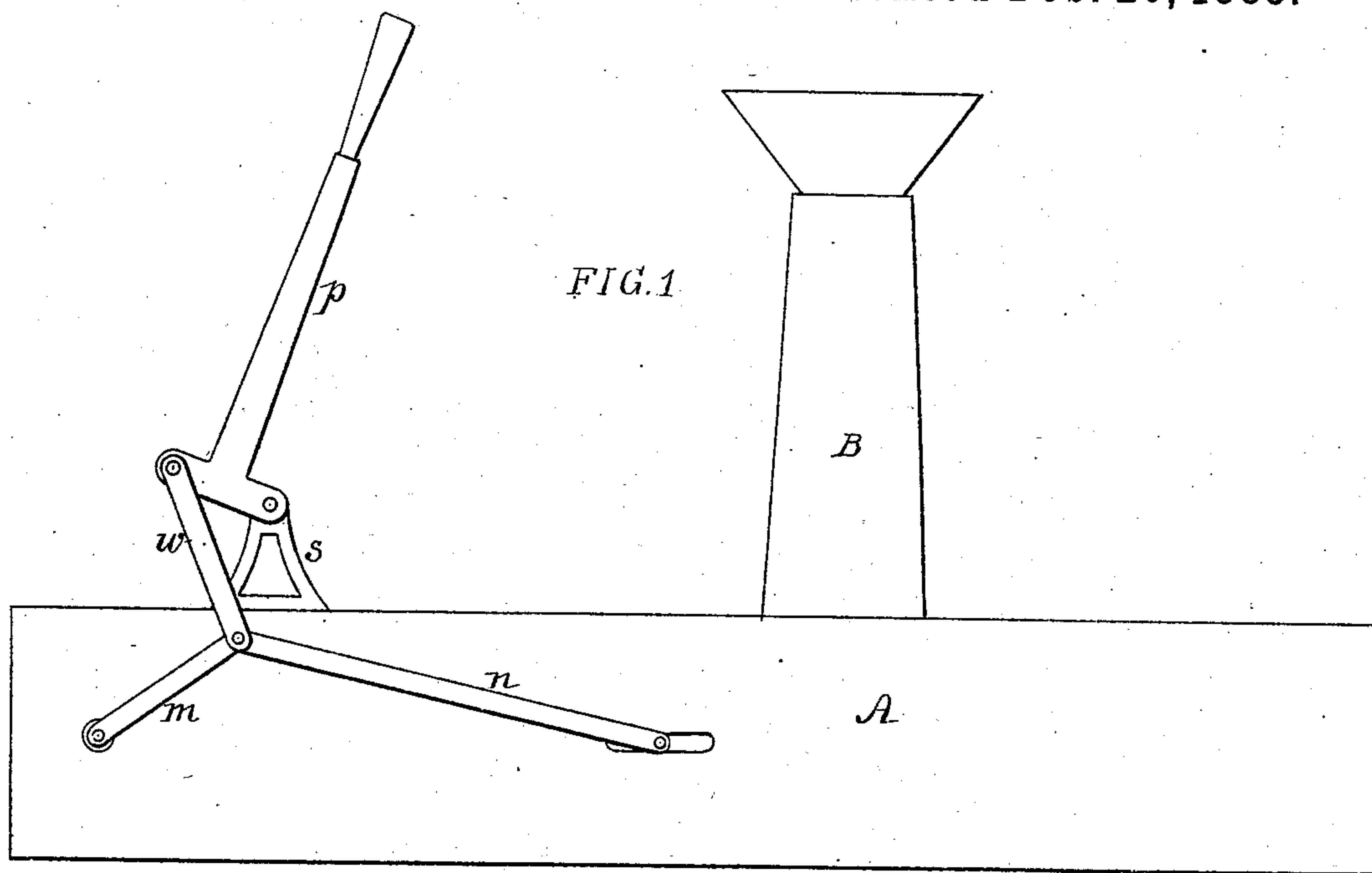
2 Sheets—Sheet 1.

W. M. CAMPBELL.

APPARATUS FOR FORMING CONTINUOUS CONDUITS OF CONCRETE.

No. 272,411.

Patented Feb. 20, 1883.



WITNESSES:

Jas. L. Skidmore,
E. D. Nottingham

INVENTOR:

William M. Campbell
by his attorneys
Howson and Sons

(No Model.)

2 Sheets—Sheet 2.

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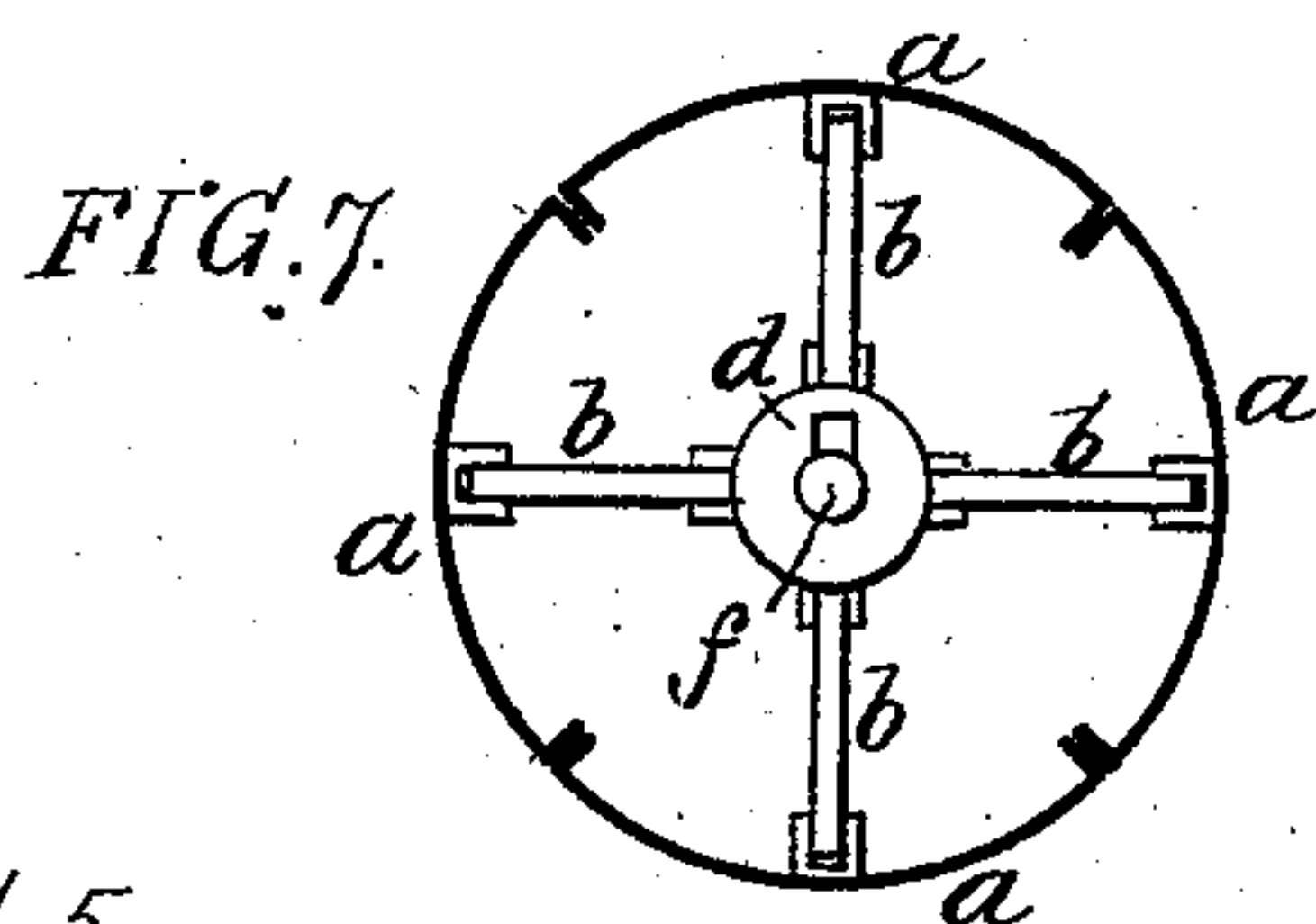
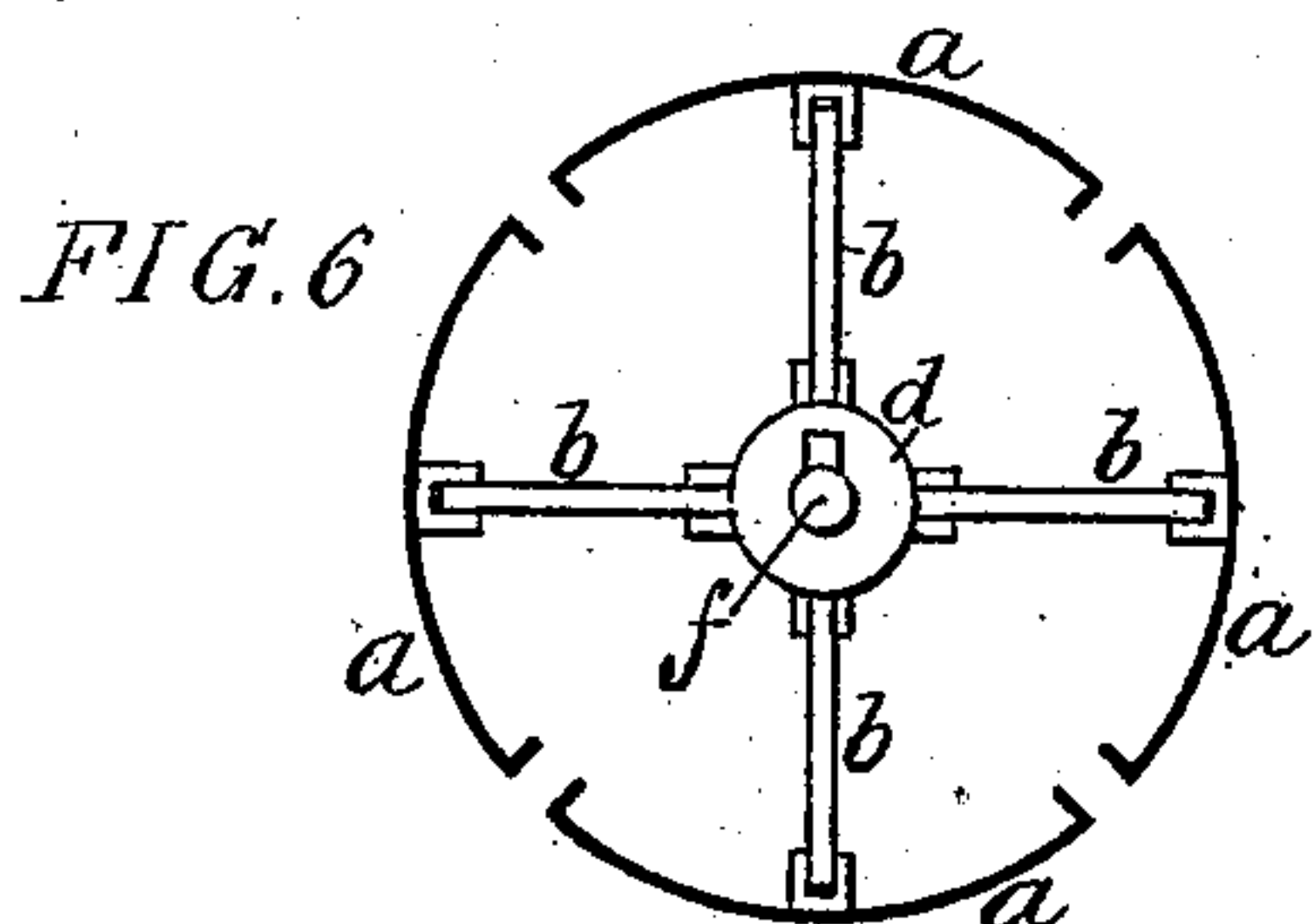
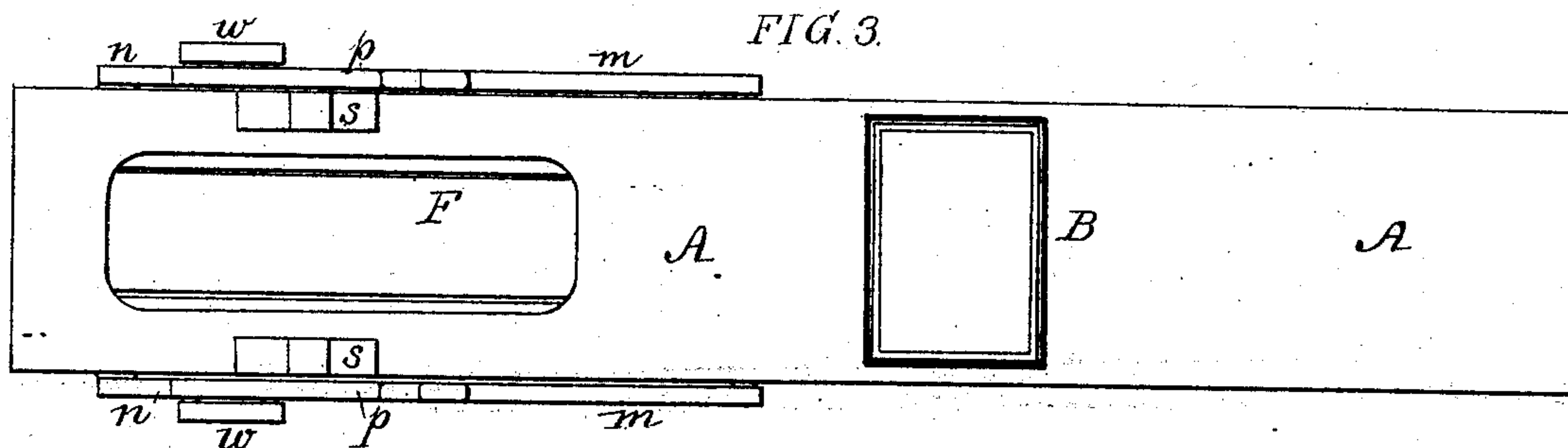
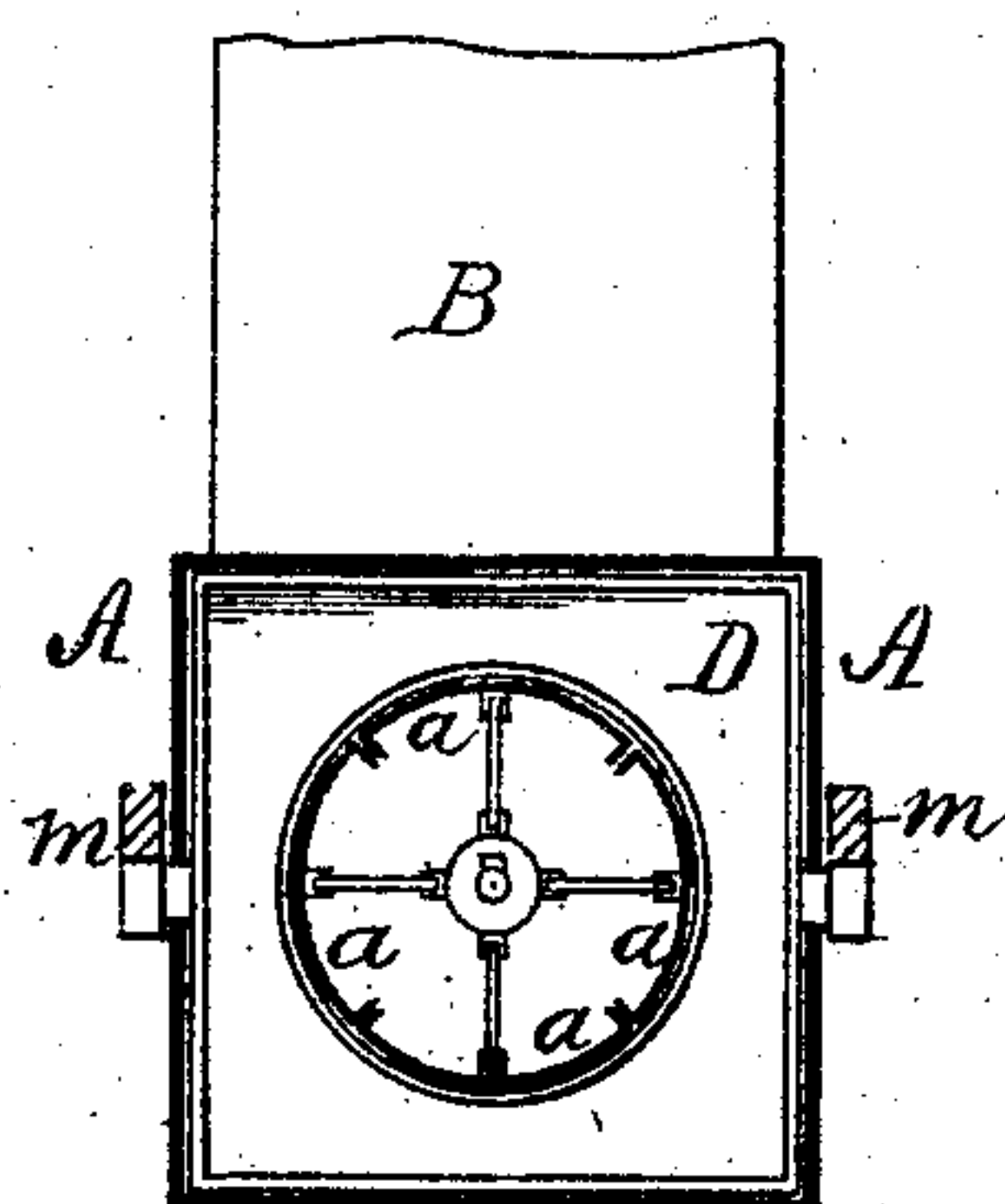
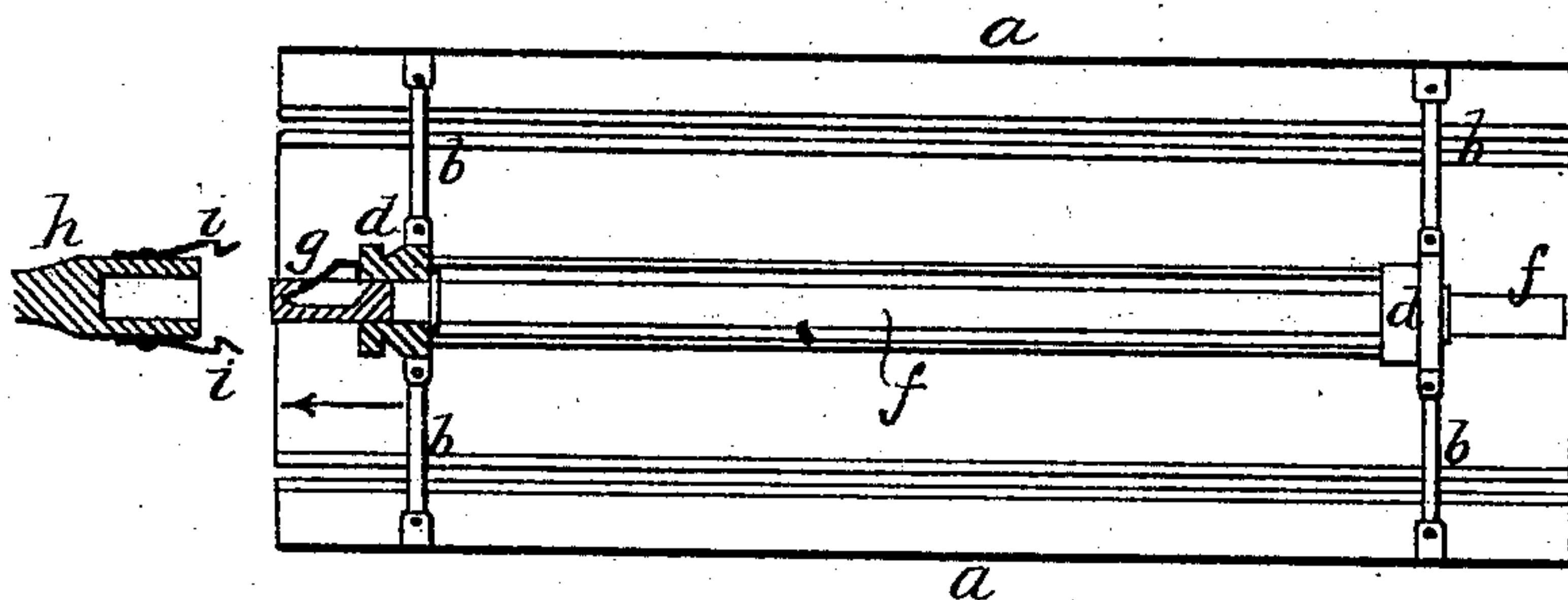


FIG. 5



WITNESSES:

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UNITED STATES PATENT OFFICE.

WILLIAM M. CAMPBELL, OF MOUNT CLEMENS, MICHIGAN, ASSIGNOR TO THE
NATIONAL CONTINUOUS STONE CONDUIT COMPANY, OF NEW YORK, N. Y.

APPARATUS FOR FORMING CONTINUOUS CONDUITS OF CONCRETE.

SPECIFICATION forming part of Letters Patent No. 272,411, dated February 20, 1883.

Application filed November 20, 1882. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM M. CAMPBELL, a citizen of the United States, and a resident of Mount Clemens, Macomb county, Michigan, have invented certain Improvements in Apparatus for Forming Continuous Conduits of Concrete, &c., of which the following is a specification.

My invention relates to certain improvements in that class of machines for making continuous pipes of cement in which the powdered-cement composition is pressed by a sliding plunger over a core or former, the present improvements being applicable especially to machines for making sewer-pipes or drains of comparatively large size.

In the accompanying drawings, Figure 1, Sheet 1, is a side view of the machine; Fig. 2, a vertical section of the same; Fig. 3, Sheet 2, a plan view, partly in section; Fig. 4, a transverse section on the line 1 2, Fig. 2; and Figs. 5, 6, and 7, views showing the construction of the core or former of the machine.

A is the tubular casing, having a feed-hopper, B, and a reciprocating plunger, D, as usual in machines of this class, the powdered or granular cement being introduced through the hopper and packed around the core or former F under the action of the plunger, the latter being adapted to slide on said core, which determines the size and shape of the opening in the conduit, the outside contour of which is the same as that of the interior of the casing A.

Usually the core F is attached to the casing, and as the latter is moved forward on each ramming operation it draws the core with it. While this is not objectionable when the opening in the conduit is small, it is not advisable in cases where the opening is large, as in sewer or drain pipes, for in such cases the internal support for the cement should be continued for a longer time in order that the cement may harden or become properly set. For this reason I make the core F separate from the casing A and allow said core to remain undisturbed in the conduit until such time as it becomes safe to remove it or draw it forward, the front end of the core passing freely through an opening in the front end of the casing A, which serves simply to support and guide the

core, without having any tendency to move the same longitudinally as the casing is moved.

A single core of sufficient length may be used, this core being drawn forward at intervals as the building of the conduit progresses; or the core may be made in sections, which may be allowed to remain in the conduit until the cement has become sufficiently hard to permit their removal.

In order to facilitate the removal of the core, I make the same or each section of the same collapsible, so that it may be contracted in diameter prior to removal, and thus prevented from clinging to the walls of the conduit so firmly as to require an undue effort to remove it.

The core may be constructed in various ways so as to be collapsible, the plan which I prefer being that shown in Figs. 5, 6, and 7, on reference to which it will be seen that each section of the core consists of a series of segments, *a*—four in the present instance—these segments being hung by bars *b* near each end to sliding collars *d* on the shaft *f*, the two collars being connected so as to move together on the shaft.

When the bars *b* are radially in line with the collars *d*, as shown in Fig. 5, the segments will be expanded, as shown in Fig. 6, and the core will fill the opening of the conduit; but by moving the collars in the direction of the arrow, Fig. 5, the effect will be to draw inward the segments *a*, and thus decrease the diameter of the core, as shown in Fig. 7.

Accidental movement of the collars *d* in the direction of the arrow is prevented by a spring-catch, *g*, and when it is desired to collapse the core a socket-wrench, *h*, is pushed over the end of the shaft *f*, so as to depress this catch *g*, spring-clips *i* on the wrench engaging with a groove in one of the collars *d*, so that on the withdrawal of the wrench the first effect will be the collapsing of the core, and then the removal of the same from the conduit.

Movement of the collars on the shaft in a direction the reverse of that pointed out by the arrow is prevented by flanges on the shaft.

The reciprocation of the plunger D is effected by means of toggle mechanism on each side of the casing, said mechanism comprising arms *m* and *n*, levers *p*, and connecting-rods *w*.

Instead of two levers *p*, a single lever may

be used, this lever being secured to a shaft carried by the brackets *s*, and said shaft having arms connected to the rods *w*.

By locating the toggle mechanism on the opposite sides of the casing *A* the interior of the same is left unobstructed for the passage of the core.

I claim as my invention—

1. The combination of the casing and plunger of the machine, with a core separate from the casing, as set forth.

2. The combination of the casing and plunger of the machine, with a core separate from

the casing, and constructed so as to be collapsible.

3. The combination of the casing, the plunger, and the core, with toggle mechanism on opposite sides of the casing for reciprocating the plunger, as set forth.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

WM. M. CAMPBELL.

Witnesses:

CALVIN DETRICK,
J. RENWICK CAMPBELL.