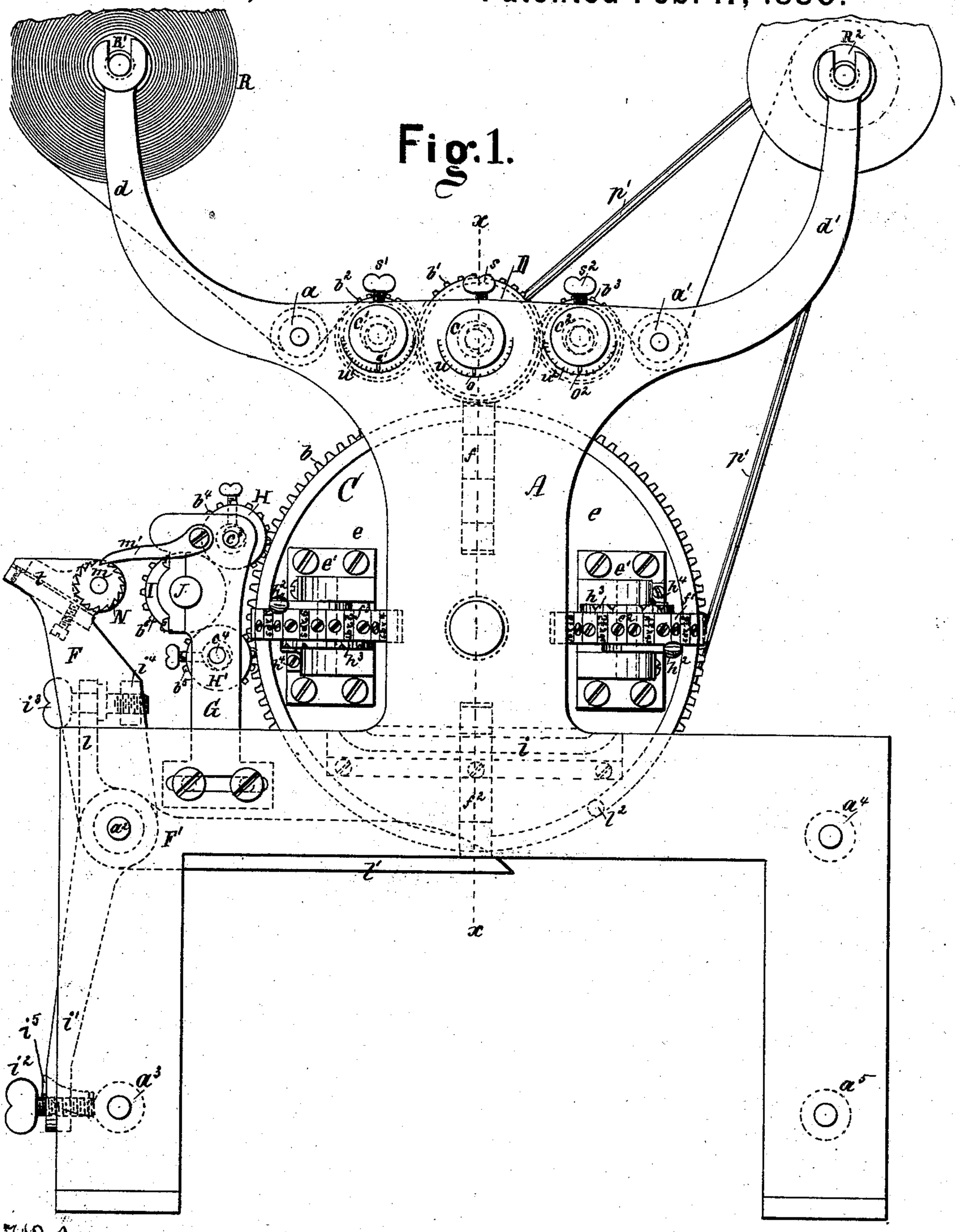
2 Sheets—Sheet 1.

T. G. HOSTER.

Ribbon-Paper Printing-Machine.

No. 224,537. Patented Feb. 17, 1880.

Fig. 1.



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2 Sheets—Sheet 2.

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Ribbon-Paper Printing-Machine.

No. 224,537. Patented Feb. 17, 1880.

Fig. 2.

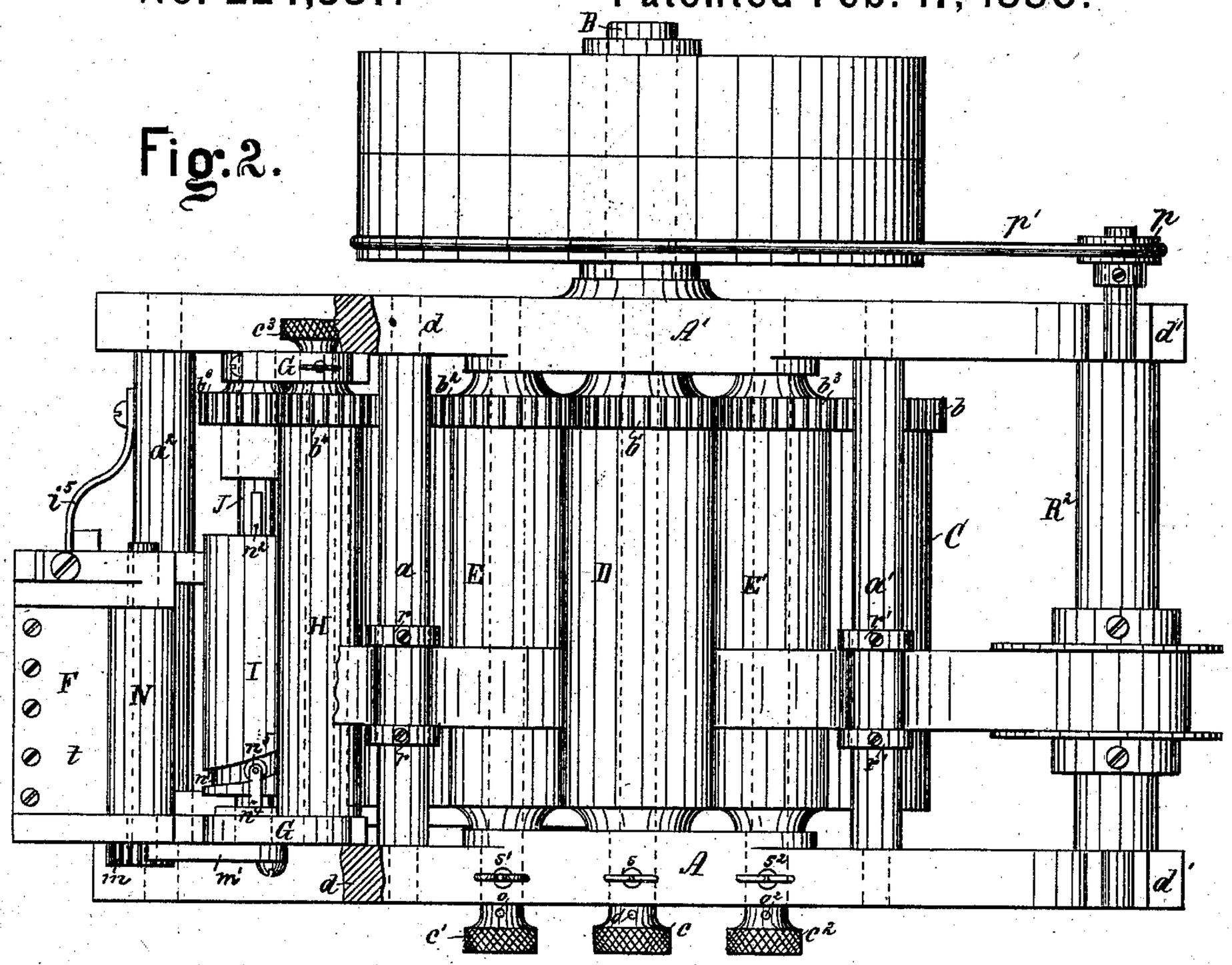
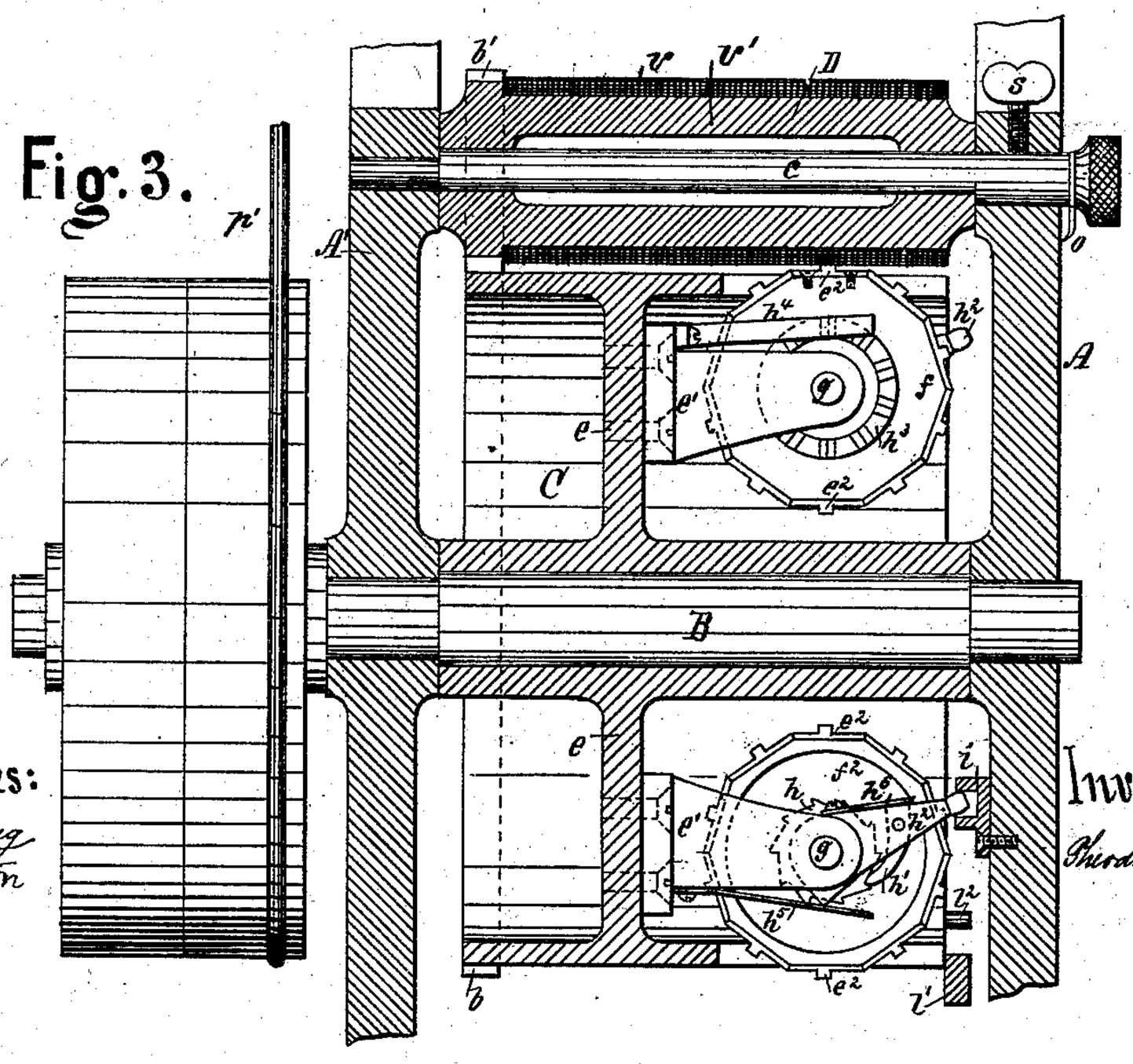


Fig. 3.



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UNITED STATES PATENT OFFICE.

THEODORE G. HOSTER, OF YONKERS, ASSIGNOR OF ONE-FOURTH OF HIS RIGHT TO WILLIAM HECKERT, OF SAME PLACE, AND ONE-HALF OF HIS RIGHT TO J. HENRY SMITH, OF BROOKLYN, NEW YORK.

RIBBON-PAPER-PRINTING MACHINE.

SPECIFICATION forming part of Letters Patent No. 224,537, dated February 17, 1880.

Application filed August 22, 1879.

To all whom it may concern:

Be it known that I, THEODORE G. HOSTER, of Yonkers, county of Westchester, and State of New York, have invented a certain new and useful Improvement in Ribbon-Paper-Printing Machines, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming part thereof.

The invention relates to printing-machines especially adapted to print measurements and other matter on ribbon-paper which is wound in a roll with the ribbon and represents the length thereof.

In the accompanying drawings, in which similar letters of reference indicate like parts, Figure 1 is a side elevation of my invention. Fig. 2 is a top view of the same, and Fig. 3 is a sectional view on the line *x x* of Fig. 1.

On upright suitably-shaped frames A and A′, which are held together by girts *a*, *a′*, *a²*, *a³*, *a⁴*, and *a⁵*, constituting thereby the main frame, are bearings in which revolves the shaft B, by means of a crank, or pulleys if driven by steam. To this shaft B is fastened, by any well-known means, a cylinder or drum, C, which has gear-teeth *b* on its periphery at one end, which work in corresponding teeth *b′* on the impression and feed cylinder D, placed immediately above the cylinder or drum C, and which impression-cylinder rotates loosely on an eccentric spindle, *c*, having its bearings on frames A and A′. In the same horizontal plane in which the spindle *c* lies are spindles *c′* and *c²*, on which revolve loosely the rollers E and E′, on each side of the impression-cylinder D, and which are geared by teeth *b²* and *b³* in teeth *b′* on said impression-cylinder D. The impression-cylinder D and rollers E and E′ constitute the feeding arrangement for the paper to be printed, which comes from a roll of paper, R, hung on a roller, R′, which rotates in bearings on extended arms *d d* of frames A A′. On a similar roller, R², on similar extended arms *d′ d′*, the paper is wound up again after leaving the rollers E and E′ and impression-cylinder D.

To a partition, *e*, in the cylinder or drum C are four (or more or less, as desired) pedestals, *e′*, fastened equal distances from each other, which carry each a consecutive numbering and marking wheel, *f*, revolving on a pin, *g*, in the pedestals *e′*. The type or electroplates *e²* are fastened to the faces of the wheels *f* in any well-known manner, and so that the face of the type, when passing the impression-cylinder D, stands directly under it, and leaves an impression on the paper which is carried by cylinder D. This impression-cylinder D consists of a rubber covering, *v*, without screws or joints, and is cast on a hollow shell, *v′*, which rotates loosely on eccentric spindle *c*.

In a recess on one side of the consecutive numbering and marking wheel *f*, and secured to it, is a ratchet, *h*. A lever, *h²*, swinging from the same center as the numbering-wheel does, carries a pawl, *h′*, and a spring, *h⁶*, which pawl *h′* works in ratchet *h*, and is kept in contact with it by spring *h⁶*. The lever *h²* is ball-shaped on its outer end, and when the cylinder or drum C is revolved, and with it the pedestals *e′* and attachments, this ball enters and passes through a cam-groove, *i*, fastened to the inner side of frame A. The shape of the cam-groove *i* causes the lever *h²*, on its passage through said cam-groove, to oscillate on its axis *g*, whereby the consecutive-numbering wheels, through the action of pawls *h′* and ratchets *h*, are moved on their spindles *g*. On the other side of the numbering-wheel *f* is a ring, *h³*, having V-shaped notches, in which fits a V-shaped boss on a spring, *h⁴*, secured to the pedestal *e′*. The object of this arrangement is to keep the numbering-wheels tight and firm when the lever *h²* is not in contact with the cam-groove *i* and when the impression is being taken. A spring, *h⁵*, also fastened to the pedestal *e′*, reaches over a flattened side of lever *h²*, and keeps it in proper position when its ball end is out of cam-groove *i*.

The inking arrangement consists of an oscillating ink-fountain, F, and stationary frame G, which carries the inking-rollers H and H′ and the distributing-roller I. The ink-fountain F swings on girt *a²*, and has an extension, *i′*, downward, reaching to girt *a³*. At the end of this extension *i′* is a set-screw, *i²*, having its inner end resting on girt *a³*, and serv-

ing as a regulator for the throw of the fountain. A spring, i^5, screwed at one end to girt a^3, and the other end resting on the front of extension i', moves the fountain back again when swung out of position.

An L-shaped lever, F′, swinging on the same girt a^2, is connected to the fountain-frame F by a set-screw, i^3, (on its smaller arm l,) screwed in a boss, i^4, on the fountain-frame. The incline of arm l' of lever F′ reaches to the cylinder or drum C, and a pin, l^2, secured to the latter in its periphery, strikes the incline of arm l' when said cylinder or drum C is rotated and oscillates the ink-fountain, so that the fountain-roller N touches the distributing-roller I and delivers its ink, while spring i^5 brings fountain F and lever F′ into their former positions when the pin l^2 has left the incline of arm l'.

The ink-fountain roller N is turned by a ratchet, m, on its shaft, outside of the fountain-frame F, and a pawl, m', fastened on the frame G, when the fountain F oscillates toward the frame G.

The composition or inking rollers H and H′ turn loosely on eccentric spindles c^3 and c^4, which have their bearings in frame G, and receive a rotating motion by their respective gear-wheels b^4 and b^5 being geared in teeth b on the main cylinder or drum C. Between these inking-rollers H and H′ lies the distributing-roller I, which is mounted on shaft J, and is turned with the same by having gear-wheel b^6, fastened on shaft J, geared in wheels b^4 and b^5 on the inking-rollers. A distributing or sliding motion of the distributing-roller I is obtained by a stationary roller or pin, n^5, on an arm, n^4, fastened to frame G, said roller or pin working in a groove, n^3, on roller I. A key on shaft J turns the loose distributing-roller I when said shaft is rotated by gear-wheel b^6, as before stated, and also allows a sliding or sidewise motion of said roller I on said shaft J, which motion is obtained by the action of roller or pin n^5 in groove n^3.

The rewinding of the paper is accomplished by means of a grooved pulley, p, on the shaft of roller R^2, over which runs a belt, p', to the driving-pulley on shaft B.

On girts a and a' are adjustable collars r r and r' r', which serve to guide the paper directly to the feeding-rollers E E′ and impression-cylinder D, and admit of being adjusted to the different widths of the paper to be printed.

The operation of this machine is as follows: The paper from the roll R is passed under girt a and between the collars r r, over roller E, and under and between impression-cylinder D and drum or cylinder C, then over roller E′, then under girt a' and between collars r' r', up to the rewinding-roll R^2, to which it is, by some known devices, fastened to be rewound.

To adjust the impression, the eccentric spindle c is turned, thereby moving the impression-cylinder D to or from the form-cylinder C, as desired. The spindle c is then held in such position by fastening set-screw s. The feed-rollers E and E′, which work at each side of the impression-cylinder D, are adjusted to suit and feed the various thicknesses of paper by turning their respective spindles c' and c^2, and are then fastened in the desired position by set-screws s' and s^2, in the same manner as spindle c.

Now, if the shaft B is set in motion, it rotates the drum or cylinder C, and, through the gears b and b', transmits motion to impression-cylinder D, which in turn transmits its motion, by gears b', b^2, and b^3, to the rollers E and E′. Said rollers E and E′ and said impression-cylinder D will continually unwind and feed the paper from the roll R, and it will be rewound on R^2 by the belt p' and pulley p on roll R^2.

The consecutive numbering and marking wheels f, f', f^2, and f^3 will make their impressions on the paper when passing under the paper and the rubber impression-cylinder D, and will be shifted to the next number through the action of the end of the ball-shaped lever h^2, its pawl h', and the ratchet h on the numbering-wheels when said lever is entering in and passing through the cam-groove i, and oscillates on its axis g, so that the pawl h' moves the ratchet h one tooth, and consequently, as the numberings on the wheels correspond with the number of teeth on the ratchet, shifts the numbering-wheel to the next number, which is repeated by each revolution of the drum or cylinder C.

When the pin l^2 strikes and passes over the incline of arm l' on lever F′ the fountain-roll N is moved against the distributing-roller I and delivers its ink, which is in turn taken up by the inking-rollers H and H′, which ink the consecutive-numbering wheels f, f', f^2, and f^3 when they are passing by on their way to make the impression. The spring i^5 oscillates the fountain back again into its original position when the pin l^2 has left the incline of arm l'.

By each movement of the fountain-frame F the fountain-roll N is also turned a little by the action of the ratchet m on its striking against the stationary pawl m', secured to frame G. If more or less ink is desired the spring-plate t is screwed looser or tighter against the fountain-roll N, thereby allowing the latter to take more or less ink over to the distributing-roller I.

In order to assure a uniform inking of the consecutive numbering and marking wheels, the inking-rollers H and H′ turn loosely on eccentric spindles c^3 and c^4, which, when turned, bring the inking-rollers H and H′ in such relation and contact to the consecutive-numbering wheels f, f', f^2, and f^3 as to give a uniform inking. The spindles c^3 and c^4 are then fastened in their bearings on frame G by set-screws.

On the eccentric spindles c, c', and c^2, which

carry, respectively, the impression-cylinder D and rollers E and E′, are pins or hands *o*, *o′*, and o^2, which point to graduations of half-circles on the frame A, and record the different thicknesses of paper which may be used and which require a separate adjustment or setting of the impression-cylinder D and rollers E and E′ relatively to each other, and of the impression-cylinder D relatively to the consecutive-numbering wheels. By this arrangement the operator of the machine is able to make a quick adjustment of the different rollers E and E′ and impression-cylinder D when the thickness of paper is changed.

In order to accomplish the printing of the consecutive numbers and marks—"yards," for instance—in the right spaces of measurement I make the circumference of an imaginary circle drawn over the faces of the type, when outside of the cylinder C, from the center of the cylinder or drum exactly one yard, so that one type of one consecutive-numbering wheel, making one revolution with the drum, measures and prints off on the paper one yard, and by the next revolution the same consecutive-numbering wheel, changing to the next number, as before described, measures and prints off two yards, and so on—that is, one yard in measurement by each revolution and consecutive numbers of yards by the farther revolutions—until the consecutive-numbering wheel has itself made a revolution around its own axis, when it will commence again to print one yard, two yards, and so on. The next consecutive-numbering wheel, *f′*, has as consecutive numbers and marks "$\frac{1}{4}$ yard," "$1\frac{1}{4}$ yard," "$2\frac{1}{4}$ yards," and so on.

The numbering-wheel f^2 has the halves in consecutive numbers, and numbering-wheel f^3 has the three-quarters in consecutive numbers, so that in this case, as represented in the drawings, I print by one revolution of the drum C one yard, which is divided in exact quarters, halves, three-quarters, and yards; but I do not limit myself to only four consecutive-numbering wheels, as I may increase or dimish the number of wheels, so as to make more or less divisions of the yard; nor do I limit myself to making the imaginary circle around the face of the type on the drum one yard, as I may also increase or diminish it in yards or change it to any other system of measurement—as, for instance, the metric.

In order to print a strip of paper in the same lengths of another size than ten yards, as in this case is represented in the drawings, I increase or diminish the divisions of numbers on the consecutive-numbering wheels and divisions of teeth on the ratchets on them to a corresponding number, and regulate the throw of lever h^2 accordingly.

To the periphery of the drum or cylinder C, and between and in line with the different consecutive-numbering wheels, I may fasten type of the same height as the type on the consecutive-numbering wheels above the drum, for printing advertisements or other matter, which would be repeated every revolution and printed between each yard on the paper.

I claim—

1. In a ribbon-paper-printing machine, the form-cylinder C, carrying the consecutive numbering and marking wheels *f*, *f′*, f^2, and f^3, as described, in combination with the feeding arrangement, consisting of rollers E and E′, rotating loosely on eccentric spindles *c′* and c^2, and impression-cylinder D, consisting of a rubber covering without seams or joints cast on a hollow shell rotating loosely on eccentric spindle *c*, all arranged and constructed as and for the purpose specified.

2. In a ribbon-paper-printing machine, the rollers E and E′ and impression-cylinder D, which consists of a rubber covering without seams or joints cast on a hollow shell, in combination with the eccentric spindles *c′*, c^2, and *c*, on which said rollers E and E′ and impression-cylinder D, respectively, rotate loosely, and the set-screws *s′*, s^2, and *s*, to fasten said eccentric spindles, all arranged as described, and for the purpose as specified.

3. In a ribbon-paper-printing machine, the form-cylinder C, carrying the consecutive numbering and marking wheels *f*, *f′*, f^2, and f^3, as described, in combination with the eccentric spindles c^3 and c^4, on which rotate loosely the inking-rollers H and H′, as described, and for the purpose as specified.

4. In a ribbon-paper-printing machine, the pedestal *e′*, provided with a pin, *g*, on which rotates the consecutive numbering and marking wheel *f*, which has on one side a ratchet, *h*, in which engages pawl *h′*, fastened to lever h^2, oscillating on pin *g*, and on the other side a notched ring, h^3, in which engages the spring h^4, all arranged and constructed as described, in combination with the cam-groove *i*, as described, and for the purpose as specified.

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Witnesses:
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WM. HECKERT.