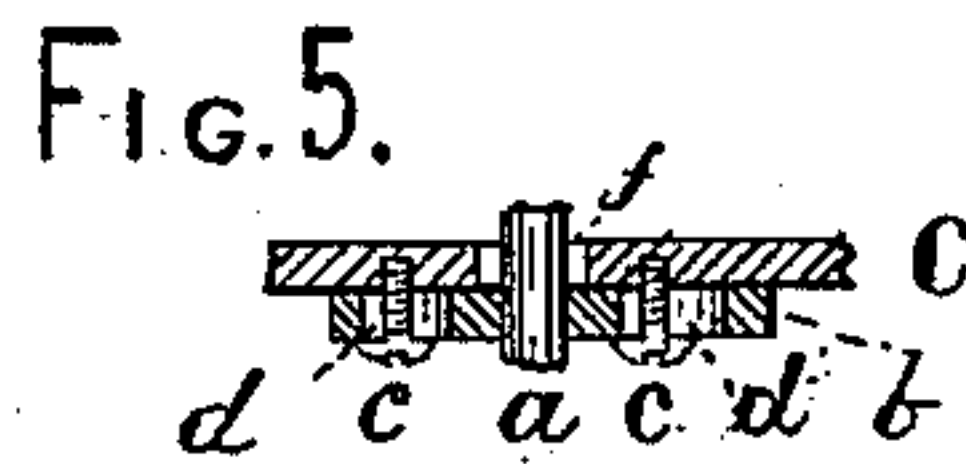
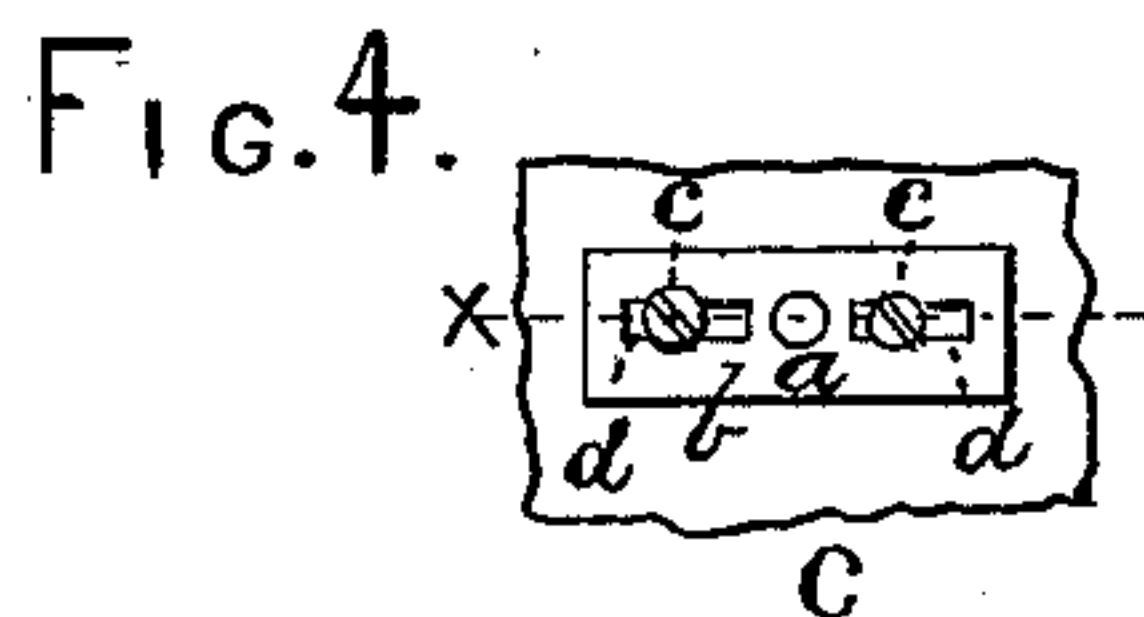
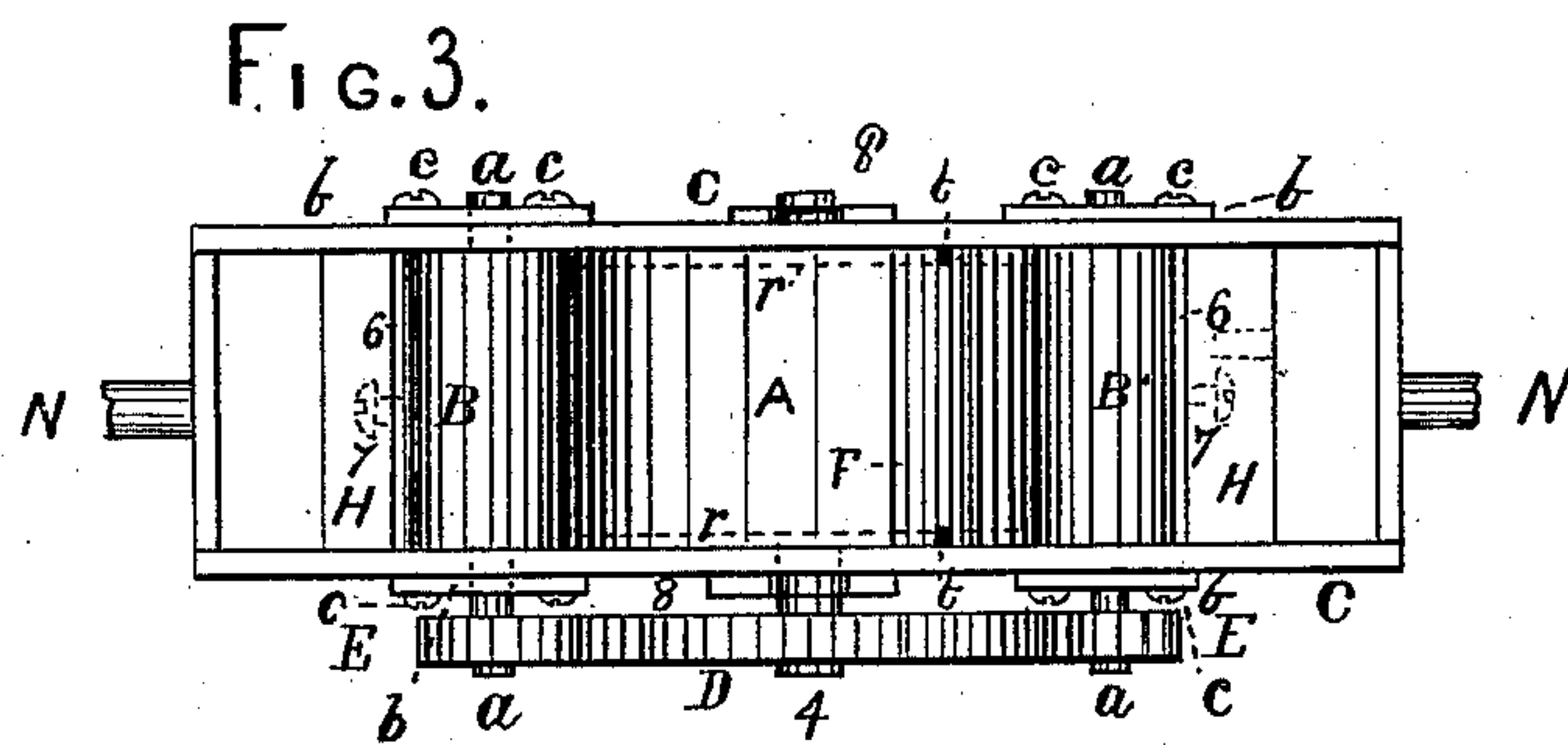
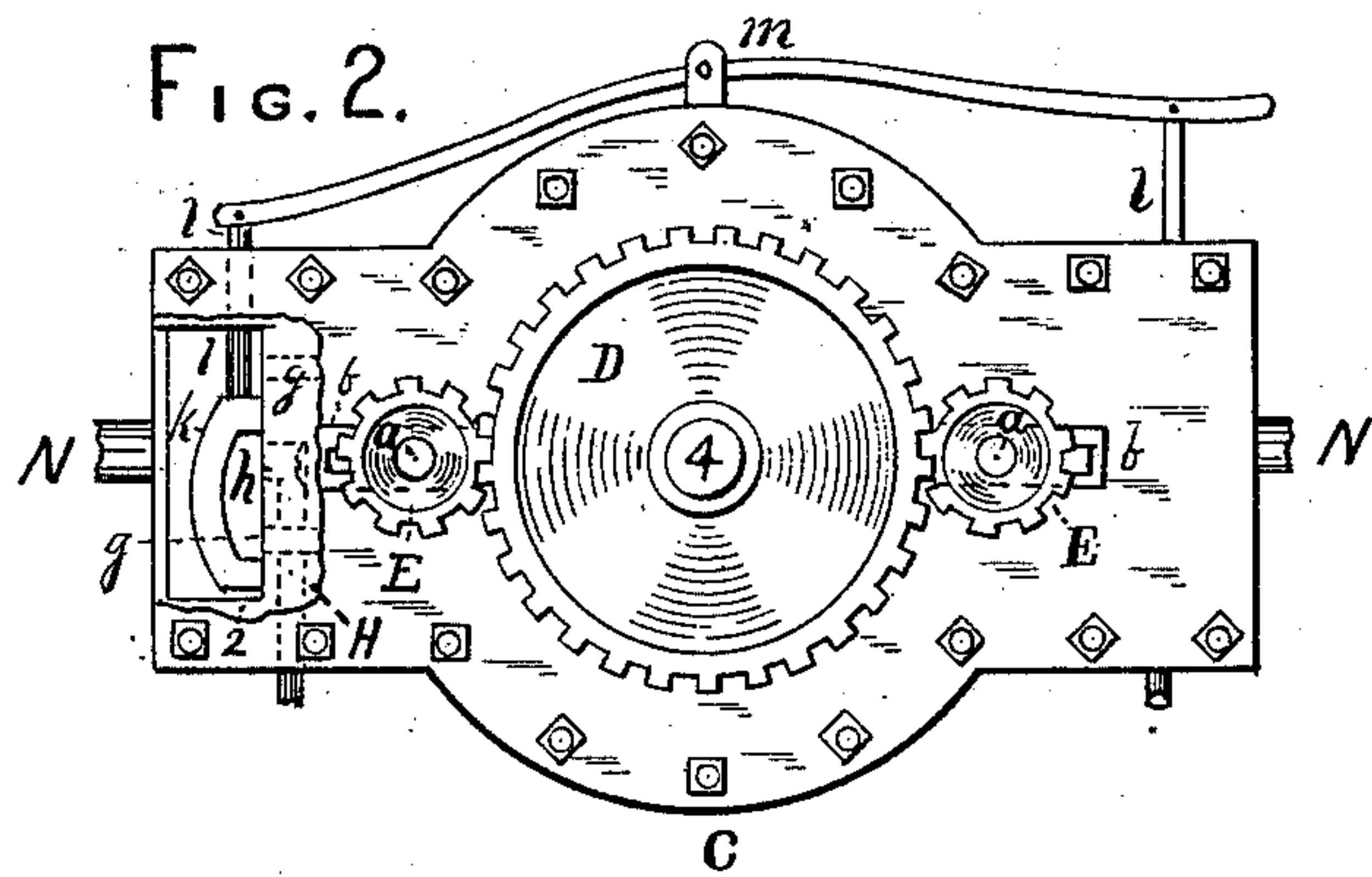
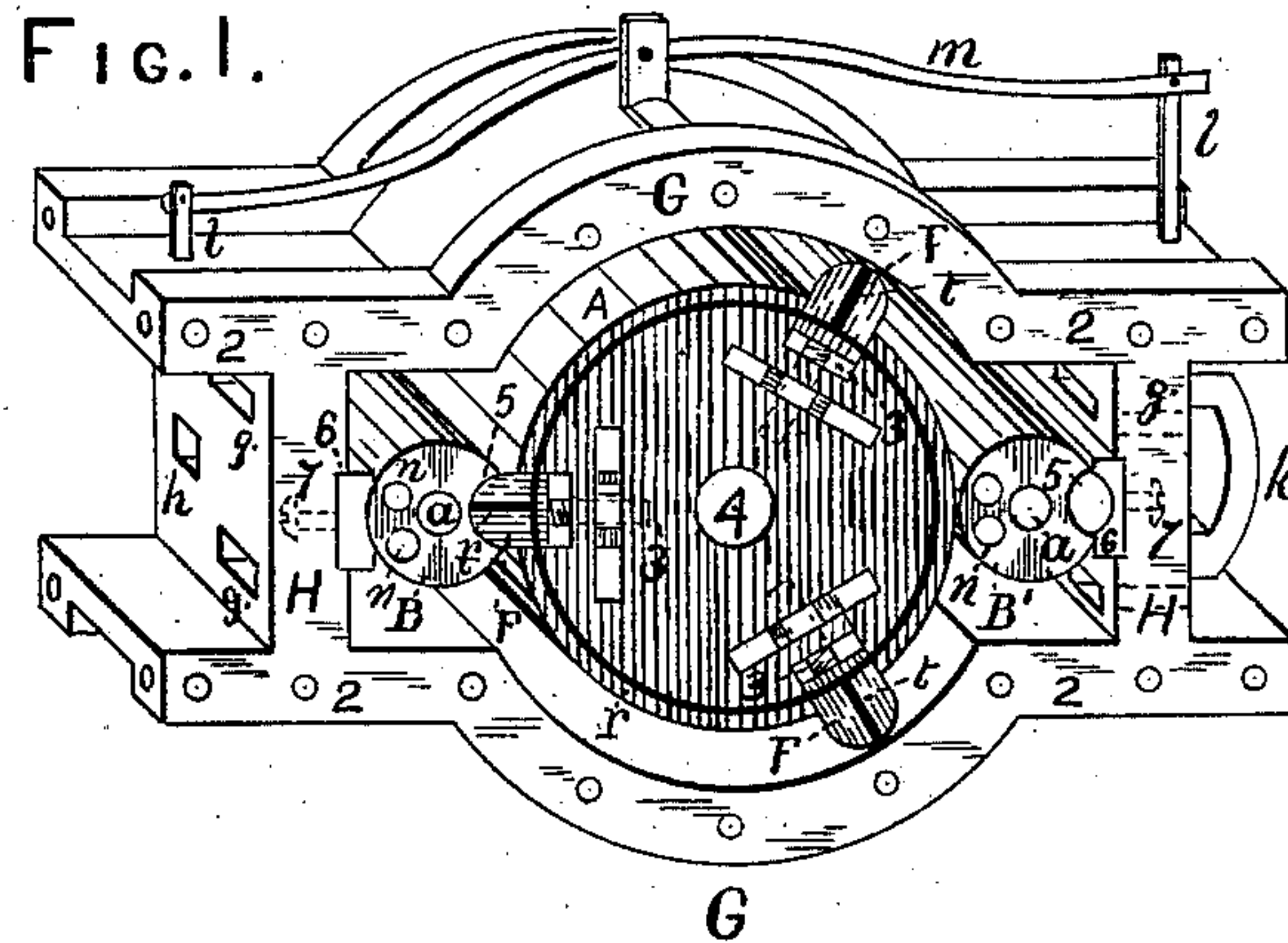


(No Model.)

J. H. McVAY.
ROTARY STEAM ENGINE.

No. 299,824.

Patented June 3, 1884.



WITNESSES:

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JAMES H. McVAY, OF SOUTH CHICAGO, ILLINOIS.

ROTARY STEAM-ENGINE.

SPECIFICATION forming part of Letters Patent No. 299,824, dated June 3, 1884.

Application filed August 20, 1883. (No model.)

To all whom it may concern:

Be it known that I, JAMES H. McVAY, of South Chicago, county of Cook, and State of Illinois, have invented new and useful Improvements in Rotary Steam-Engines, of which the following is a specification, reference being had to the accompanying drawings, in which—

Figure 1 is a perspective view of a rotary steam-engine embodying my improvements, with the heads and cog-gear removed. Fig. 2 is a side elevation, with one head partly broken away. Fig. 3 is a top or plan view, with the upper case removed. Fig. 4 is an elevation of one of the adjustable boxes. Fig. 5 is a sectional view of the same on line *x*.

The nature of the present invention consists, first, in a rotary steam-engine which has a single piston and an adjustable cut-off at opposite ends thereof, which is adjustably packed at the ends of the case, so as to compensate for the wear of the parts, and which has double ports at the ends for driving the piston, in either direction, outside gear being employed to insure a uniform movement; second, in a fabric packing on the ends of the piston, which extends through grooves on the ends of the adjustable buckets, whereby any adjustment does not in anywise affect the relative position of the packing; third, in slotted boxes attached to the outside of the case for adjusting the partitions.

I am aware that in some engines two rotary pistons are employed with buckets, and meshing into each other, the steam operating to propel both pistons, and that the shafts of such pistons have been connected by outside gear; but there is no provision made for adjusting the parts when worn, as in the construction I ask a patent for; neither are there any cut-offs, except the buckets.

I am also aware that it is common to pack the ends of rotating cylinders separately from the packing which is in the ends of the buckets; but in this case, where the packing is separate, steam finds its way between the joints to a considerable extent, and the only remedy is to pack the annular grooves in the ends of the cylinders with a fabric which extends through the grooves in the ends of the buckets. This I am not aware has been before done; but in doing it I overcome a serious

objection to the waste of steam in the rotary engine. Engines have also been constructed with three rotating pistons, with the steam and exhaust ports between them; but there are no means of adjusting them together when worn; neither are there any means on the case for adjusting the cut-off to the smaller piston. Such construction is not my invention. It is further known that adjustable buckets have been before used. I therefore confine myself to adjustable buckets which are held by screws in fixed positions, when adjusted, so as not to be thrown out and catch the parts by centrifugal force.

G G 2 represent the top and bottom part of the case, and H H are the ends thereof that separate it from the steam-chest, of which said ends form the inner plate. The parts G of the case are true segments of a circle, and are cast solid to the straight part 2 2 2 2, which in this case extend out to form the top and bottom of the steam-chests and are bolted fast to the plates H H. The outer ends of the steam-chests are removed, as are also the end plates of the case at Fig. 1; but the end plates to the case are shown at C C, Figs. 2 and 3. The piston is cylindrical in form and is shown at A, and on its periphery are buckets F, which are of the same length as the piston, and placed in grooves in its periphery made parallel to the piston's axis. The buckets F are held in fixed positions relative to the segments G by means of set-screws 3, tapped into their inner edges. The bearings 4 of the piston run in boxes 8, attached to ends C of the case.

B B' represent what I term "rotary partitions," which divide the steam-chamber in the case longitudinally in two parts. These partitions are cylindrical in form and have circumferences each one-third of the circumference of the piston, and formed in the periphery of each partition is a depression or groove 5, which runs parallel to the buckets F, and is the exact reverse counterpart of the ends of the buckets. This construction is such that the peripheries of the partitions may roll on the periphery of the piston between the buckets, and the ends of the buckets will enter the grooves 5 where passing the partitions, and form steam-tight joints between the compartments. The opposite sides of the partitions

B from the piston are made to form steam-tight joints against the plates H H by means of bearings 6, which are channeled into the plates and are made adjustable to the partitions by set-screws 7, tapped into plates H H, to force the bearings against the partitions. The bearings *a* to the partitions B are supported at the outsides of the ends C of the case by adjustable boxes *b b*, which are slotted at *d d*, that the boxes may be moved inward on the screws *c c* to keep the partitions to the pistons. As shown at Fig. 5, the bearings *a* to partitions B pass through enlarged openings *f* in the end plates, C, to the case. This is that packing may be inserted round the bearings *a*, to form steam-tight joints. The bearings 4 to the piston are packed in the same way as the bearings *a*, and for that purpose the holes where they pass through the ends of the case are also enlarged.

That the buckets F may be brought correctly into the grooves 5, gears E are placed on their bearings at one side of the case and are driven by a gear, D, three times the size on shaft 4, said gear being of the kind known as "close-cut gear," to run without lost motion. Inasmuch as the partitions run fast, the loss in weight by grooves 5 is compensated in the usual way by boring the partitions out at *n n*.

Ports *g g* are made to communicate with the steam-chests and the steam-chambers inside of the case at both ends thereof, and cup-valves *k l* are adjusted on the plates H H by means of a lever, *m*, to admit steam from one chest through one upper port to the piston above the partitions B and through a lower port from the other steam-chest to the piston below the partitions, and vice versa when the engine is to run in an opposite direction, the exhaust-

steam passing out through ports *h* in the ordinary manner of working steam at both ends of the ordinary piston-stroke engine and exhausting it. The steam in this case enters the chests through ordinary pipes, N N.

I am aware that rotary engines have been constructed with partitions or cut-offs which are moved by the buckets of the piston, and that grooved cut-offs or partitions have been in some form worked by gear inside of the case; but I have not known that the bearings to the rotating partitions of an engine have been provided with adjustable bearing-boxes and a packing-space formed round the bearings where they pass through the ends of the case.

Having thus described my invention, what I claim, and desire to secure by Letters Patent, is—

1. In rotary steam-engines, a single central piston, whose buckets are adjustable by set-screws, and the annular fabric packing in the ends of the piston, extending through the grooves in the ends of the buckets, as specified.

2. In rotary steam-engines, a single central piston, combined with rotary cut-offs—one at each side thereof—which are adjustable to the piston, and the bearings *b c d* to the cut-offs being adjustable in the ends of the case, to compensate for the wear of the parts, as specified.

3. The slotted boxes *b*, attached to the outside of the case, in combination with the rotary partitions B B', adjustable bearings 6 7, and piston A, as set forth.

JAMES H. McVAY.

Witnesses:

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