

(No Model.)

G. R. PHILLIPS.
DRYING CYLINDER.

No. 543,051.

Patented July 23, 1895.

FIG. 1.

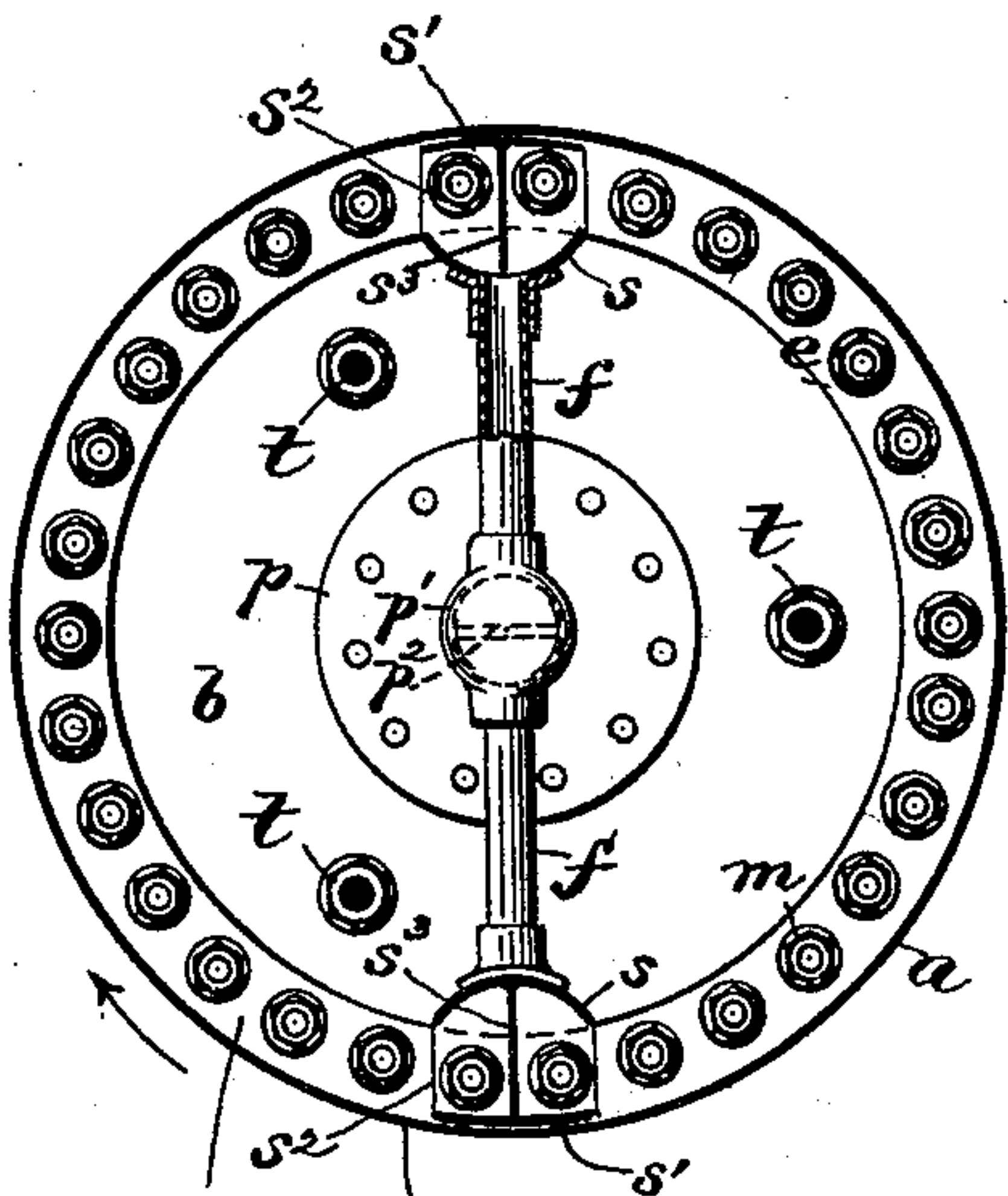
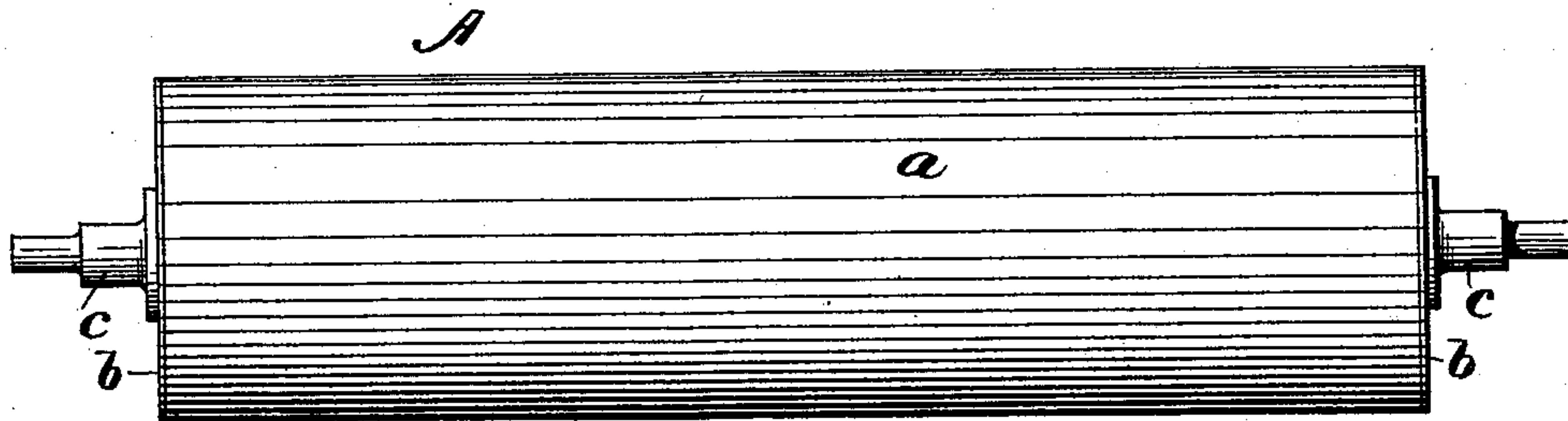


FIG. 3.

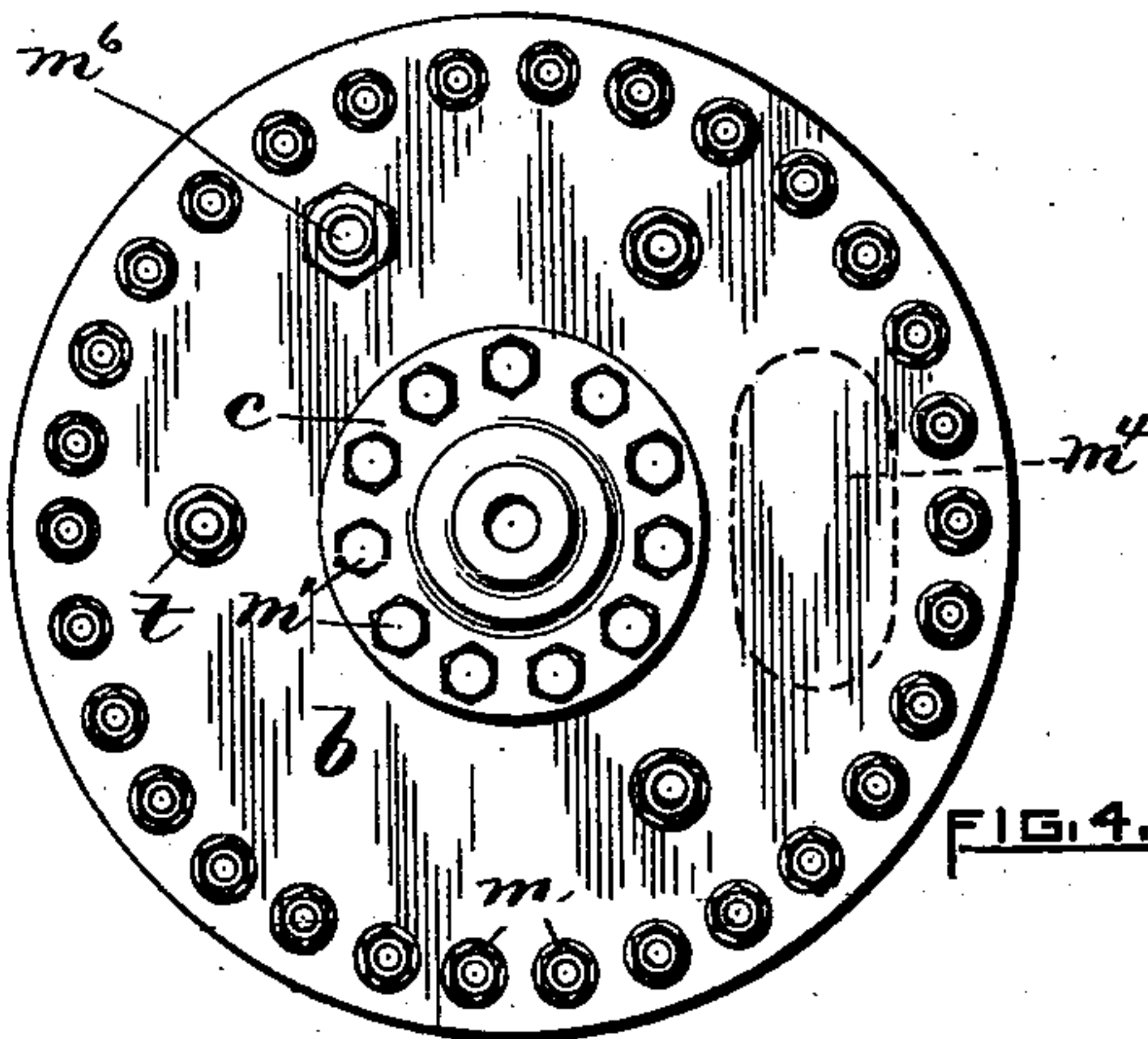


FIG. 4.

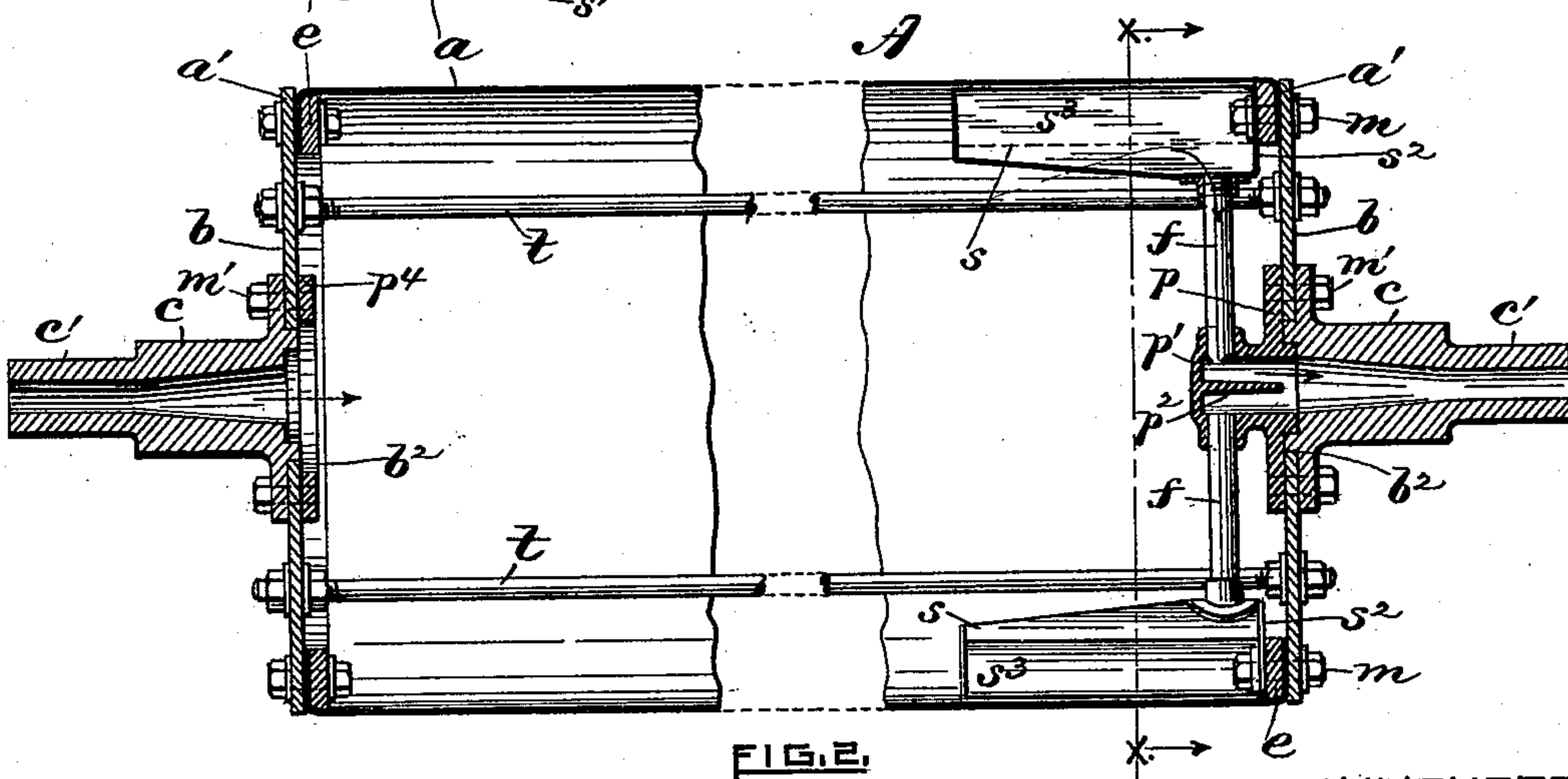


FIG. 2.

WITNESSES.

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DRYING-CYLINDER.

SPECIFICATION forming part of Letters Patent No. 543,051, dated July 23, 1895.

Application filed June 11, 1891. Serial No. 395,853. (No model.)

To all whom it may concern:

Be it known that I, GEORGE R. PHILLIPS, a citizen of the United States, residing at Providence, in the county of Providence and State of Rhode Island, have invented certain new and useful Improvements in Drying-Cylinders; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to letters of reference marked thereon, which form a part of this specification.

My invention relates to drying-machines, but more especially to the horizontally-mounted copper drying-cylinders of such machines over which wet fabrics or yarns are passed. The journals or trunnions of this class of revolving cylinders are usually hollow, one end being adapted to receive steam under pressure, whence it passes into the cylinder and escapes as water or condensed steam through the opposite journal.

I am well aware that drying-cylinders have previously been provided with heads or ends having hollow trunnions or axles, through which latter the water of condensation passes after being first collected and conducted thereto by buckets secured to the interior of the revolving cylinder.

The object I have in view is to produce a much lighter drying-cylinder.

To that end my invention consists, essentially, of a copper or other suitable sheet-metal drying-cylinder having the ends thereof bent inwardly and forming integral flanges, to which are bolted sheet or plate metal heads having each a chambered metallic center or journal portion, longitudinal braces or ties uniting said heads, and removable buckets secured to the discharge end of the cylinder, each bucket being duplex or divided longitudinally and provided with a tube having its lower or inner end fitted into the said chambered head, so as to allow the tube to freely expand and contract, all as will be more fully hereinafter set forth and claimed.

In the accompanying drawings, Figure 1 is a side elevation, in reduced scale, of a drying-cylinder embodying my improvements. Fig. 2 is a central longitudinal sectional view en-

larged. Fig. 3 is a transverse sectional view taken on line $x x$ of Fig. 2. Fig. 4 is an end view.

My improved drying-cylinder as a whole is indicated by A. The end portion of the copper or sheet-metal barrel a is bent inwardly by suitable means, thereby forming a comparatively-narrow integral flange a' .

Each head portion of my improved drying-cylinder consists of a comparatively thin annular disk-shaped piece b , of suitable plate metal, as steel, to which is bolted a flanged cast-iron exterior center or trunnion c , its outer portion being reduced in diameter to form a journal c' . I preferably provide the face of the trunnion c with a projecting peripheral flange arranged to fit the corresponding enlarged center hole b^2 of the head disk b , bolts m' , passing through the said center head b , and a narrow annular flange p^4 , serving to rigidly secure the parts together. The trunnions c are hollow—that is, they are provided each with a central hole extending longitudinally through it, as clearly represented—steam being admitted into the cylinder at one end through the corresponding trunnion and discharged therefrom at the opposite end through the other trunnion. The end flanges a' of the cylinder are each backed by an annular metallic plate e , between which and the head b it is snugly clamped by a series of bolts m , the parts being suitably washered or packed, so as to form steam-tight joints. The heads themselves are braced by a series of tie-rods t , passing longitudinally through them, suitable nuts and washers being employed to retain them in place and also to prevent leakage of steam, as clearly shown in Fig. 2.

The discharge end of the cylinder is as drawn provided with two oppositely-arranged buckets or scoops s , each being provided with a longitudinal partition s^3 , thereby dividing the bucket into two parts. The two ends of the bucket are closed. Each bucket is secured to the end or head b of the cylinder by means of the head-bolts m before described, the same also passing through the outer end s^2 of the bucket. (See Figs. 2 and 3.) By this arrangement it will be seen that rivets are dispensed with, thereby avoiding leaky joints. The buckets, moreover, can be readily removed when desired, a feature not common

to cylinders as usually made. The lower side of the bucket is slightly concave and tapering downwardly toward the outer end thereof, at which point is centrally secured a drainage-tube *f*, the latter extending in a radial direction, its inner or lower end being so fitted into a hollow head or expansion chamber *p'* as to permit the tube to freely expand and contract. This head is further provided with an enlarged flange *p*, by means of which, in connection with the bolts *m'*, the whole is firmly secured to the corresponding or discharge center *c*. The head *p'* is also provided with a transverse partition *p²*, thereby practically dividing the chamber and causing the discharge water from each bucket to be deflected in turn into the trunnion. It will be seen that by this arrangement the buckets may be readily detached from the cylinder, and by means of the comparatively snug-fitting tubes *f* the latter are permitted to freely expand and contract without injury to themselves or to the cylinder. Another advantage resulting from my improved drying-cylinder is that it may be mounted and revolved in either direction, as desired, without rearranging or adjusting the buckets.

In cylinders having a comparatively-large diameter I preferably provide one or both heads with manholes, substantially as indicated in Fig. 4 by the dotted lines *m⁴*. Cylinders of this class are usually provided with vacuum-valves which open inwardly and automatically in case a minus pressure be produced in the cylinder, thereby preventing the latter from collapsing. *m⁶*, Fig. 4, indicates a valve of this character as common.

By means of my improvement it is obvious that the heads may be readily removed, as would be impossible in cylinders constructed as usual. The cylinders also are very much lighter and at the same time stronger and are driven with less power. The buckets may at any time be easily and quickly removed without injury to the barrel of the cylinder.

Assuming my improved drying-cylinder A to be mounted and driven substantially as common, the operation of the buckets, &c., will be substantially as follows: Steam enters the

revolving cylinder through the left trunnion *c*, Fig. 2, the water of condensation passing into the advancing open sides of the buckets; thence as the latter pass upwardly past the horizontal center it flows therefrom through the corresponding pipe *f* into the expansion-chamber of the head *p'*, the partition *p²* diverting the water into the discharge-trunnion *c*. (See arrow direction.)

I claim as new and desire to secure by United States Letters Patent—

1. The drying-cylinder, substantially as hereinbefore described, the same consisting of the sheet metal barrel portion *a* having inturned ends or flanges *a'*, outer and inner annular sheet metal plates *b, e*, located at each end of the cylinder having the said flanges *a'* interposed between and rigidly secured to the said plates, hollow central trunnions secured to the said outer plates *b*, tie-bolts or braces *t* extending longitudinally of the cylinder and uniting the heads, and buckets or scoops removably secured to the discharge end of the cylinder and communicating with the discharge trunnion thereof, substantially as set forth.

2. In a drying-cylinder, the combination of the oppositely arranged double chambered buckets *s* removably secured to the cylinder-head, discharge tubes *f* leading from the buckets, and a double chambered central head member *p* communicating with the discharge trunnion having the inner ends of said discharge tubes movably mounted in the head *p*, substantially as and for the purpose set forth.

3. The combination, in a drying-cylinder constructed and arranged substantially as hereinbefore described, of longitudinally divided removably-secured buckets *s*, and freely expanding discharge tubes *f* uniting the buckets to a chambered head communicating with the discharge trunnion.

In testimony whereof I have affixed my signature in presence of two witnesses.

GEORGE R. PHILLIPS.

Witnesses:

CHARLES HANNIGAN,
GEO. H. REMINGTON.