No. 860,656. PATENTED JULY 23, 1907.

F. L. GREGORY.

ROTARY PACKING DEVICE.

APPLICATION FILED DEC. 12, 1906.

2 SHEETS—SHEET 1.

Fig. 1.

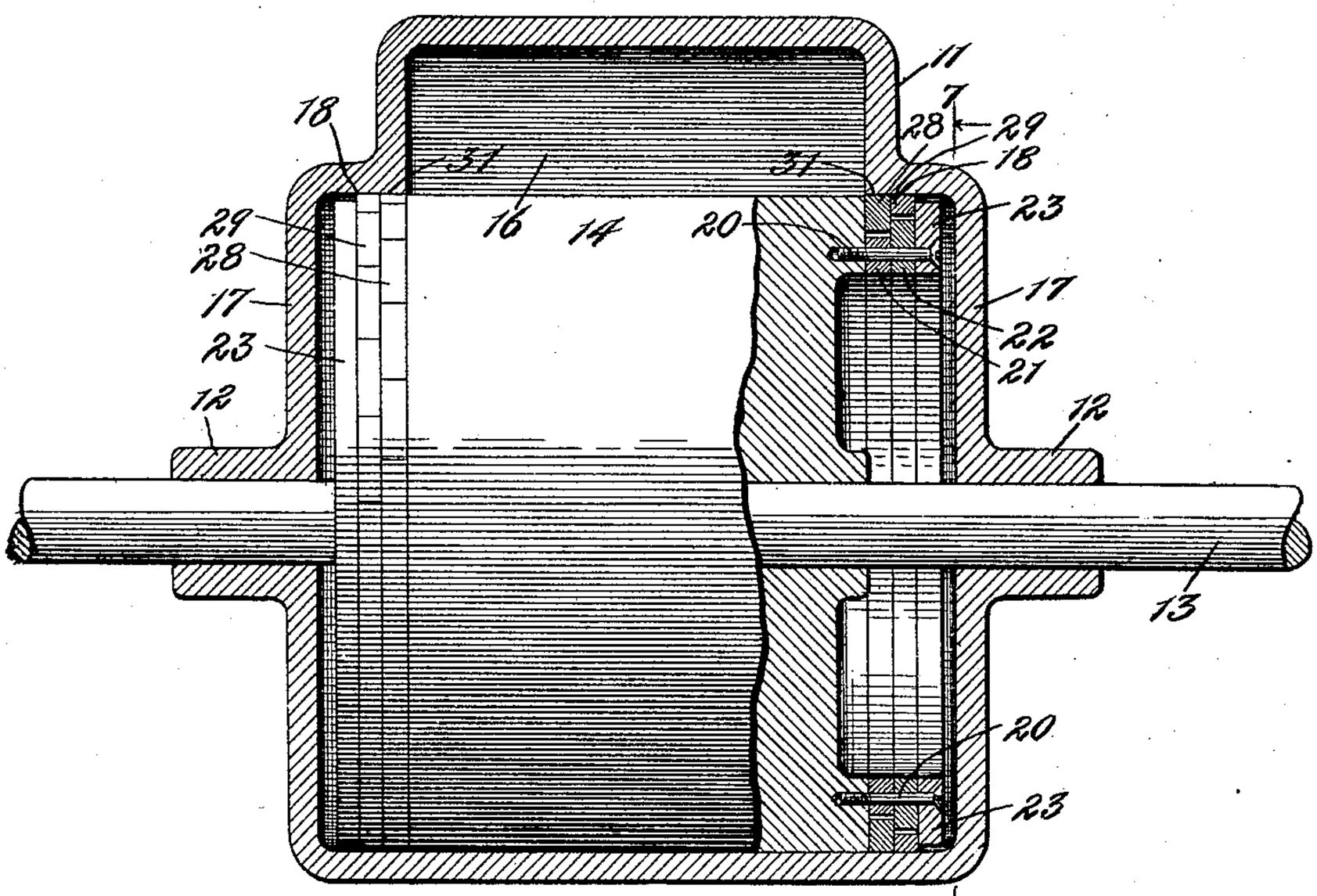
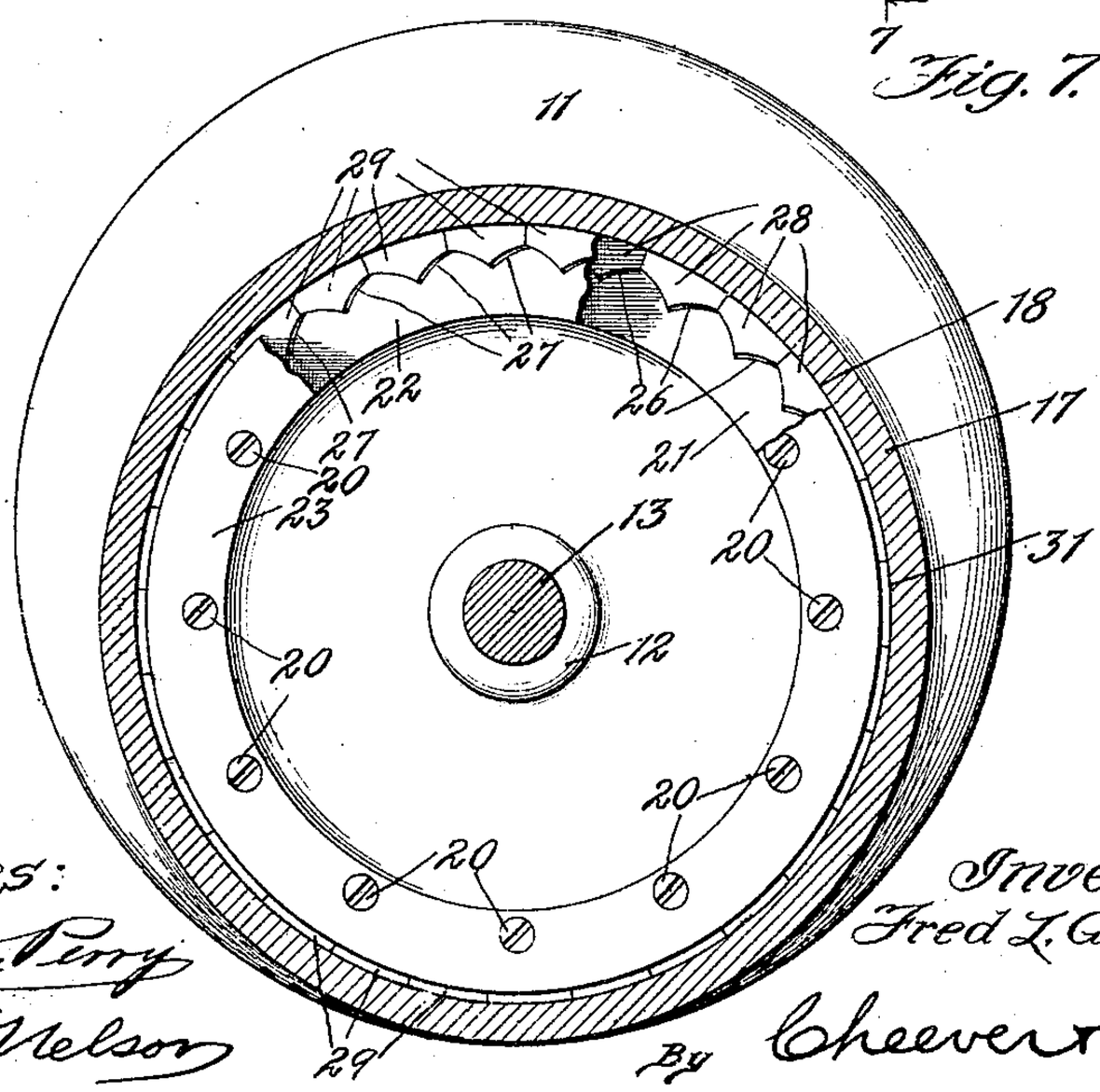


Fig. 7.



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2 SHEETS—SHEET 2.

Fig. 2.

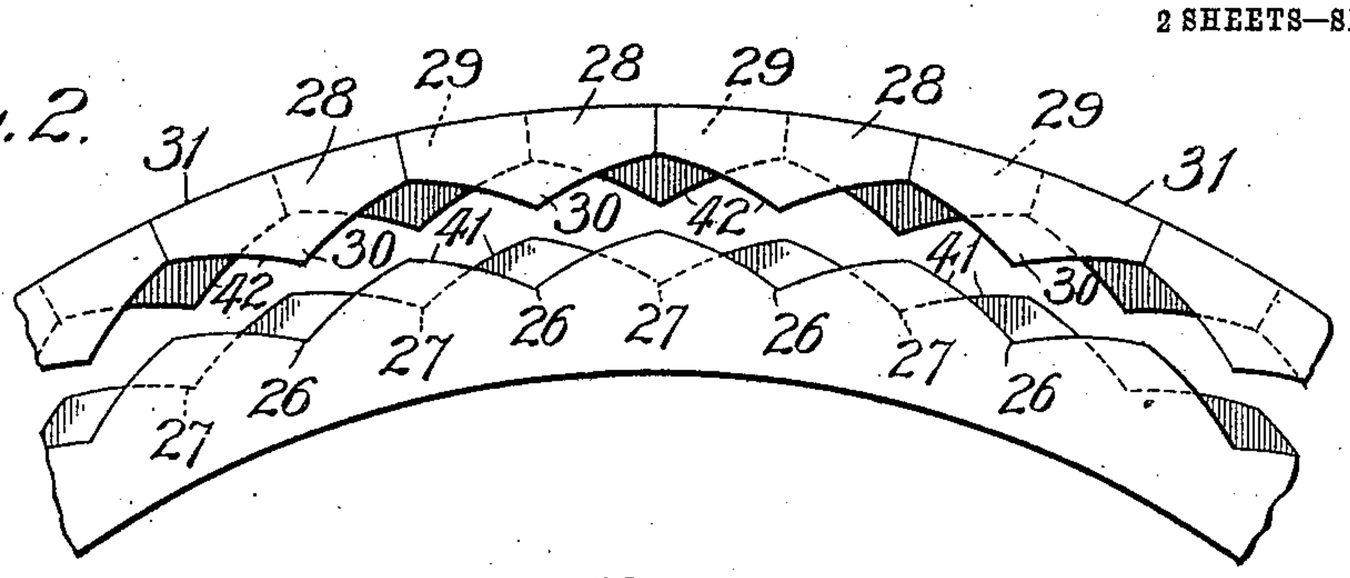


Fig. 3.

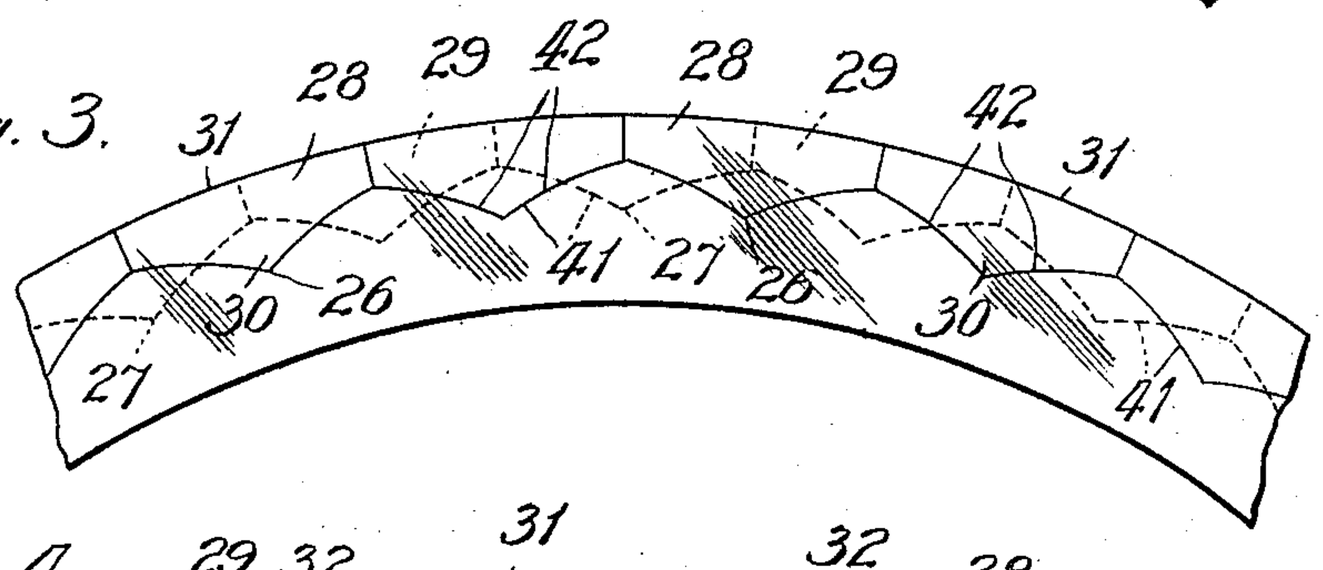


Fig. 4.

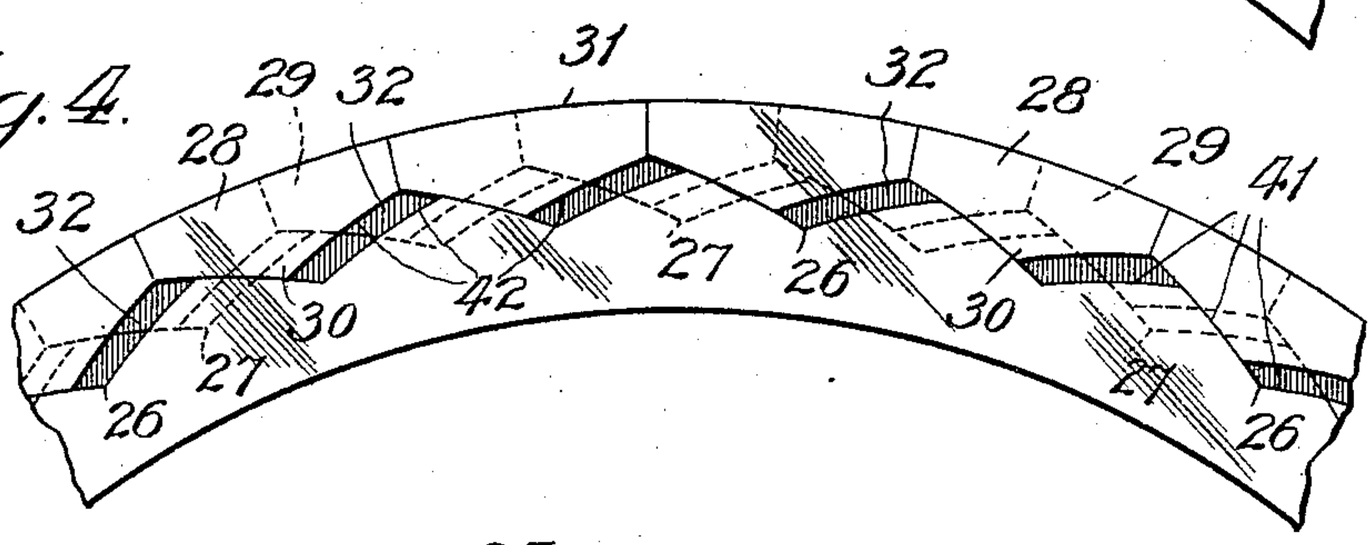


Fig. 5.

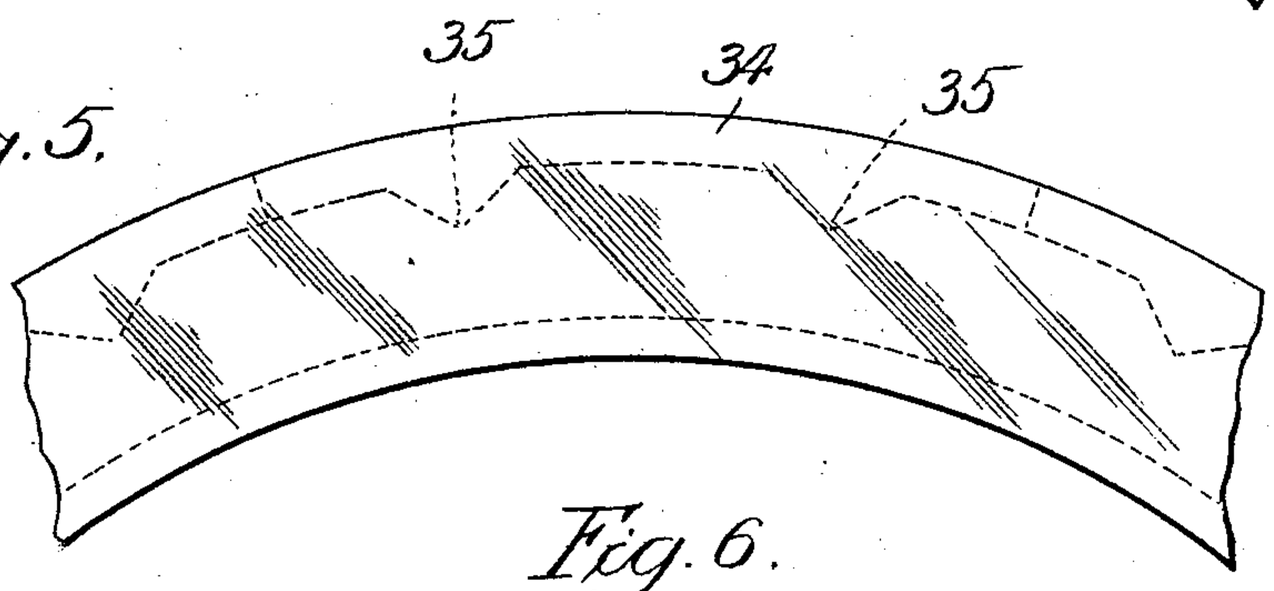
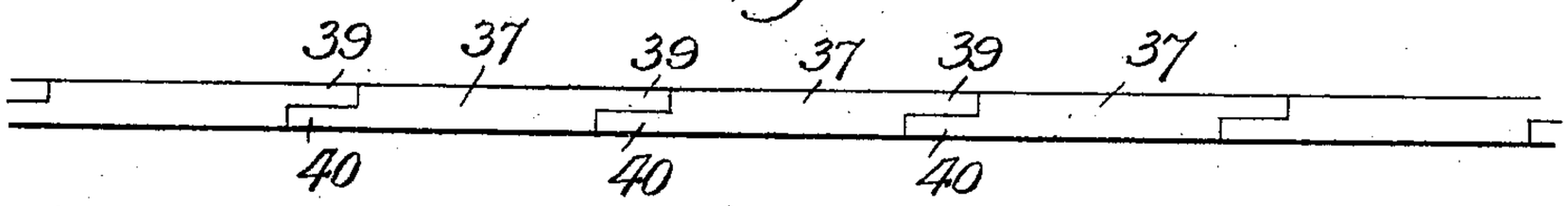


Fig. 6.



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UNITED STATES PATENT OFFICE.

FRED L. GREGORY, OF CHICAGO, ILLINOIS, ASSIGNOR TO GREGORY ROTARY ENGINE COMPANY, OF PIERRE, SOUTH DAKOTA, A CORPORATION OF SOUTH DAKOTA.

ROTARY PACKING DEVICE.

No. 860,656. Specification of Letters Patent. Patented July 23, 1907.

Application filed December 12, 1906. Serial No. 347,564.

To all whom it may concern:

Be it known that I, FRED L. GREGORY, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a certain new and useful Improvement in Rotary Packing Devices, of which the following is a specification.

My invention relates to rotary packing particularly for rotary engines.

The object of my invention is to provide a packing device which may be used between any two members the smaller of which is rotatable with reference to the other member, which is economical in construction, efficient in operation, and not readily liable to get out of order.

Broadly my invention consists in a device capable of accomplishing the foregoing objects but more in detail it consists in the application to the periphery of an internal rotating member of a plurality of short packing members adapted to overlap each other or break joint with each other in such a way that they may be moved outward by centrifugal force against the outer member without permitting the escape of steam, gas, liquid or other agent used in the machine.

More in detail my invention consists in features of construction which will be hereafter more fully described and claimed as the specification proceeds.

Referring to the drawings Figure 1 is a central sectional detail view of a rotary engine having the device of my invention applied thereto. Fig. 2 is a portion of the periphery of the smaller or internal rotating member and a plurality of packing members adapted to engage the same but totally separated therefrom. Fig. 3 shows the parts illustrated in Fig. 2 in the position which they assume when first put together and when the parts are at rest. Fig. 4 illustrates the manner in which the packing members move outwardly and circumferentially under centrifugal force while still performing their packing function. Fig. 5 is a view corresponding to Figs. 2, 3 and 4 showing a modified form of construction of the packing members. Fig. 6 is another modified construction showing the manner in which a single ring or circumferential row of packing members may be used to accomplish the purpose of my invention. Fig. 7 is a partially broken away view on line 7—7 of Fig. 1.

Again referring to the drawings and particularly to Fig. 1 we see a suitable casing 11 of a rotary engine, extending from which is a bearing 12 in which is journaled a shaft 13 carrying the drum 14 of the engine. The especial object of my invention is to pack the spaces between this drum 14 and the casing 11 so that when the drum 14 is rotated with reference to the casing the casing in this instance being stationary though it might be rotated about the same center as that on which the drum rotates without departing from the spirit of my invention the steam, air, gas or liquid in the space 16 cannot escape. In other words my invention consists in mechanism for packing one rotatable member with reference to another member wherever used.

In order to accomplish the desired packing effect I form upon the casing 11 cylindrical off set portions 17 having cut inside them cylindrical surfaces 18, preferably but not necessarily of the same diameter as the circumference of the drum proper. To each end of the drum 14 I secure by means of bolts or screws 20, or other suitable means the circular rings 21 having cut in them a circular row of depressions 26 extending around the outer circumference as will more fully appear hereafter. Outside of these rings 21 I secure by similar means other rings 22 having similar depressions 27 therein staggered with reference to the depression 26 in ring 21. Outside of these rings 22 just described I secure cover plates or rings 23 preferably of greater outside diameter than the angular points between the depressions just described.

The drum might be made of one piece including the rings 21 and 22 and the plates 23 as shown and have the depressions 26 and 27 cut therein without departing from my invention but in practice I find it much more convenient to build up the parts as described. The net result of either construction is that I make the rows of depressions 26 and 27 in the circumferential surface of the drum 14 adjacent to each surface 18 heretofore described in the casing. I now provide a plurality of relatively short packing blocks or members 28 one for each of the depressions 26 and another set of blocks 29 for the depressions 27 formed in the surface of the rotating member. Each of said blocks 28 and 29 has a depending portion 30 with angular faces 42 adapted to bear against the angular faces 41 of the depression 26 or 27 to which it belongs. I provide a sufficient quantity of the packing blocks 28 and 29 in their respective circumferential rows so that they extend entirely around the circumference of the drum or inner or rotating member. I form the external surfaces of the packing blocks into the circumference 31 corresponding substantially with the circumference of the surface 18 upon the inside of the casing 11. I so locate the depressions or recesses 26 and 27 in the surface of the drum and so proportion the depth of the packing members or blocks 28 and 29 that when the rotating member is started with the parts in the position illustrated in Fig. 3 the packing blocks 28 and 29 cannot move outwardly a greater distance than the width of spaces 32 (the heavily shaded portions of Fig. 4) without the blocks coming in contact with the interior surface 18 to which it is adjacent. As the blocks 28 and 29 are staggered with reference to each other they pack each other as clearly appears in Fig. 4. This is due to the fact that as the packing blocks are moved outward from the center of the rotating member

they also move circumferentially with the result that they travel up and down the angular faces 41 of the sides of the depressions 26 and 27. In order to allow for this I make these angular faces 41 and 42 heretofore described at such an angle with reference to the circumferences of the members to be packed that the proper motion of the blocks from the position of Fig. 3 to that of Fig. 4 and back again, depending upon the speed of the machine, may take place as desired. Almost any intensity of packing may be produced by widening the angle between the sides of the depressions in which the blocks fit. For instance better results are obtained when the angle of Figs. 2, 3 and 4 is used than when that of Fig. 5 is used. Again much better results are obtained by making the faces 41 of the depressions slightly curved as shown. In actual practice the packing blocks when new are in substantially the position of Fig. 3 all the time and only begin to move outward as described when wear begins to take place.

In Fig. 5 I have shown a modified form of construction in which I provide single blocks 34 having two angular depending portions 35 instead of one depending portion like 29 of Fig. 2. This construction may be used without departing from my invention although I find that within reasonable limits shorter blocks such as are shown in Figs. 2, 3 and 4 are to be preferred.

In Fig. 6 I have shown another form of construction in which I use blocks 37 in place of the blocks 28 heretofore described each block being provided with side extension portions 39 and 40 overlapping as shown the adjacent parts of the adjacent block thereby permitting outward movement of the blocks without opening up radial spaces between them through which steam can escape. By this construction in combination with suitable plates 23 adjacent thereto I can get along with a single row or ring of packing blocks.

The reason I make angular faces 41 extending in opposite directions as shown is so that the machine may operate as described when run in either direction.

What I claim as new and desire to secure by Letters Patent, is:

1. In mechanism of the class described in combination with two members to be packed one of them being rotatable with reference to the other, a plurality of relatively short packing members so mounted around the circumference of the rotating member that they move outwardly into contact with the outer member as the rotating member revolves.

2. In mechanism of the class described in combination with two members to be packed one of them being rotatable with reference to the other a plurality of relatively short packing members so mounted around the circumference of the rotating member that as the rotating member revolves they move outwardly into contact with the outer member and means for packing the spaces between the packing members during said movement.

3. In mechanism of the class described, the combination of two members to be packed, one of them being rotatable inside the other member, a plurality of packing members mounted upon the interior member, adapted to move outward as the inner member rotates, to a sufficient distance so that they bear against and pack the other member, and means for preventing leakage between successive packing members, during said movement.

4. In mechanism of the class described two members to be packed one of them rotatable inside the other, a plurality of relatively short packing members so mounted around the circumference of the internal member that as it rotates they move outward against the interior of the other member and at the same time move slightly along the circumference of the rotating member.

5. In mechanism of the class described, a rotating member and a member external thereto, there being a row of angular depressions in the circumferential surface of the interior member, a plurality of packing members inserted in the surface of the rotating member, one to each depression, said packing members being adapted to move outward from the center of the rotating member a sufficient distance to bear against the second member and pack the same when the rotating member is rotated.

6. In mechanism of the class described, a rotating member and a member external thereto to be packed, there being a row of angular depressions in the circumferential surface of the interior member, a plurality of packing members inserted in the surface of the rotating member, one to each depression, said packing members being adapted to move outward from the center of the rotating member a sufficient distance to bear against the second member and pack the same when the rotating member is rotated and mechanism for packing the spaces between adjacent portions of the packing members on the circumference of the rotating member during said movement.

7. In a mechanism of the class described the combination of two members one rotatable within the other, two rows of packing members placed end to end extending around the circumference of the rotating member and staggered with reference to each other adapted to move under the action of forces generated by the rotation of the interior member against the interior surface of the second member to be packed, without permitting the escape of the gas or steam through the spaces between the packing members.

8. In mechanism of the class described the combination of two members to be packed, one interior to the other, and adapted to be rotated with reference thereto, two or more rows of relatively short packing blocks arranged around the circumference of the rotating member, the spaces between the blocks of successive rows being staggered with reference to each other and means for permitting a limited circumferential travel of said blocks about the circumference of the rotating member in addition to an outward movement of said blocks into contact with the exterior member whereby the blocks of one row close the spaces between the blocks of an adjacent row in all positions of the blocks.

9. In mechanism of the class described the combination of two members to be packed, one of them interior to and rotatable with reference to the other there being two adjacent rows of angular faced depressions around the circumference of the rotating member, and a plurality of substantially equal lengthed packing blocks mounted end to end in said rows of depressions, there being a portion of each block adapted to fit in the depression in the circumference of the rotating member to which it is adjacent, the blocks in the two rows being staggered with reference to each other as described for the purposes set forth.

10. In mechanism of the class described the combination of two members one of them rotatable inside the other, there being a row of angular faced depressions around the circumference of the rotating member, the angular faces of the depressions being curved as described and a plurality of packing blocks mounted end to end in said row of depressions, there being a portion of each block substantially fitting in the depression in the rotating member to which it is adjacent for the purposes set forth.

In witness whereof, I have hereunto subscribed my name in the presence of two witnesses.

FRED L. GREGORY.

Witnesses:
DWIGHT B. CHEEVER,
C. J. CHRISTOFFEL.