

(No Model.)

2 Sheets—Sheet 1.

I. M. BROWN.

RULING MACHINE.

No. 370,041.

Patented Sept. 20, 1887.

Fig. 2.

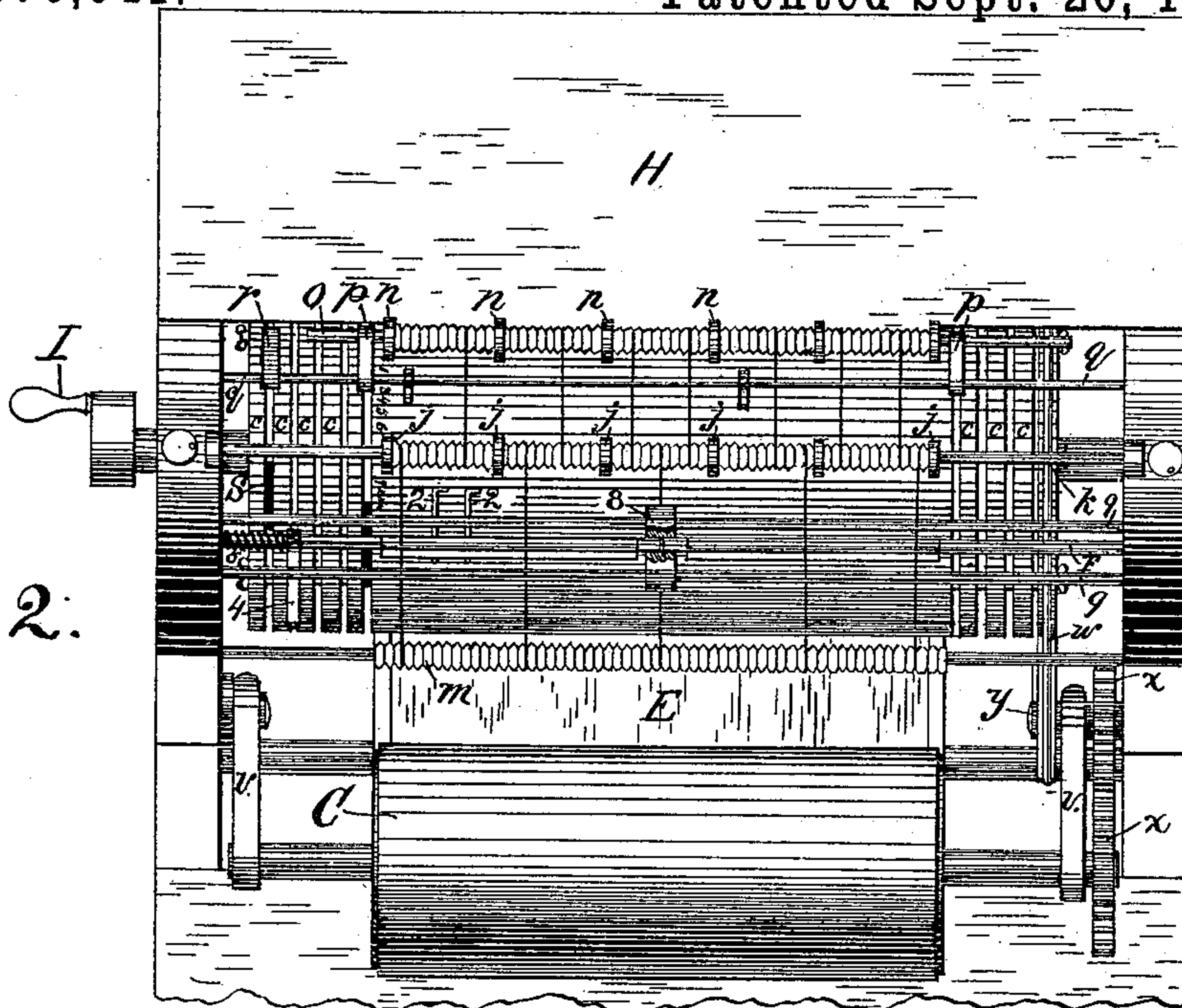
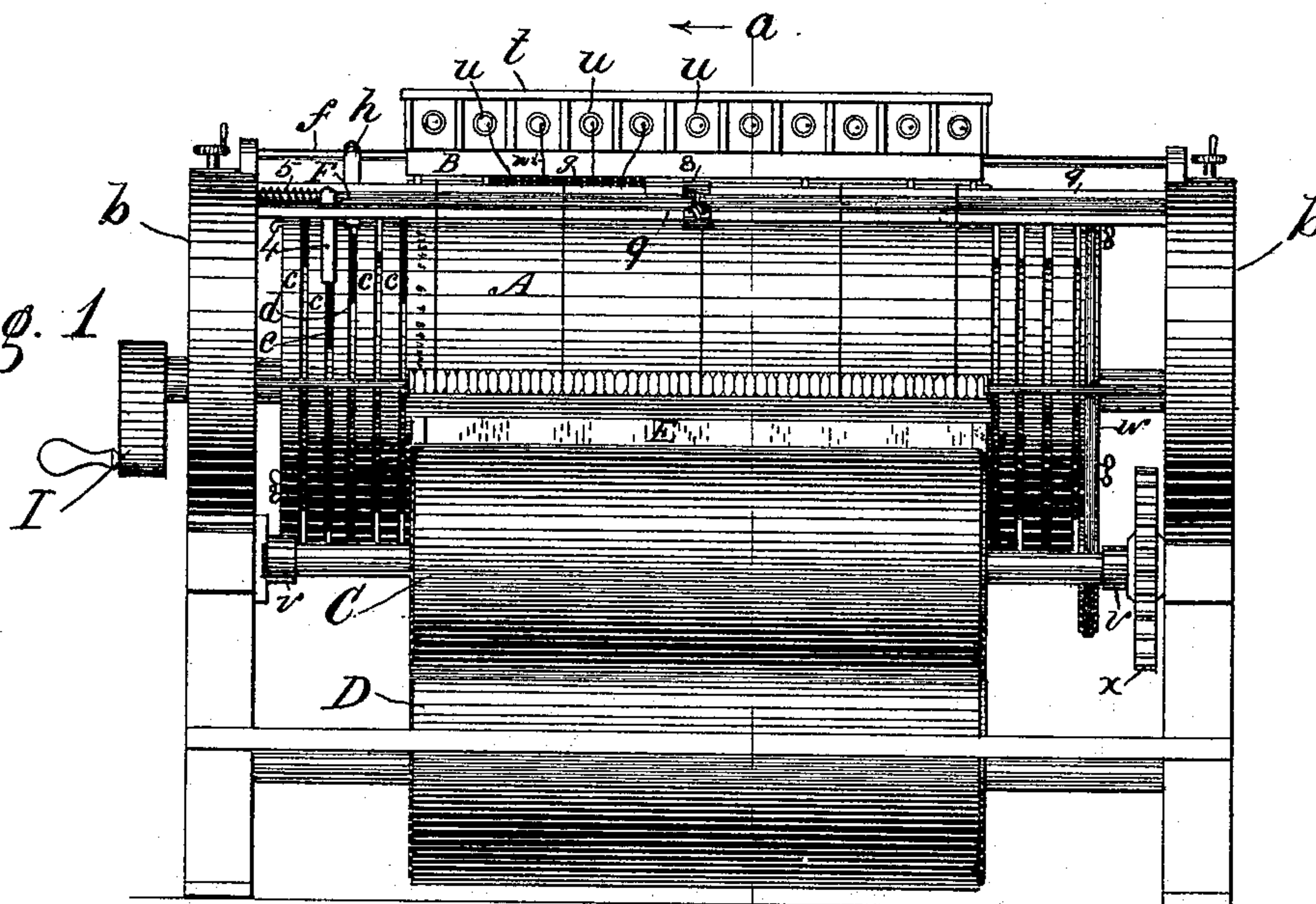


Fig. 1



WITNESSES:

O. P. Hood.

Chas. Appel.

INVENTOR:

Isaac M. Brown

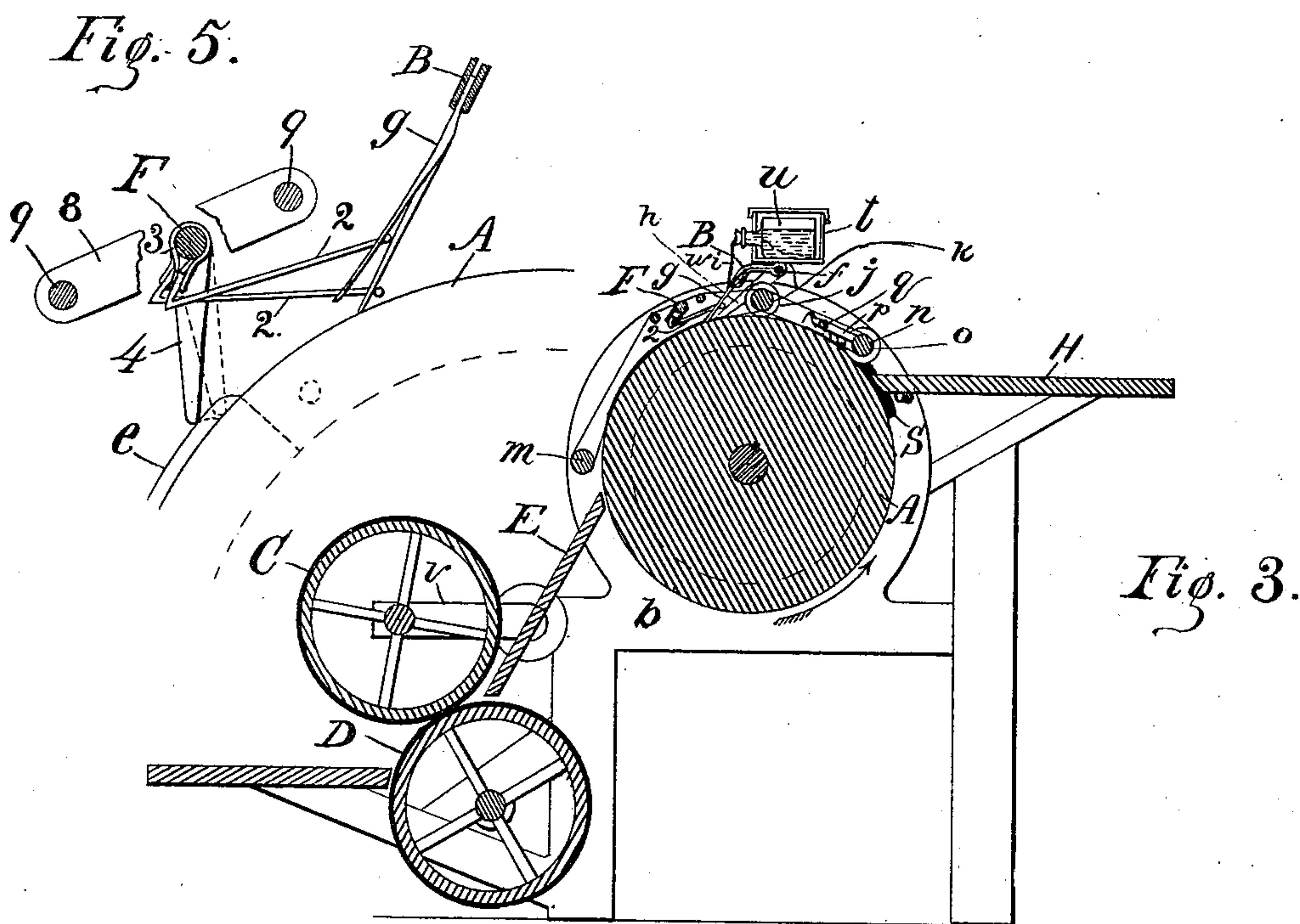
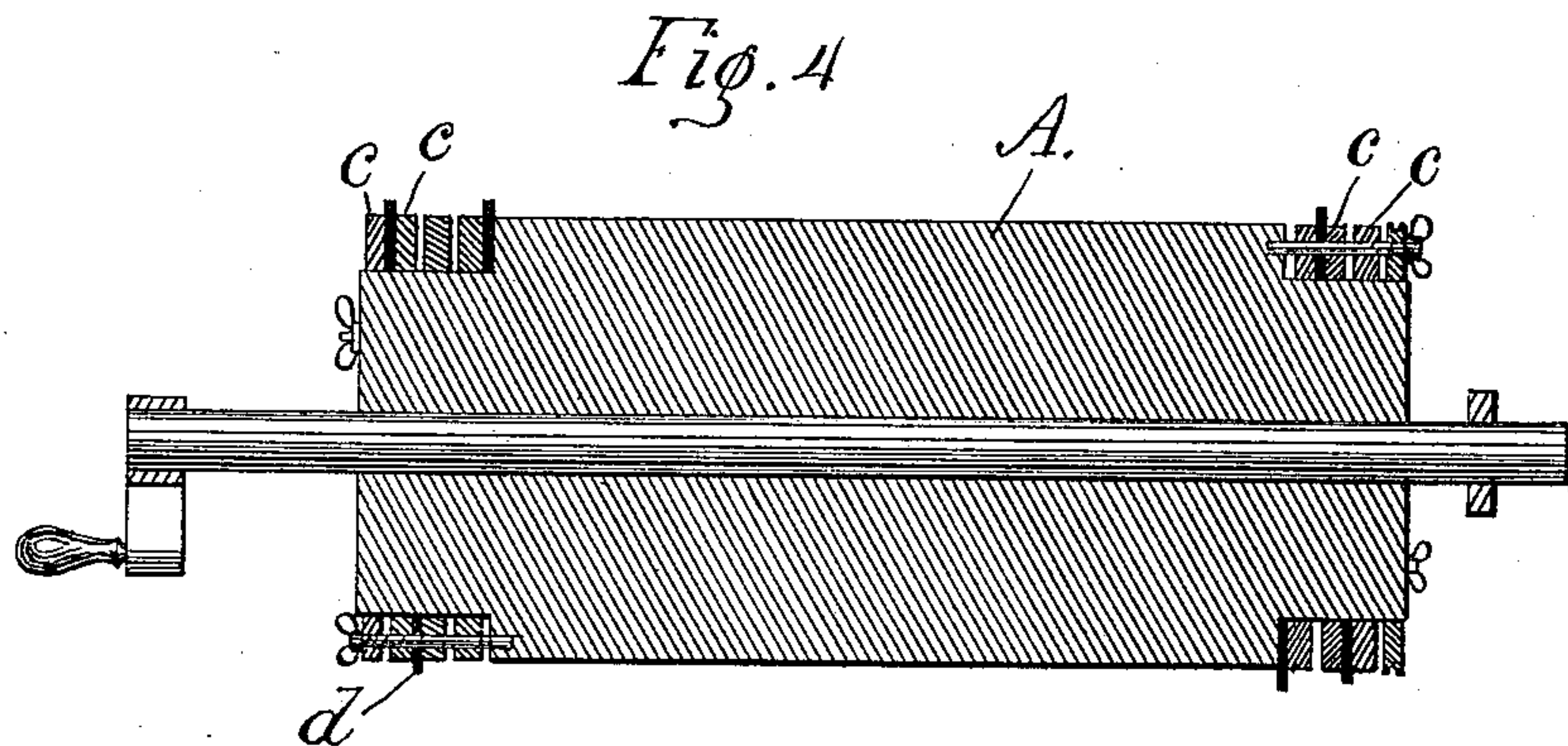
(No Model.)

2 Sheets—Sheet 2.

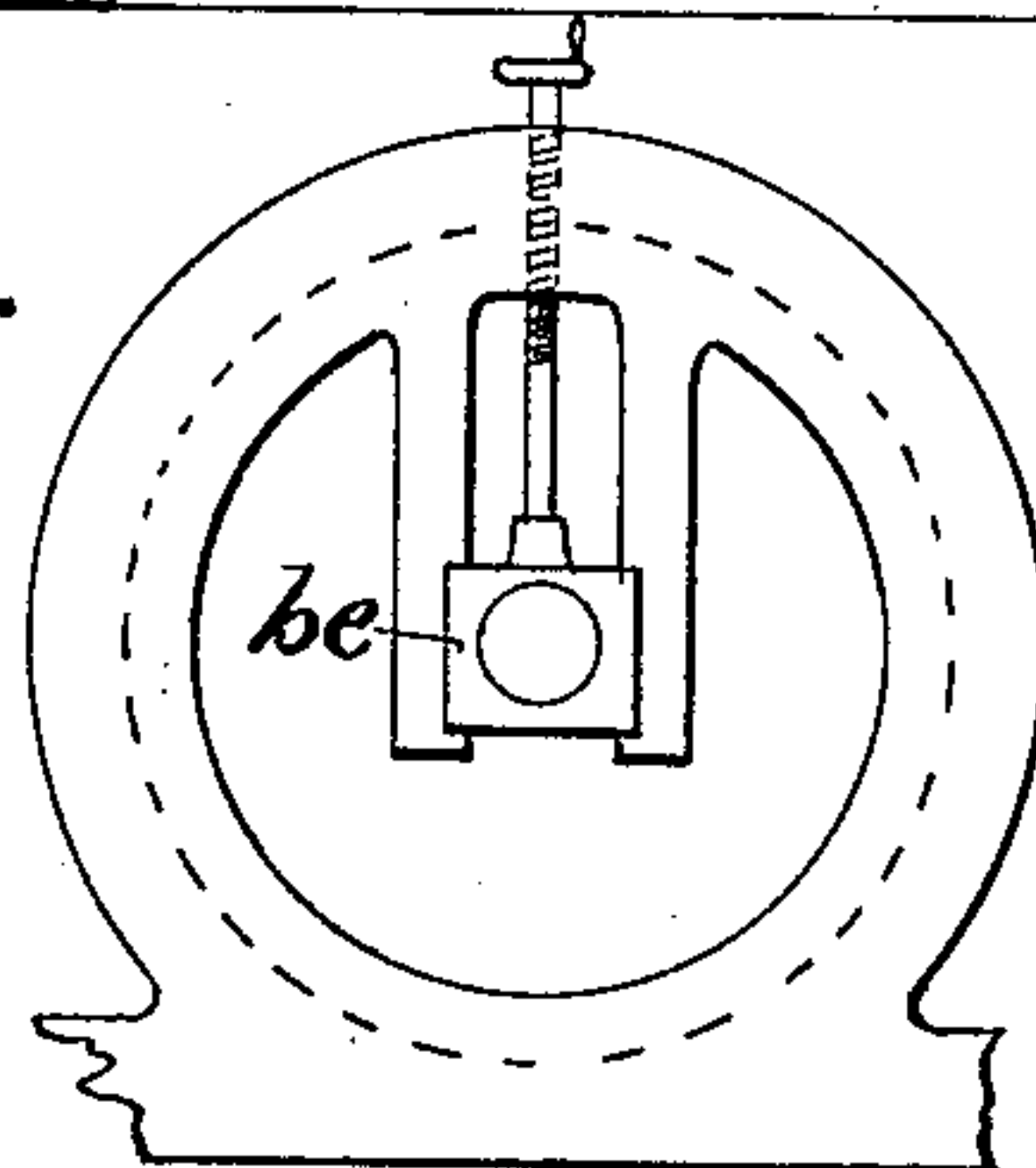
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*Fig. 6.*



WITNESSES:  
*Q. P. Hood.*  
*Chas. Apel.*

INVENTOR:  
*Isaac M. Brown.*



# UNITED STATES PATENT OFFICE.

ISAAC M. BROWN, OF COLUMBUS, INDIANA.

## RULING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 370,041, dated September 20, 1887.

Application filed November 7, 1885. Serial No. 182,092. (No model.)

*To all whom it may concern:*

Be it known that I, ISAAC M. BROWN, a citizen of the United States, residing at Columbus, in the county of Bartholomew and State of Indiana, have invented a new and useful Improved Ruling-Machine, of which the following is a specification.

My invention relates to an improvement in machines for ruling paper.

The object of my improvement is to provide a machine for ruling paper, which may be cheaply made, so as to occupy but little space, and having improved means for lifting the ruling-pens and for drying the ruled lines, all as hereinafter fully explained.

The accompanying drawings illustrate my invention.

Figure 1 is an elevation; Fig. 2, a plan, having the ink-fountain and pen-bar removed; Fig. 3, a section at *a*, Fig. 1; Fig. 4, a longitudinal section of the ruling-cylinder. Fig. 5 is a partial enlarged elevation showing the operation of the pen-lifter. Fig. 6 is a partial end elevation showing the adjustable bearings for the cylinder.

A is a smooth cylinder arranged to revolve in suitable vertically-adjustable bearings, *be*, Fig. 6, in a frame, *b*, and having at each end several annular clamping-rings, *cc*, mounted on reduced portions of the cylinder, and clamped thereto by suitable bolts and thumb-nuts. Said clamping-rings are for the purpose of securing to the cylinder segmental annular cams, like *d* and *e*, a device well known in this class of machines, for operating the pen-lifting mechanism. The peripheries of the cylinder and the rings are graduated, and the graduations are marked, as illustrated in Fig. 1, to facilitate the setting of the segmental cams.

B is the pen-bar, mounted on a rocking-shaft, *f*, above the cylinder A, and adapted to hold a series of ruling-pens, *g*. Said bar is rocked, and the ruling-pens thereby lifted from contact with the periphery of the cylinder, by means of cam *d* coming in contact with and raising an arm, *h*, secured to the shaft in the usual well-known manner. A series of friction feed-wheels, *j j*, are mounted on a shaft, *k*, so as to be in constant contact with the periphery of cylinder A. Said shaft is arranged to revolve with the feed-wheels, which

are turned by the turning of the cylinder, and is provided with a series of fine circumferential grooves, which carry endless string belts, which pass over a second similarly-grooved shaft, *m*, and in contact with the periphery of cylinder A, for the purpose of holding the paper closely thereto in the process of ruling. A second series of friction feed-wheels, *n n*, are mounted on a shaft, *o*, which revolves in bearings in a pair of short arms, *pp*, which are secured to a rocking-shaft, *q*, resting in bearings on the main frame. Endless string belts run from shaft *o* to shaft *k*, which keep the paper under the feed-wheels *n n* close to the cylinder A until the feed-rollers on shaft *k* receive it. Shaft *q* is rocked, and wheels *n n* are thereby lifted from contact with cylinder A by means of a cam, *S*, adjustably secured to the cylinder by the clamping-rings *c*, and engaging an arm, *r*, secured to the shaft.

The ink-fountain consists of a case, *t*, removably secured to the pen-bar shaft and adapted to receive and hold a series of bottles, containing ruling-ink. Said bottles lie on their sides with their necks projecting through one side of the case, as shown, and each bottle is provided with a wick, *wi*, of woolen or other suitable fiber, which dips into the ink in the bottle and passes through a suitable opening in the cork, which closes the mouth of the bottle, to one or more of the ruling-pens, thereby conducting the ink by capillary attraction in a constant flow to the pen.

C D are a pair of hollow cylinders, C having an outer covering of blotting-paper, and D being also covered with blotting-paper or other slightly-yielding material. The lower cylinder, D, is arranged to revolve in permanent bearings on the main frame. Cylinder C rests on D, and is arranged to revolve in swinging bearings *vv*. Motion is given to C by a belt, *w*, passing from a pulley on the same shaft with cylinder A. Said belt drives a pair of spur-gears, *xx*, one of which is secured on the shaft of cylinder C, and the other turns on a stud at *y*. Cylinders C and D are for the purpose of rapidly drying the ruled lines, and may be used at a normal temperature; or they may be heated by introducing steam into their interiors or by other well-known means.

E is an inclined table on which the ruled



papers are delivered from cylinder A, and pass by gravitation to the drying-cylinders.

It is often desirable in ruling a series of lines in certain classes of work to make some of the lines in short sections with unruled spaces between, while the rest of the lines of the series are continuous. For this purpose I raise the points of one or more of the ruling-pens while the others are still on the paper by means of the following mechanism:

I mount one, two, or more rocking shafts, F, above the ruling-cylinder and behind the ruling-pens. These shafts are independent of each other and rest in bearing on the frame and in a central bearing, 8, which is held by permanent rods 9 9, secured to the main frame above and below the rocking shafts. Said shafts are provided with one or more short arms or pen lifters, 2 2, which are adjustably secured to the shaft by means of a spring-clamp, 3. An arm, 4, is permanently secured to shaft F in such position as to be engaged at its free end by a cam or cams, e, on the cylinder A. Spring 5 holds arm 4 normally downward against the cylinder. The short arms 2 are bent at their free ends and adjusted so as to pass partly around and engage the under side of the pen and hold the point of the pen up clear of the paper when arm 4 is not engaged by the cam e, as seen in Fig. 5 in both positions, the pens being sufficiently elastic to admit of being bent to that extent without permanent set. When arm 4 is raised by the cam, arms 2 are depressed and the pens allowed to spring back to their normal position in contact with the paper.

It will be observed that the mechanism just described for lifting individual pens is entirely separate and independent from that for lifting the whole series of pens, so that any required number of the series of pens may be lifted while the rest are at work. It is my purpose in practice to use several shafts like F, with its arms 2 and 4, so that different pens of the series may be lifted at different times, cams for that purpose being used at opposite ends of the cylinder.

The operation of my machine is as follows: Shaft o being raised by the cam S, and the pen-bar with its pens being held up by cam d, and the blank sheets to be ruled resting on feed-board

H, the edge of one of the sheets is placed on cylinder A, under the feed-wheels n, and adjusted to a guide which is attached to shaft q on the opposite side to the feed-wheels n n, and is lowered as the feed-wheels rise, and is raised as they fall. The cylinder is now turned, by means of crank I, in the direction indicated by the arrow. As cam S passes out of engagement with arm r, wheels n fall, and the sheet is seized between said wheels and the cylinder and carried forward under the endless string belts connected with shaft k and under feed-wheels j. Cam d passing out of engagement with arm h, the whole series of pens fall, and all, except those sustained by coming in contact with arms 2, as before explained, come in contact with the paper, and the ruling commences. When cam e engages arm 4, these last-mentioned pens come also into action by the lowering of arms 2, which will be raised by spring 5, when said arm 4 and cam e pass out of engagement. The sheet, when ruled, passes from cylinder A down the inclined table E, and is seized by the drying-rolls, and, passing between said rolls, is delivered to a suitable receptacle. The long and cumbersome system of conveyer-belts for drying the sheets heretofore used is thus dispensed with, and the paper is ruled, as described, with lines of different lengths at one operation, and with much greater speed than heretofore.

I claim as my invention—

In a ruling-machine, the combination of the main frame, the cylinder A, arranged to revolve and carrying the cam e, the ruling-pen arranged to stand normally with its point resting on the periphery of said cylinder, the shaft F, having arm 4 arranged to engage said cam, the spring 5, arranged to hold said arm normally in contact with the cylinder, the clamp 3, mounted on said shaft, and the pen-lifter 2, secured in said clamp and arranged to engage the pen near its point, all arranged to co-operate substantially as described, whereby the point only of the pen is lifted at intervals, for the purpose specified.

ISAAC M. BROWN.

Witnesses:

CHAS. APEL,  
W. F. COATS.