

Sheet 2, 4 Sheets.

B. Beniowski.

Printing Press.

N^o 7,558.

Patented Aug. 13, 1850.

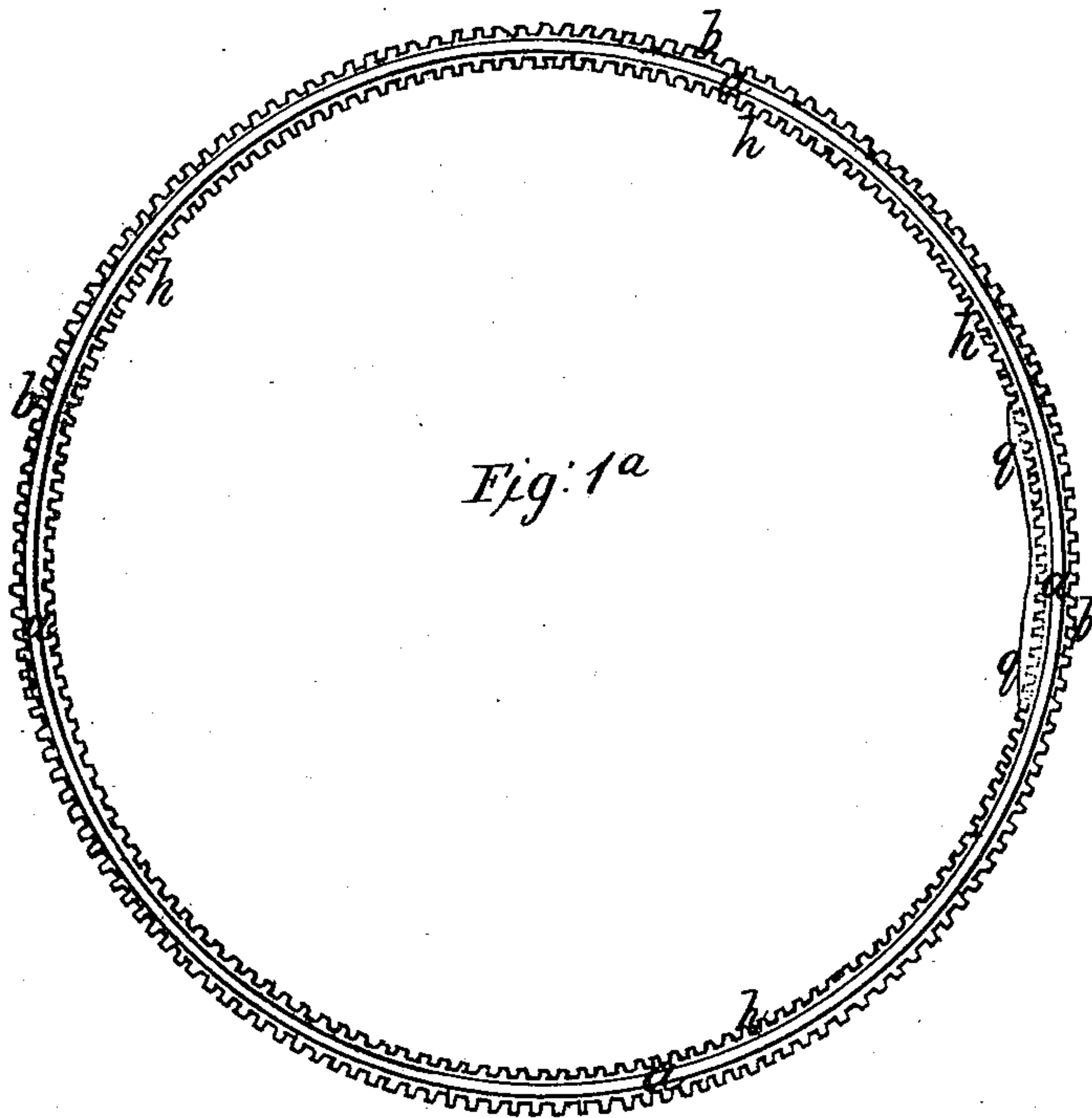


Fig. 1a

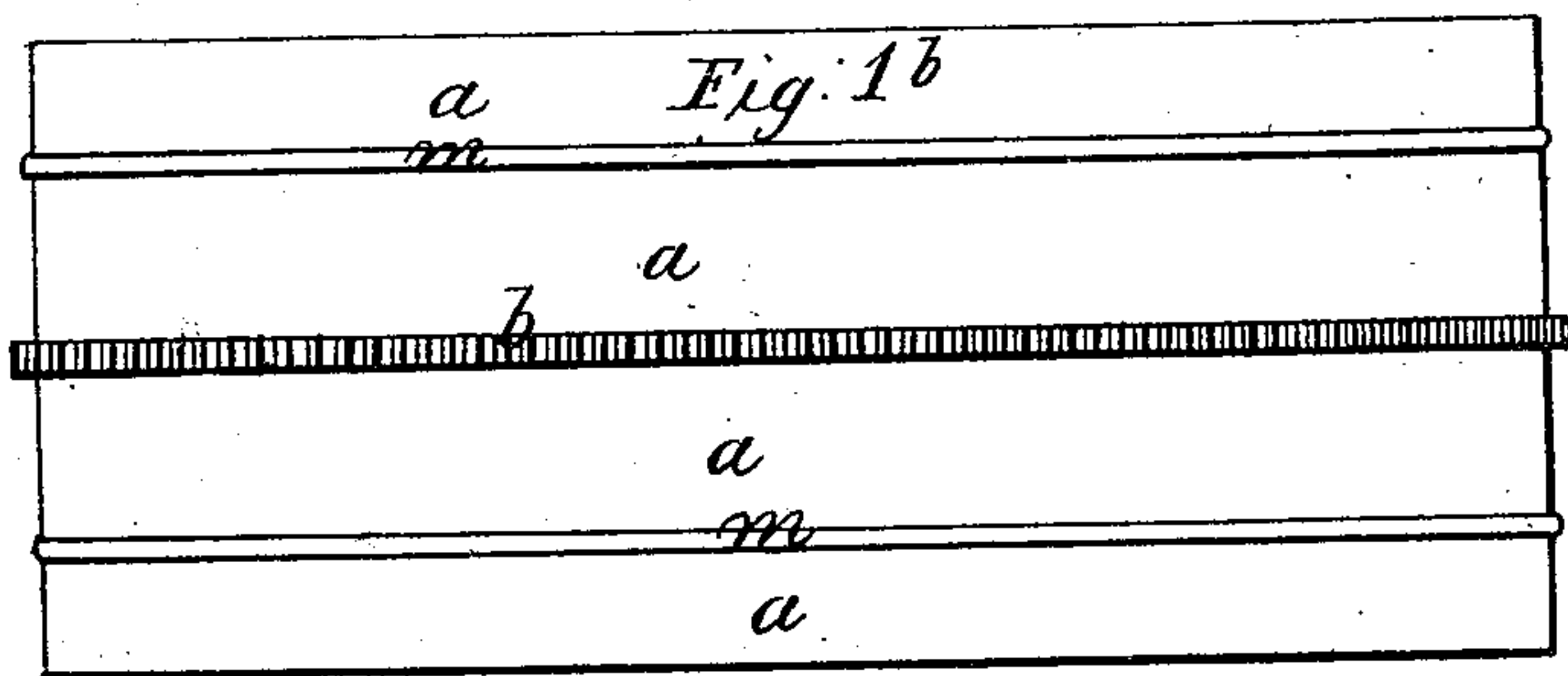


Fig. 1b

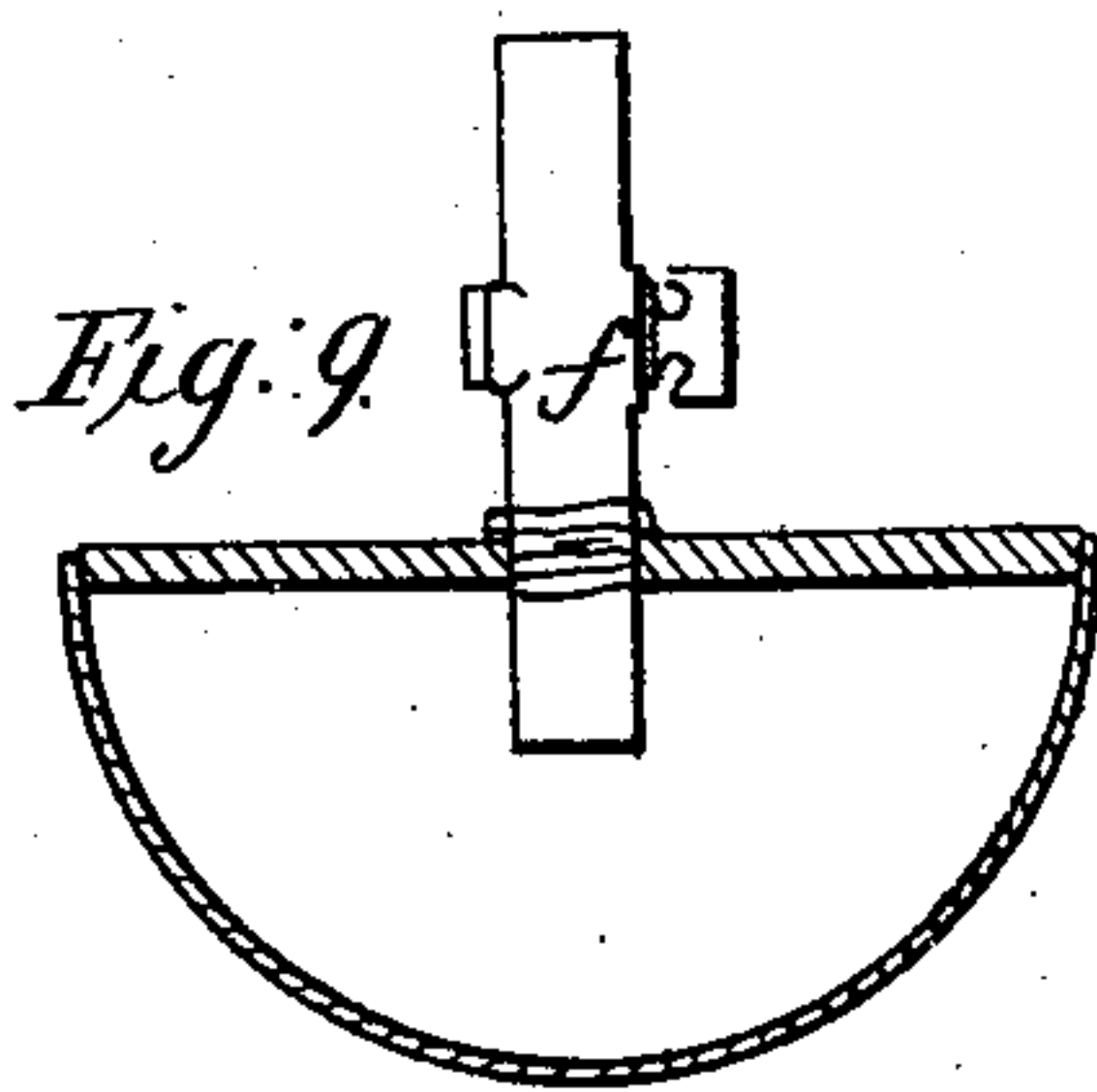


Fig. 9

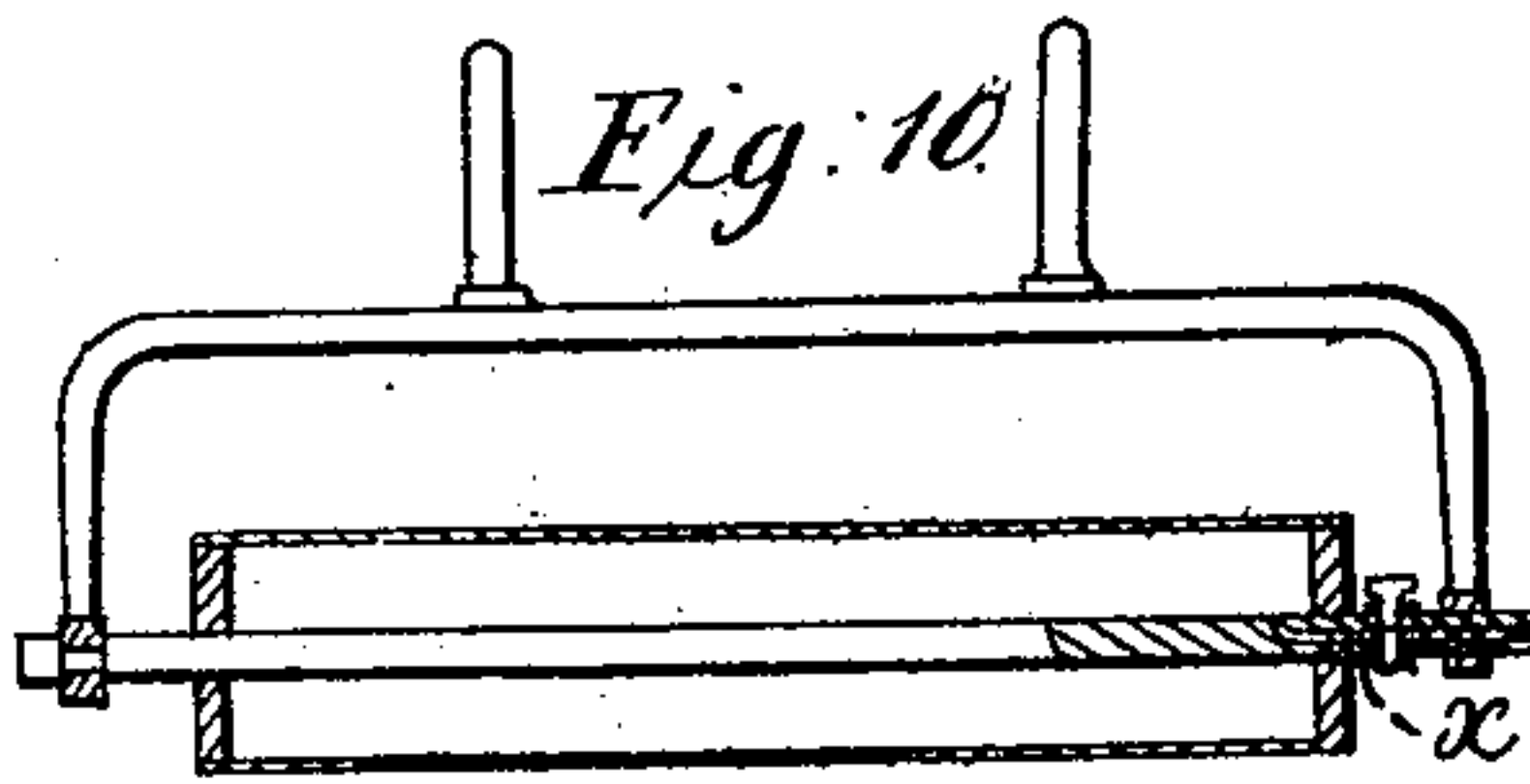
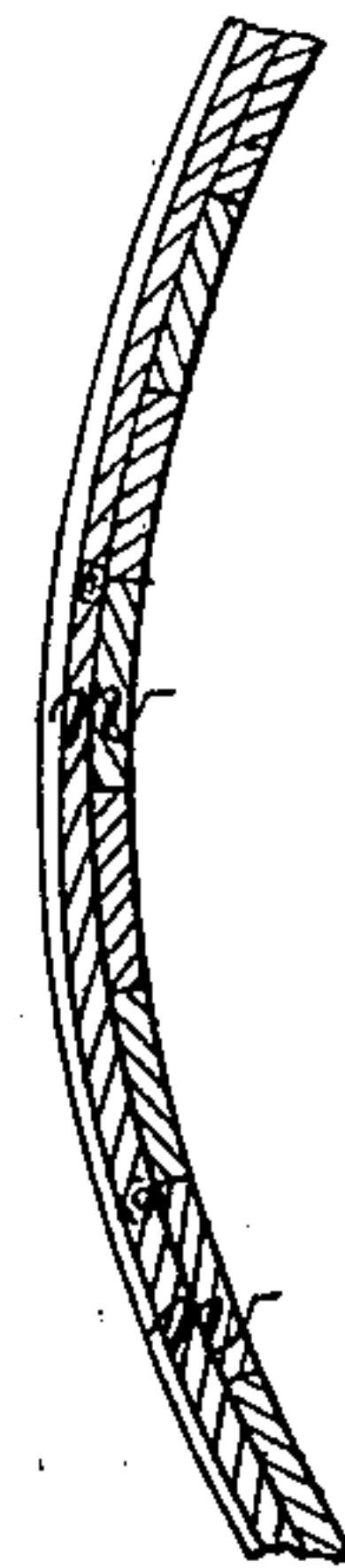


Fig. 10

Fig. 6



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Fig. 2.

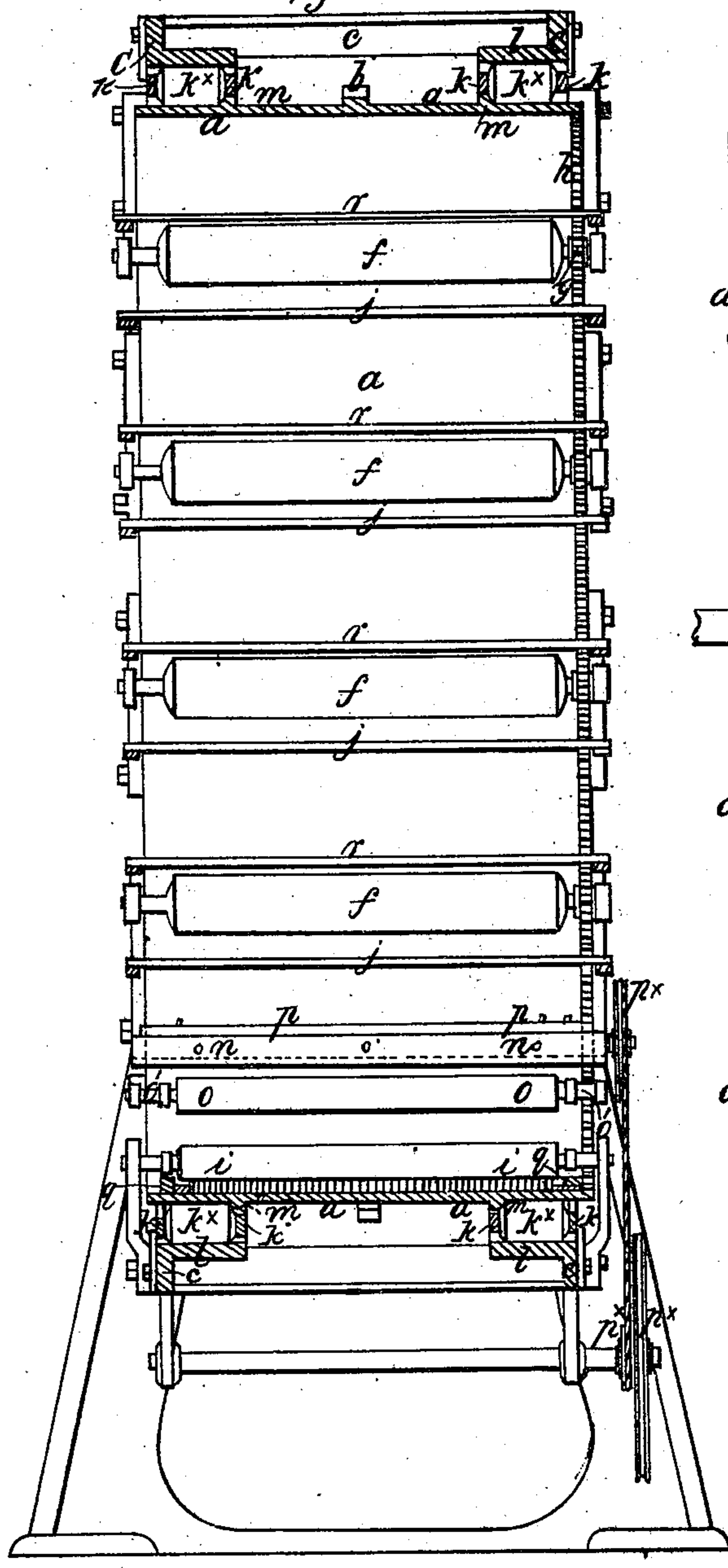
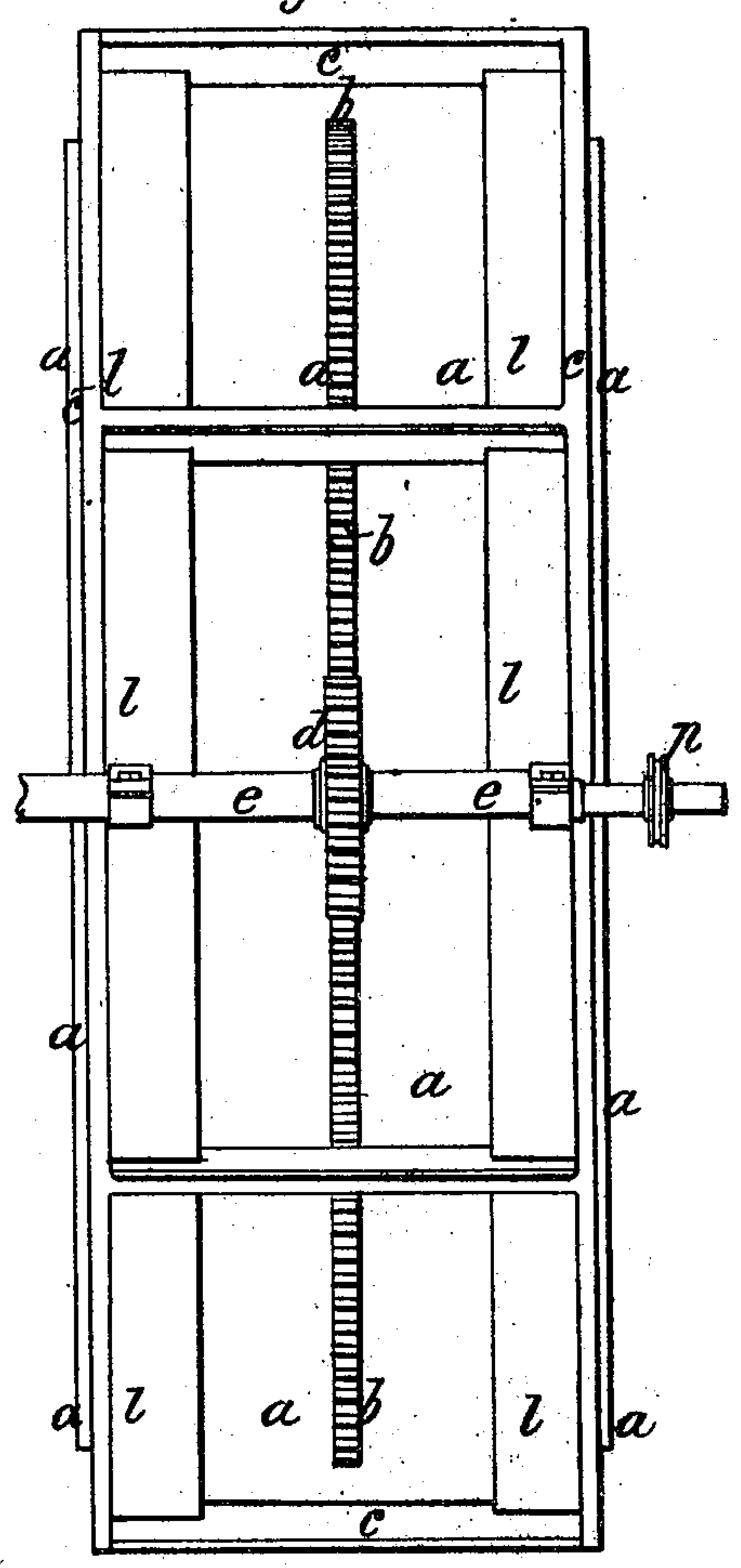


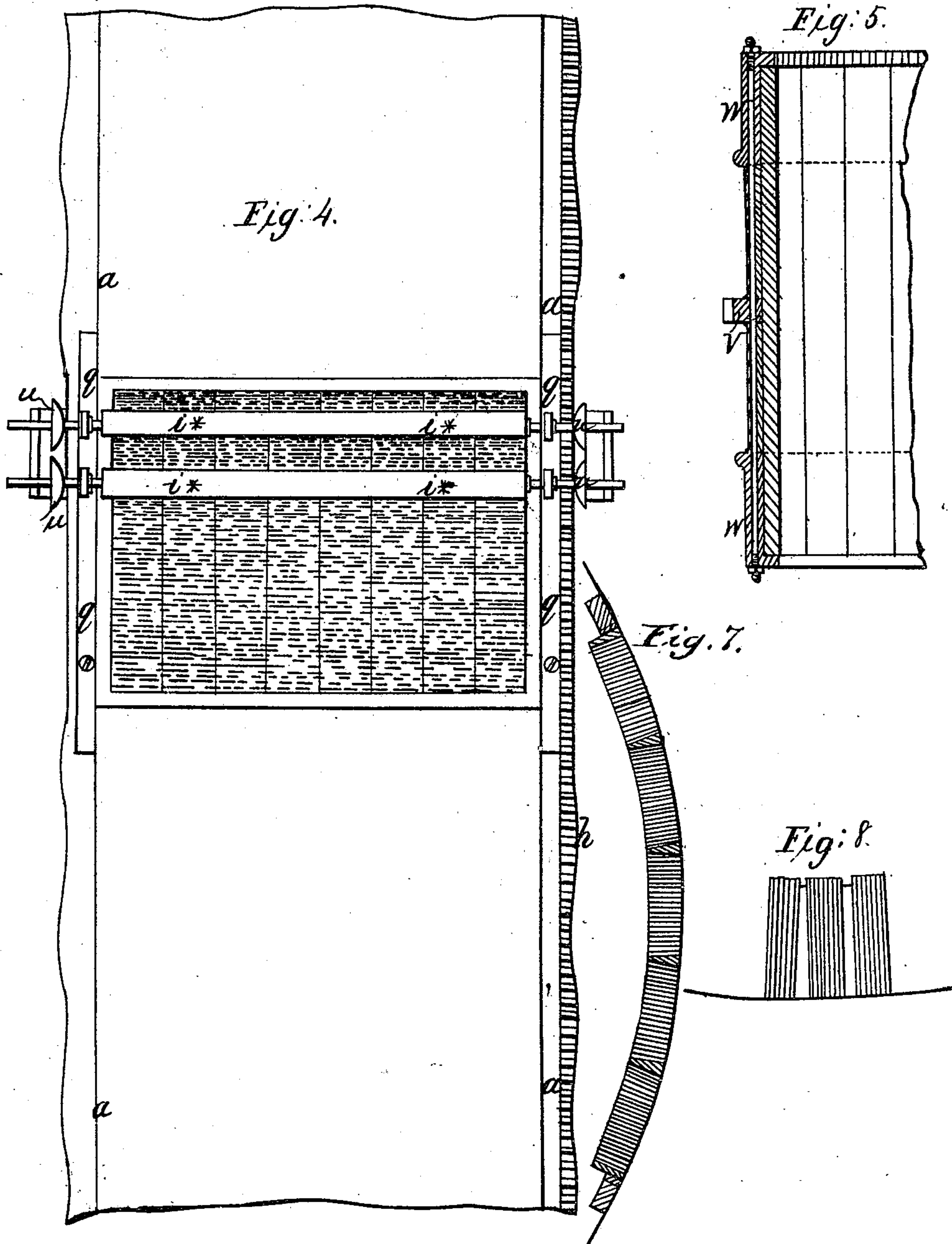
Fig. 3.



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Patented Aug. 13, 1850.



UNITED STATES PATENT OFFICE.

B. BENIOWSKI, OF LONDON, ENGLAND.

CYLINDER PRINTING-PRESS.

Specification of Letters Patent No. 7,558, dated August 13, 1850.

To all whom it may concern:

Be it known that I, BARTHOLOMEW BENIOWSKI, a Polish refugee now residing at Bow street, in the county of Middlesex and Kingdom of England, have invented and discovered a new and useful invention of Improvements in Machinery for Printing; and I do hereby declare that the following is a full and exact description thereof.

My invention of improvements in machinery for printing relates in the first place to the construction of a novel arrangement or construction of machinery for letter press or other printing whereby a larger number of impressions may be obtained in a given time from one form of composition than by the printing machines now in general use.

The invention relates secondly to an improved mode of making the inking rollers or apparatus employed for inking the types and this part of my invention may be employed in conjunction with my other improvements or independent of them and applied to other machinery or apparatus for printing.

The difficulties that were hitherto in the way of those who attempted by cylindrical printing to substitute a continuous circular motion of printing surfaces for their evidently disadvantageous usual alternate rectilinear motion were mainly the following—First, the difficulty of fixing types in general, and the usual types in particular upon a cylindrical surface; a difficulty increasing in the ratio of the increase of the diameter of the cylinder on account of the centrifugal force which becomes developed when the machine is in motion and which tends to throw off the types from the surface of the cylinder; destroy the composition and derange the other parts of the machine, and also endanger the safety of the workmen and bystanders. Various remedies from the time of Nicholson up to this day have been devised to obviate these evils. Some of these plans may have been partially successful, but to form a really cylindrical printing surface by means of conical types is very difficult and cannot I believe ever be practically and generally useful on account of the unavoidable expenses of having types

of a peculiar form and dimensions for each particular kind of type and each particular diameter of the cylinder upon which such conical types are to be used especially as such types could not also be employed for the purpose of ordinary printing.

In order to use the ordinary type upon a cylinder the diameter of such cylinders must be increased, but with this increase besides the inconvenience already mentioned of the difficulty of securing the types thereon another inconvenience arises—viz, that the increased diameter of the chief cylinder with the printing cylinders, inking rollers, distributing rollers, fountain roller, and other parts which must be mounted on the outside of the large cylinder the whole machine would occupy a greater space in width and height than would be profitably practicable. To remedy these inconveniences I have devised the following plan which will be sufficiently explained by the accompanying drawings and the description thereof.

The principal feature of novelty consists in securing the type or blocks to the inner or concave surface of a cylinder in place of the outer circumference as has hitherto always been done. By this arrangement the centrifugal force developed during the rapid rotation of the large cylinder has the effect of retaining my types in their proper places rather than of deranging them as was formerly the case.

Figure 1, Sheet I, represents a longitudinal vertical section taken through my improved cylinder printing machine near the middle. Fig. 2 is a transverse vertical section of the same.

The machine consists principally of a large working cylinder *a, a, a, a, a, a* shown detached in plan and elevation in Figs. 1^a and 1^b, Sheet II, to the inner or concave surface of this cylinder the form of types is secured by screw bolts or in any other convenient manner. This large cylinder is furnished on its outer periphery and nearly equidistant from the sides with a toothed rack *b, b, b, b*, which extends all around the same (and is seen best in Fig. 3) which represents the cylinder mounted in its frame *c, c, c, c, c, c* in the manner hereafter described. The rack *b, b*, of the large cylinder gears into a

toothed wheel d, d , on the main driving shaft e which is mounted in bearings attached to the framing. Any convenient number of printing or impression cylinders f, f, f, f, f, f, f dependent of course upon the internal capacity of the large cylinder are placed therein but run in bearings attached to the framing c, c, c . These impression cylinders f, f , carry at one of their ends toothed wheels g, g, g , which gear into a circular rack h, h, h, h made on the inner or concave side of the large cylinder and extending all around the same as seen in Fig. 1. As the printing or impression cylinders f, f are placed in the large cylinder a, a, a , but have their bearing outside the same and as the inking rollers i, i, i, i, i, i and the delivering and feeding rollers and tables j, j, j, r, r, r , and other parts of the machinery are situated within the large cylinder it will be obvious that the latter must be driven from the outside and must not be permanently attached to anything inside, it is therefore supported by two pairs of rings k, k, k, k , furnished with suitable antifriction rollers k^*, k^*, k^* , k^* which run on a pair of wide circular rails l, l, l, l , cast on or attached to or forming part of the framing. The large cylinder is prevented from moving laterally out of its place when rotating, by two ribs m, m, m, m which are cast on its outer surface and bear against the inner edges of the antifriction rollers k^*, k^* as the cylinder rotates (as seen best in Fig. 2). The form of type is as before mentioned secured in any suitable and convenient manner to the inner surface of the cylinder as shown and the remaining portion of the concave surface of the cylinder is employed as a table for distributing the ink and supplying the inking rollers i, i , therewith. These latter are mounted in suitable bearings attached to the framing as shown and are kept in contact with the distributing table by means of coiled springs which bear on their axles and always press them outward. The inking apparatus is seen at n, n , and consists as usual of a fountain or trough p , containing a quantity of ink which is gradually supplied to the machine by a ductor roller n^* which is constantly in contact with the ink of the fountain n , as is well known and is made to rotate slowly by means of bands and pulleys p^*, p^*, p^* connected therewith and communicating with the main shaft of the machine (as seen best in Fig. 1). From the ductor roller n^* , the ink is communicated to a second or vibrating roller o , mounted at one end of an arm or lever and worked by cam pieces q, q , secured to the large cylinder near the place where the form of type is secured. The cam pieces q, q , also serve to raise up the inking rollers i, i, i, i , and the distributing rollers i^*, i^* as the form of type comes around and thereby ink the surface of the

types as will be hereafter more fully explained. r, r, r, r, r, r are boards or tables containing piles of paper which is fed into the machine sheet by sheet by boys and j, j, j, j, j, j , are other boards for delivering the printed sheets as they issue from the machine near each impression cylinder a bell crank vibrating lever t, t, t, t, t, t , furnished with a drop-down bar t^* , or small rollers at each end is mounted for the purpose of laying hold of the blank sheet of paper and carrying it into the machine. These bars t, t, t , are also worked by the cam pieces q, q , as will be hereafter explained.

It will be understood by every practical printer that in order to distribute the ink in a proper manner on the cylindrical distributing table it will be necessary to give the distributing rollers $i^* i^*$ an alternate horizontal motion in the direction of their axes as well as a rotary motion, and this is effected in the following manner. Upon referring to the detached view Fig. 4, sheet II, which represents a portion of the internal surface of the large cylinder a , laid out flat with the form of type and some other parts of the machine, it will be seen that the axles of the distributing rollers i^*, i^* , are furnished at each end with conical friction pulleys u, u , and that the edges of the large cylinder instead of being straight or even, are waved or made with curves in the form of a cam all around except that part where the form of type is placed, and as the faces of the friction pulleys u, u , bear against these curved or cam shaped edges they will be moved laterally backwards and forwards and so communicate the required motion to the distributing rollers.

The operation of the machine is as follows: Supposing the form of type to have received a supply of ink from the inking roller (i), the form will advance in the direction of the arrow and by the front part of the cam piece q, q , coming against the small roller at the lower end of the first bell crank lever t , the "drop-down bar" t^* , at the end of the upper arm of the lever will catch hold of the sheet of paper that the boy has placed there for the purpose and the impression cylinder will by its rotation carry the same into the machine when it will receive an impression from the form of type as this latter proceeds and will afterwards be delivered from the upper side of the impression cylinder onto the delivering table j , above. The form then passes on and comes in contact first with the second inking roller, then with the second printing cylinder and so on until it has passed all the impression cylinders which with their accessories, such as inking rollers, and drop-down bar, are all actuated in precisely the same manner and each impression cylinder will therefore print one impression for

every revolution of the large cylinder. The axle o^1 of the vibrating roller o of the inking apparatus carries two small rollers one at each end against which the cam piece q comes in contact and lifts up the vibrating roller o , to the ductor roller n^* at every revolution of the large cylinder and keeps it in contact therewith until it has received a supply of ink and when the cam piece q passes onward it lets the vibrating roller o , down onto the distributing table which is thereby furnished with a fresh supply of ink. I would here observe that the axles of the distributing rollers i^* , i^* , and the inking rollers i , i , are furnished with small rollers against which the cam piece q , comes in contact as it moves around and will thereby lift up the same when required but as it is necessary that the form should pass under the distributing rollers without being touched by them the rollers on their axles are made of greater diameter than those on the axles of the inking rollers.

In Figs. 1, 2, and 3 I have represented the large cylinder a , a , as constructed entirely of iron or metal but it is obvious that other materials may be used for part thereof without injuriously affecting the strength or stability of the machine, for instance in Figs. 5 and 6 I have shown two sectional views of a plan of constructing the large cylinder partly of wood and partly of iron. In this instance the cylinder is composed of a framing consisting of three strong metal rings w , w , and v , firmly bolted together by cross ties as shown in the drawing, the body of the cylinder is formed of strong planking the ends of which abut against the flanges of the outside rings w , w , and are secured in their places by the strong tie-bolts before mentioned.

It will be evident that when my improved machine is used for printing, the type must be secured in a curved surface and therefore the ordinary "chase" in which type is usually imposed cannot be employed. I therefore construct chases or galleys with the proper curve and impose upon an imposing table whose surface is made of the required concave curve also, and when imposing newspaper work I employ wedge formed column rules and furniture whose bases or lower ends are larger than their upper ends. I also propose in some cases to employ wedge formed spaces and leads in lieu of the ordinary ones their lower ends being wider than the upper ends. In Fig. 7 I have shown an enlarged view in section of a chase constructed in the manner just described showing the wedge formed column rules therein and at Fig. 8 I have shown a quantity of type set up with wedge formed spaces and furniture. I would also observe that if thought desirable more than one form of type may be secured to the inner or concave

surface of the large cylinder, but in such case it may be necessary to have an additional inking cylinder.

The second part of my invention relates to an improved method of constructing or making the inking rollers or balls used in letter press or block printing. This part of my invention I intend to apply to my improved machine just described, but it is equally applicable either to the ordinary hand press or to any of the printing machines now in general use. By my improvement I make the rollers or balls much lighter cheaper and more durable and permanently elastic than the ordinary balls and rollers. To effect this I substitute for the usual composition either india rubber or gutta percha. I make them also of some air tight substance which I fill with compressed air. Many substances may be used for this purpose such as gut, bladders, impervious cloth or sheet india rubber. I prefer this last. Fig. 9, Sheet II, represents an inking ball made according to my improvements, the back is a disk of wood or any other suitable material having a hole in the center in which is fitted a tube as a handle furnished with a stop cock f , the lower part is a segment of a sphere formed of an air tight substance attached to the disk with an air tight joint. The air is then pumped into the interior of the ball through the handle and is retained there by turning the stop cock when filled. Fig. 10 represents a cylindrical inking roller to be worked by hand. To the iron axle two disks of wood or other material are affixed. One end x , of this axle is made tubular as shown by the curved line and furnished with a stop cock. An air tight substance of skin, india rubber, or other suitable material is attached to the disks and made air tight at the joints by well known means. The air is then pumped in and retained by turning the stop cock. The roller is in all other respects similar to the ordinary ones and is to be used in the same manner. Cylindrical rollers intended for printing machinery are to be made in a similar way to that just described.

Having now described my invention and the best means with which I am acquainted for carrying the same into effect I would observe in conclusion that I do not intend to confine myself rigidly to the precise arrangement or construction of parts herein shown as they may perhaps be varied without departing from the nature and object of my invention, but that which I consider to be new and therefore wish to claim as the invention secured to me by the present patent is—

1. Constructing a printing machine in which the form or forms of types or blocks are placed on or secured to the inner or concave surface of a cylinder or drum which is

made to revolve and carry the form or forms secured thereto from the inking rollers to the printing or impression cylinders all of which parts are mounted inside the cylinder
5 or drum.

2. I claim the methods above shown and described of making the inking rollers or balls of printing presses or machines.

In witness whereof I, the said BARTHOLO-

MEW BENIOWSKI, have hereunto set my hand 10
and seal this thirteenth day of January, in
the year of our Lord one thousand eight
hundred and forty-nine.

BARTHOLOMEW BENIOWSKI.

Witnesses:

J. W. MOFFETT,
FRED WALKDEN.