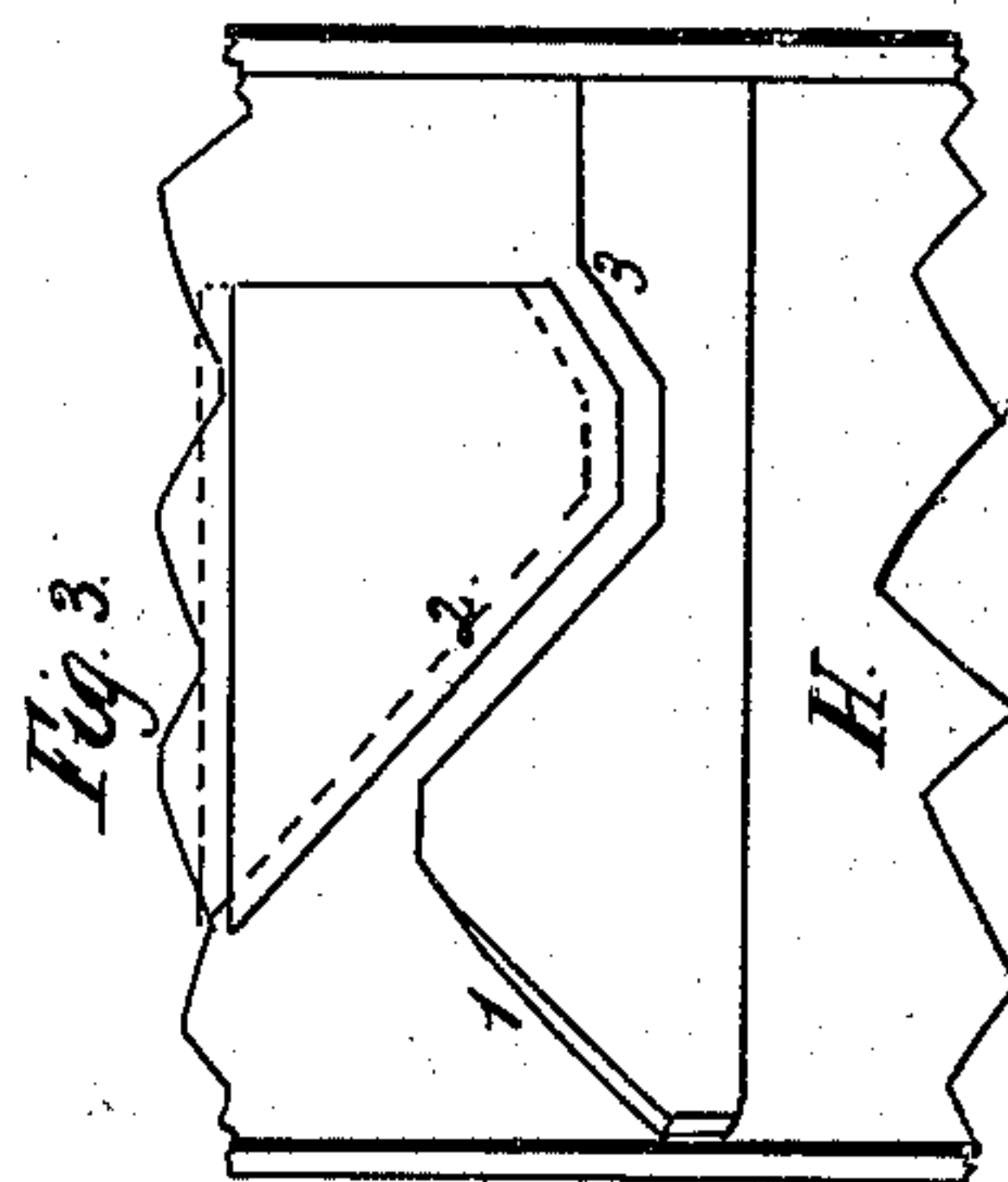
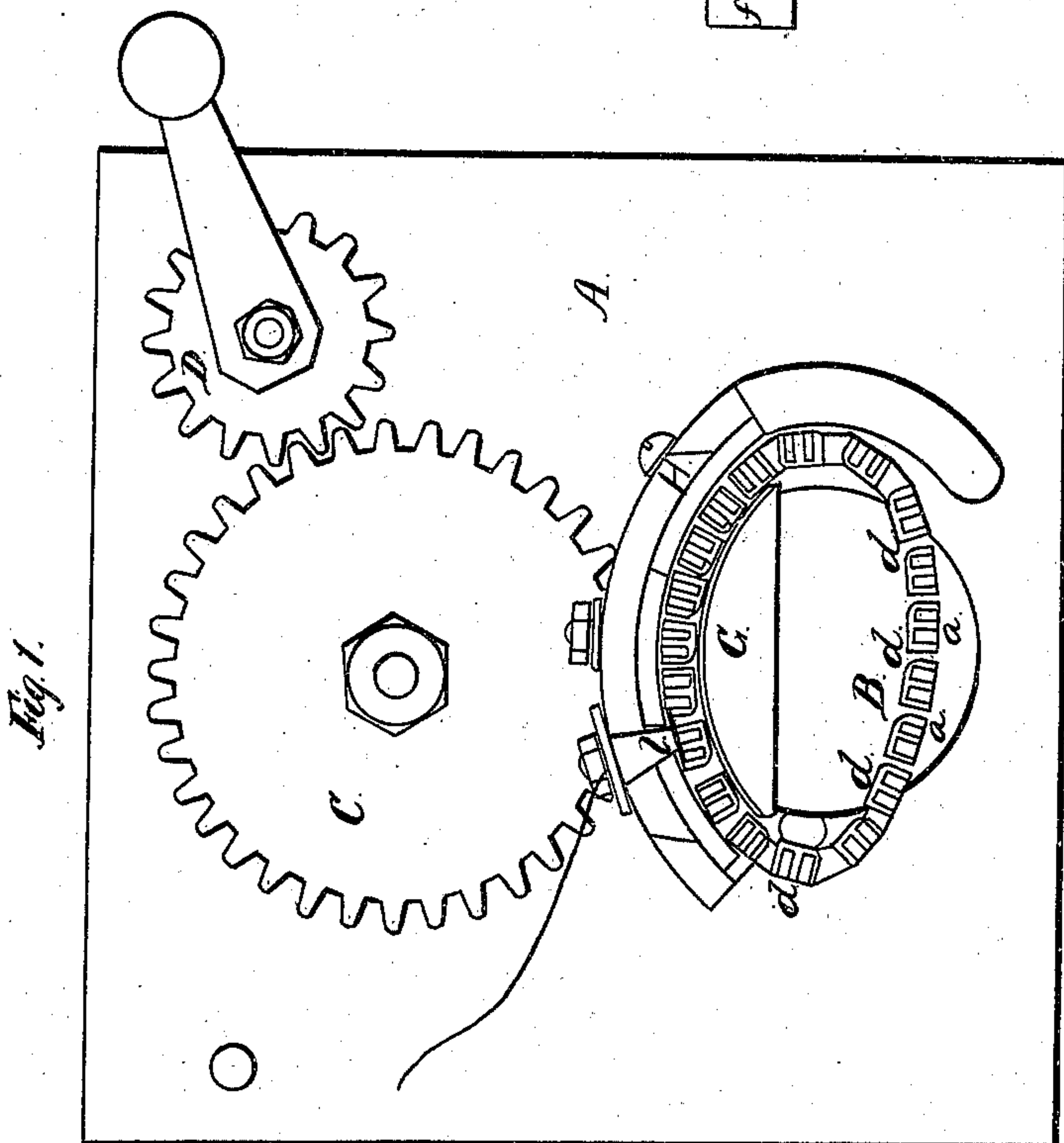
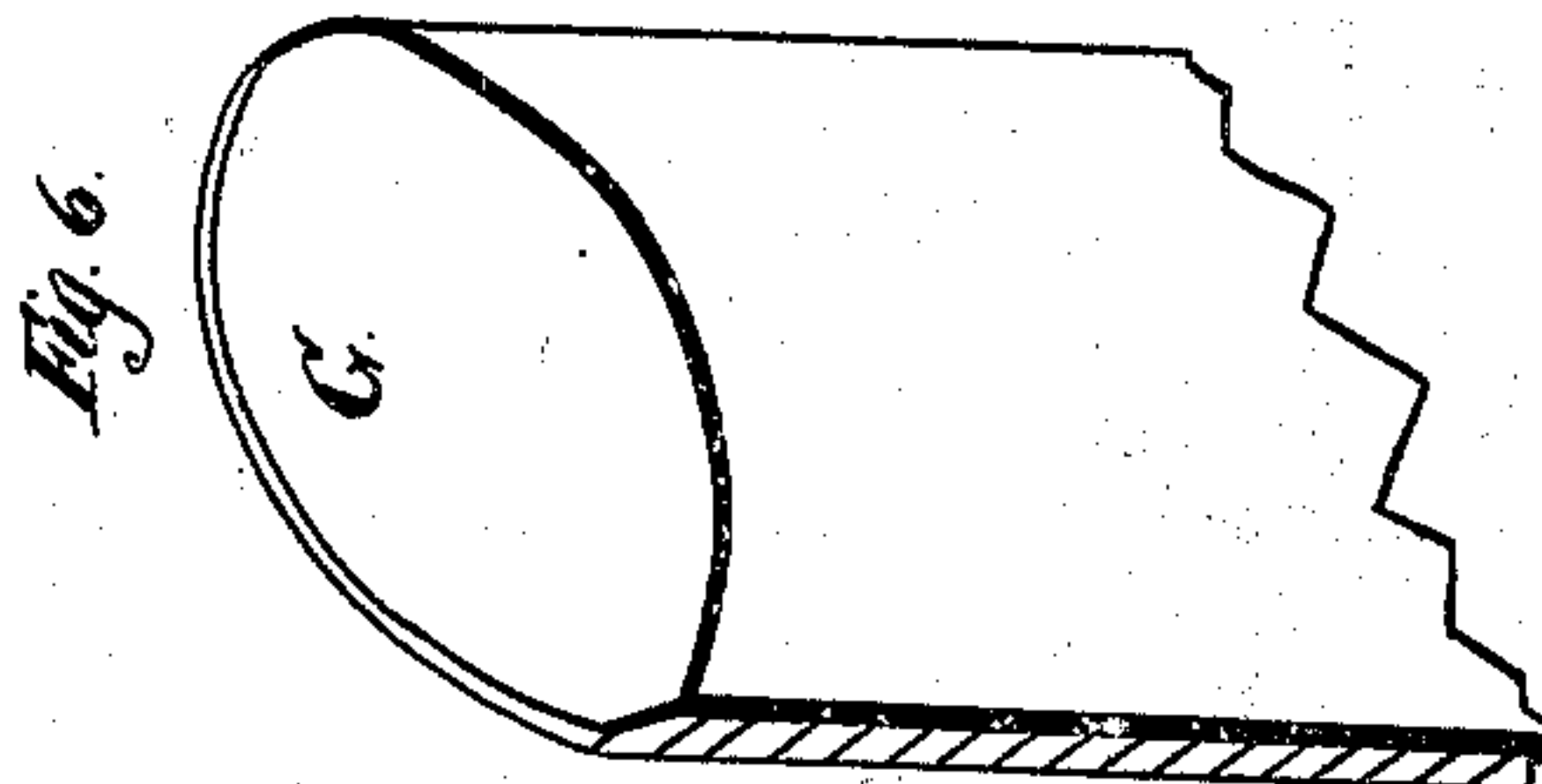
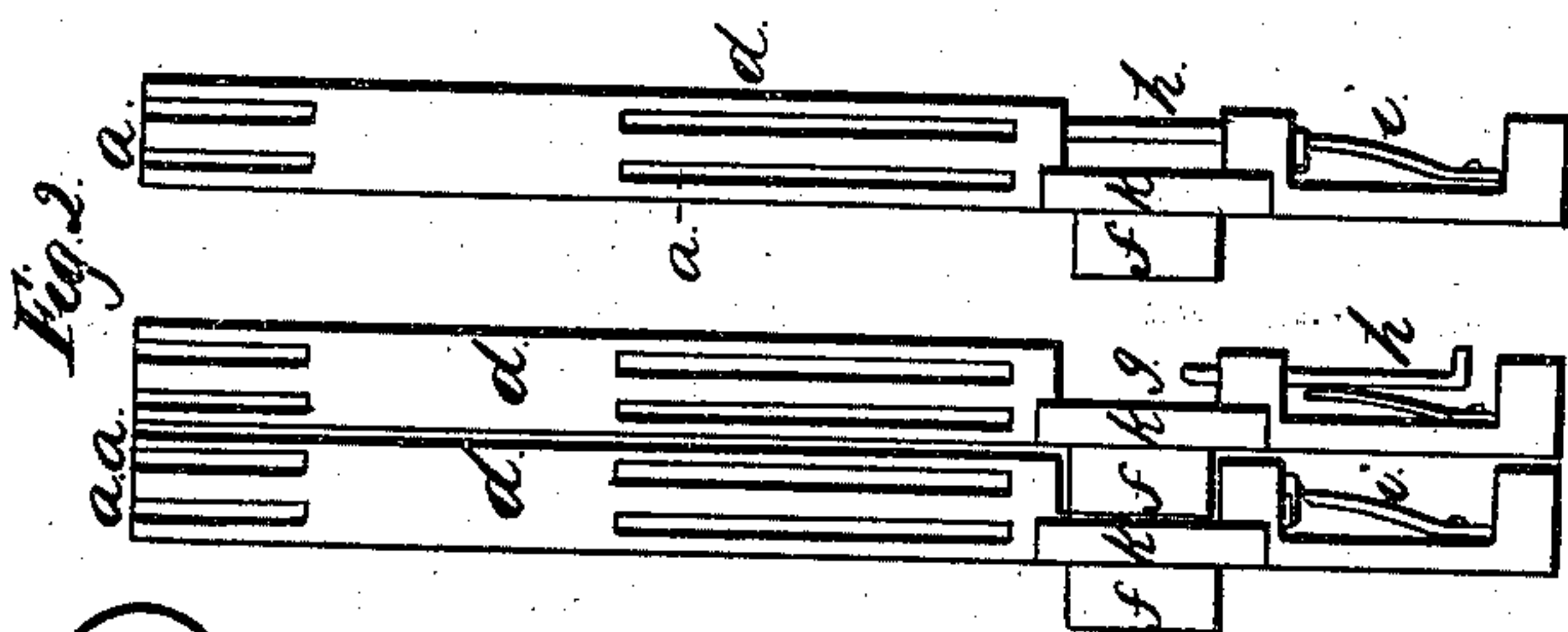
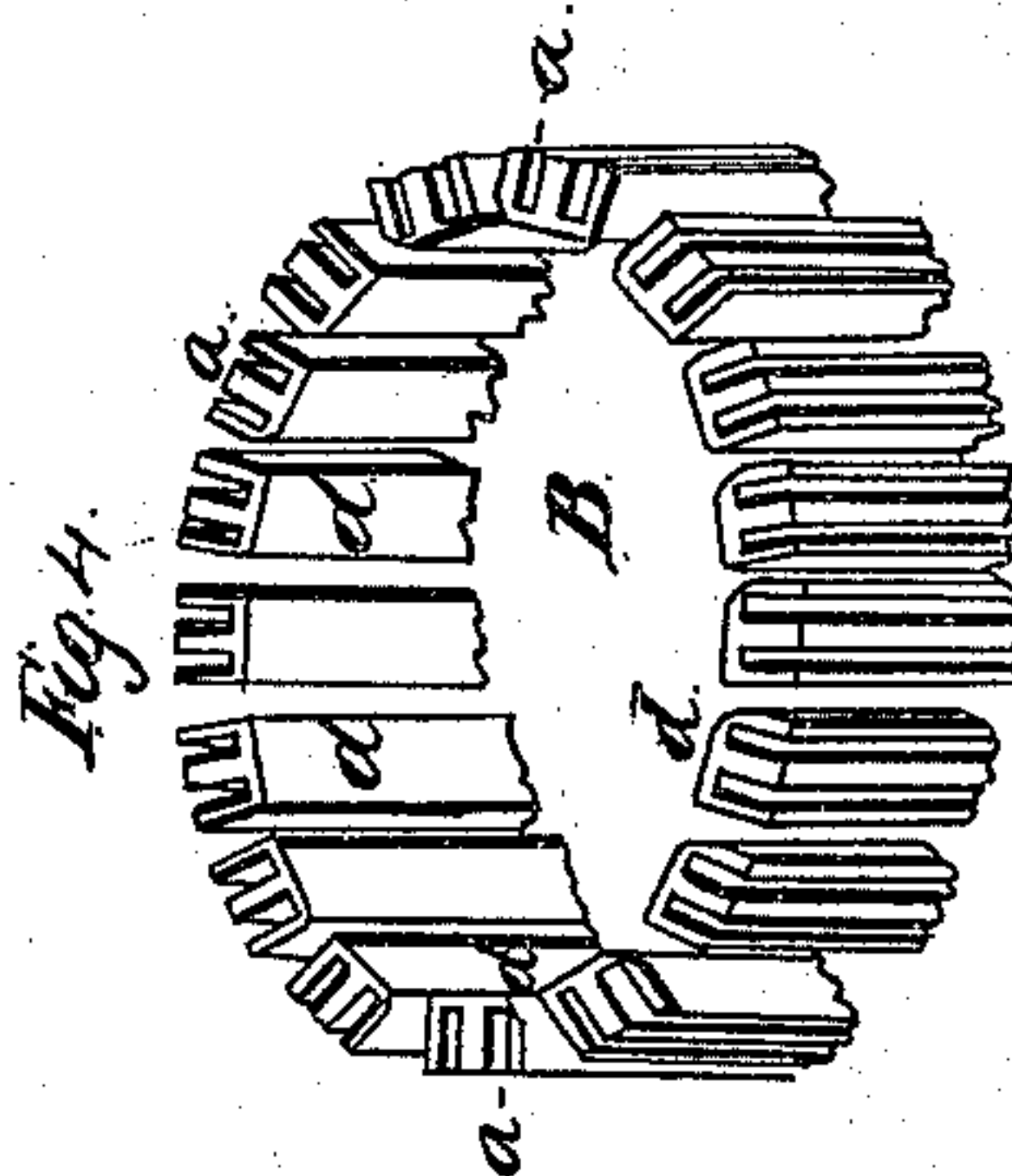
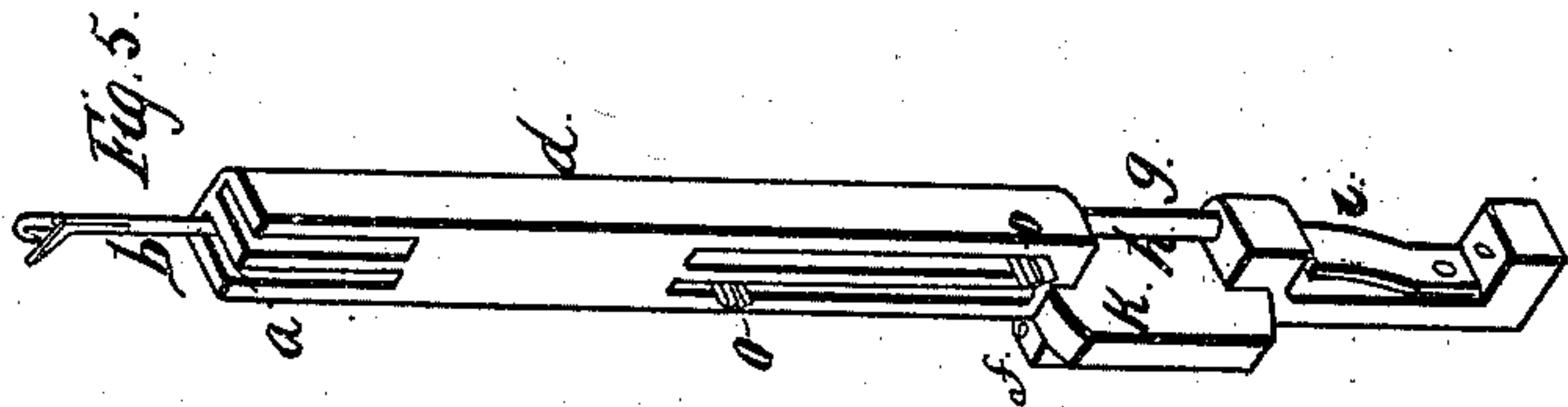


*H. L. Williams.*  
*Knitting Mach.*

*Nº 55,968.*

*Patented Jun. 26, 1866.*



*Witnesses:*  
*J. A. Davis.*  
*R. F. Osgood*

*Inventor.*  
*H. L. Williams.*  
*By J. Fraser & Co.*



# UNITED STATES PATENT OFFICE.

H. L. WILLIAMS, OF SENECA FALLS, NEW YORK, ASSIGNOR TO NATIONAL KNITTING MACHINE COMPANY.

## IMPROVEMENT IN KNITTING-MACHINES.

Specification forming part of Letters Patent No. 55,968, dated June 26, 1866.

*To all whom it may concern:*

Be it known that I, H. L. WILLIAMS, of Seneca Falls, in the county of Seneca and State of New York, have invented certain new and useful Improvements in Knitting-Machines; and I do hereby declare that the following is a full and exact description thereof, reference being had to the accompanying drawings, making part of this specification.

Figure 1 is a plan of my improved machine; Fig. 2, an elevation of several of the lags or sections composing the form in which the needles run; Fig. 3, a diagram representing the arrangement of the cams for operating the needles; Fig. 4, a perspective view of the top of the form; Fig. 5, a perspective view of one of the lags or sections of the form; Fig. 6, a perspective view of the guide for stiffening the form to enable it to gear with the cog-wheel.

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

In ordinary knitting-machines the form in which the needles run is made of tubular form and rigid, or not flexible, so that its diameter cannot be increased or lessened to suit different sizes of work. Thus the web that is manufactured must be of one unvarying diameter.

My invention consists, first, in providing the lags that constitute the form with cogs that gear with a cog-wheel; and, second, in the employment of a guide, in combination with the form and cog-wheel, for giving the necessary stiffness to the parts to gear with the wheel, and to perform the operation of knitting.

As represented in the drawings, A is a table or frame on which the working parts are mounted; B, the form having the ordinary slots *a a*, in which play the needles *b b*; C, the cog-wheel which gives motion to the form, and D a driving crank-pin.

Instead of making the form a simple rigid tube or cylinder, as in the usual way, I make it up of a series of lags or sections, *d d*, which are suitably united together. Any means of uniting that will allow a free revolving motion of the form may be employed; but I prefer that shown in the drawings, in which a lateral projection, *f*, on one side of the lag fits into a corresponding depression or cavity, *g*, of the contiguous lag, a pin, *h*, passing up through and holding the parts together. In order to retain

the pin in place and still allow its removal at any time, I employ a spring, *i*, under its head, which can be depressed in inserting or removing the pin.

The advantage of this arrangement is that I can increase or diminish the size of the form at any time by simply adding or removing a suitable number of the lags. This is of the greatest importance, for by this means I am enabled, by the employment of the same form, to knit a web of large or small size at pleasure and by the same needles. If separate forms of different sizes were employed, not only would a series of forms be required, but also a great number of needles. I am enabled to knit either small or large sizes on the same form and with the same needles.

At a suitable position I provide each lag with a cog, *k*, Figs. 2 and 5, projecting from its face, the whole forming a series of cogs that gear with the cog-wheel C to receive motion. In order that the lags shall approximate the circle of the cog-wheel, and shall be retained in a stiff or rigid position to gear properly with it, I make them pass outside a curved guide, G, against which they rest, and also, if desired, within a concave guide, H, which holds them steady.

By this means it will be perceived that the form will receive a revolving motion, and this action will be steady and unvarying, so that there can be no difficulty in the action. I am not aware that the form itself has ever before received a revolving motion. It is usually stationary. This revolving motion is a consequence of my particular arrangement of the form.

In order to raise the needles at the point *l* where the thread enters to catch the latter, and to draw the needles down to form the stitch after the thread is caught, and, still further, to again raise the needles a little after the stitch has been formed, I provide the cam arrangement represented in Fig. 3. These cams are stationary, and are preferably connected with the guide H. When the needles come to the point *l*, where they must be raised to catch the thread, their projections *o o* at the bottom strike the ascending cam 1 and are raised to the proper elevation; then, in order to draw the thread down to form the stitch, they strike

the descending cam 2, which I prefer to make adjustable higher or lower, as shown in red lines, Fig. 3. The needles then are raised a little distance by an ascending cam, 3, so that the thread can be easily adjusted.

In ordinary knitting-machines the needles are operated by a movable cam that passes around the stationary form. I reverse this arrangement and make the cam stationary, while the form is movable. This is a consequence of making the form expanding and contracting, as a movable cam of fixed size cannot easily be made adapted to a form which is either contracted or made larger.

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

1. The combination of the cogs *k k* with the lags constituting the form, and with the gear-wheel by which they are driven, substantially as specified.

2. The combination of the curved guide *G* with the form *B* and gear-wheel *C*, substantially as described.

H. L. WILLIAMS.

Witnesses:

J. V. PALMER,  
WM. H. HOOD.