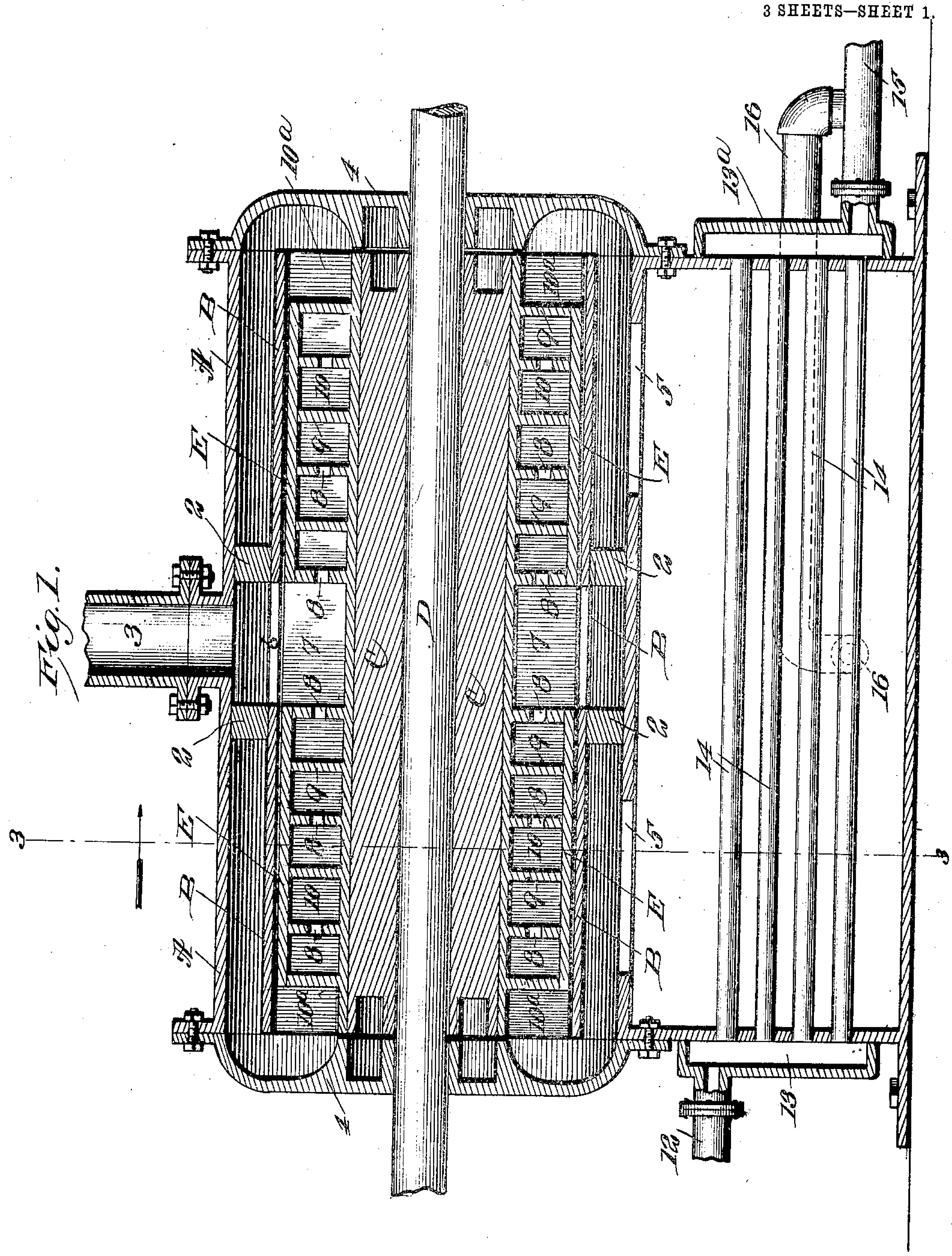
No. 887,700. PATENTED MAY 12, 1908.

A. SAUER.

ROTARY MOTOR.

APPLICATION FILED JAN. 31, 1907.

3 SHEETS—SHEET 1.



WITNESSES
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Amos W. Hart

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ATTORNEYS

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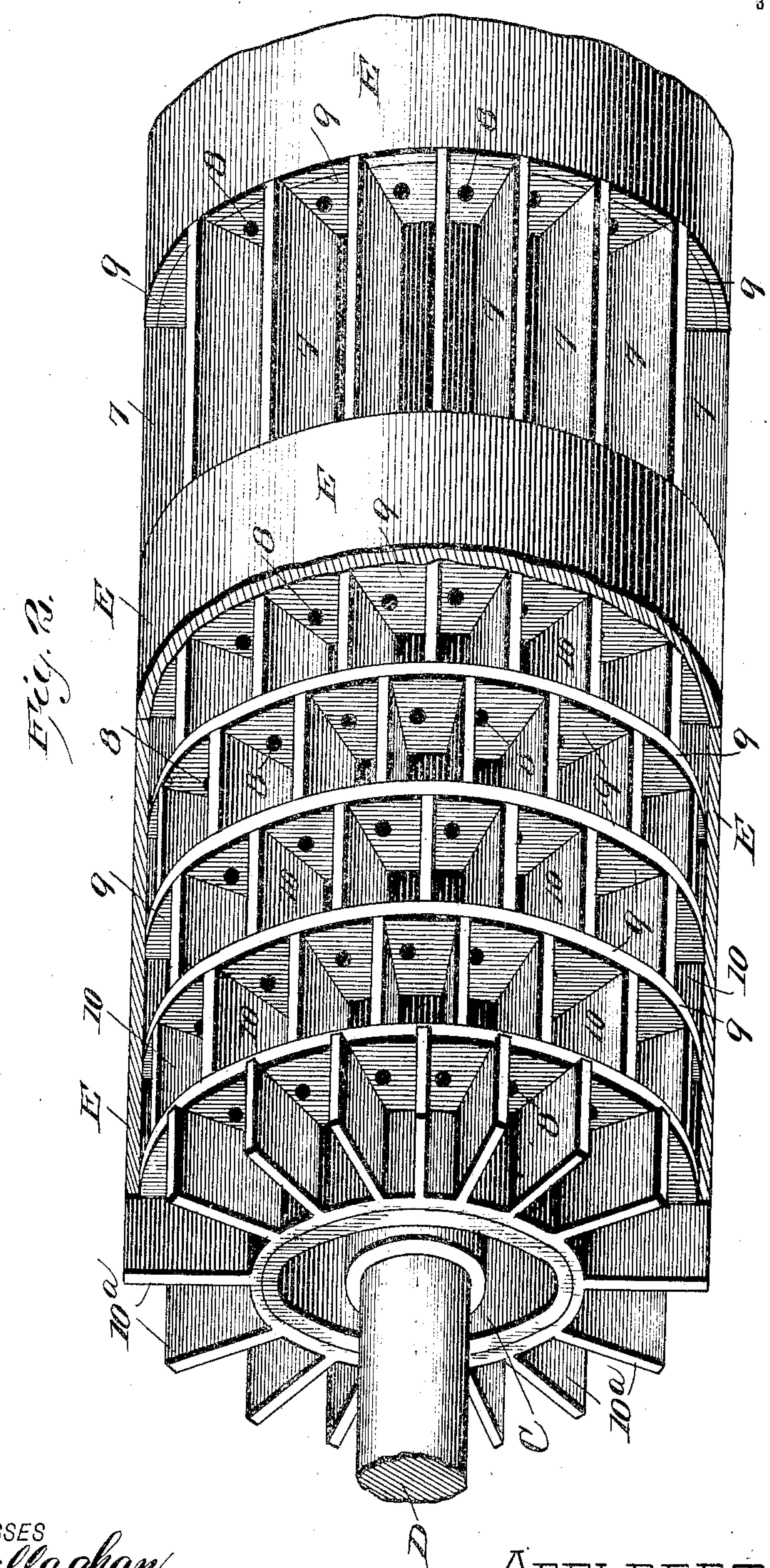

Fig. 2.

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3 SHEETS—SHEET 3.

Fig. 3.

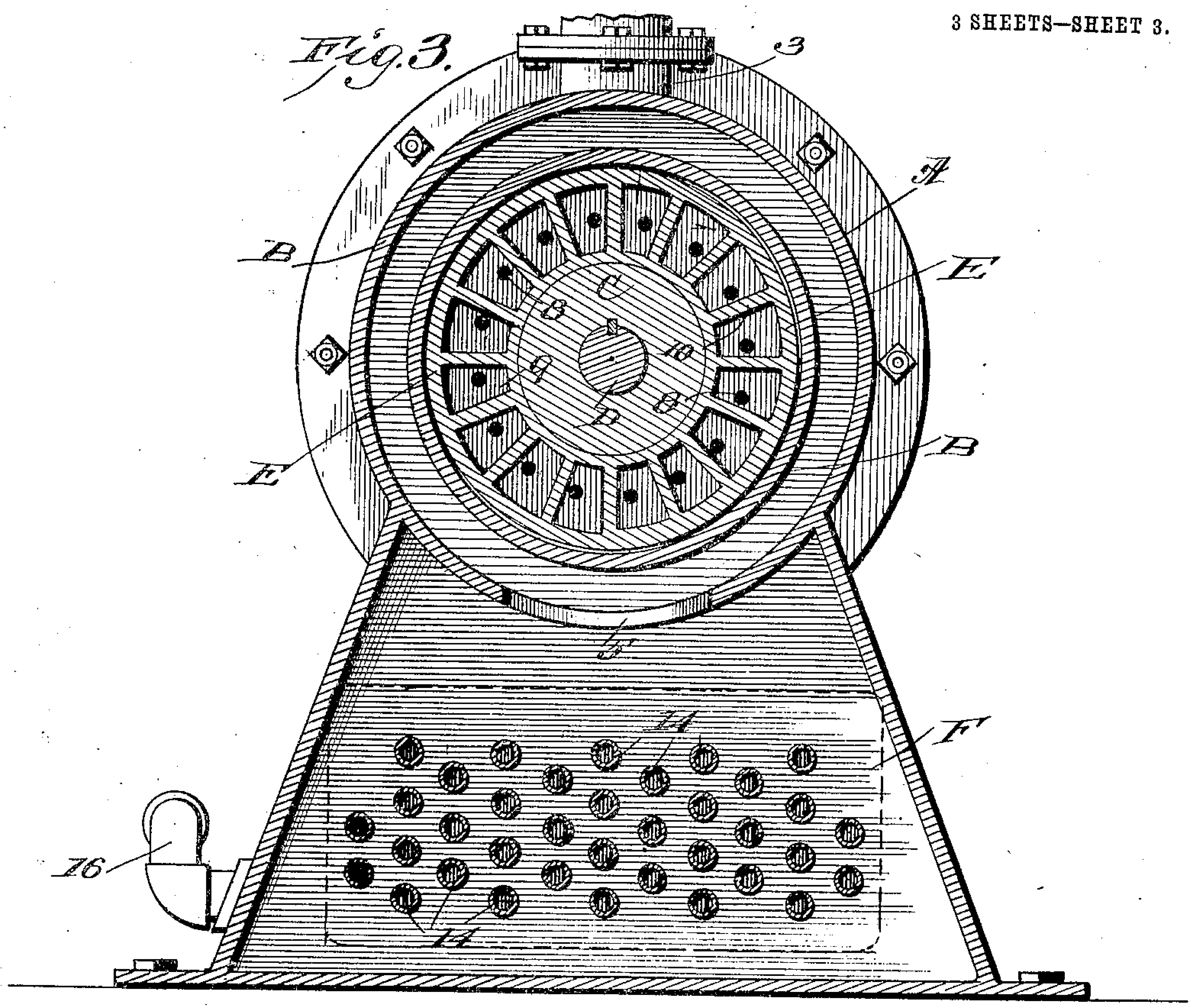


Fig. 4.

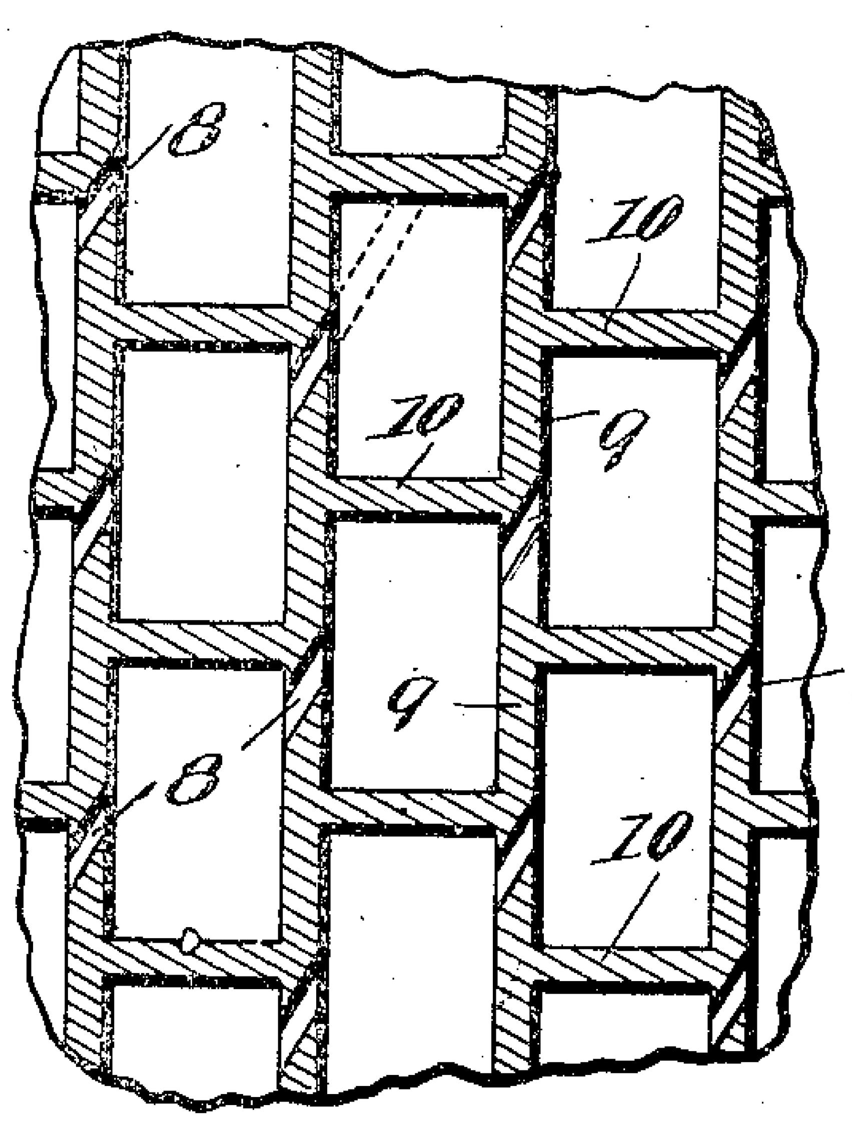


Fig. 4a

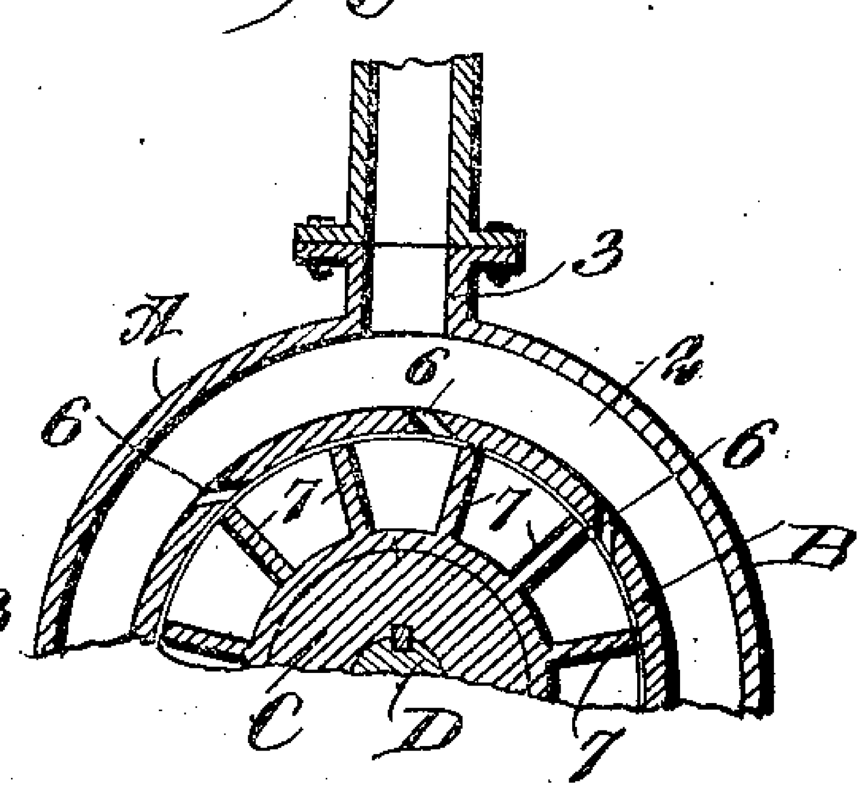
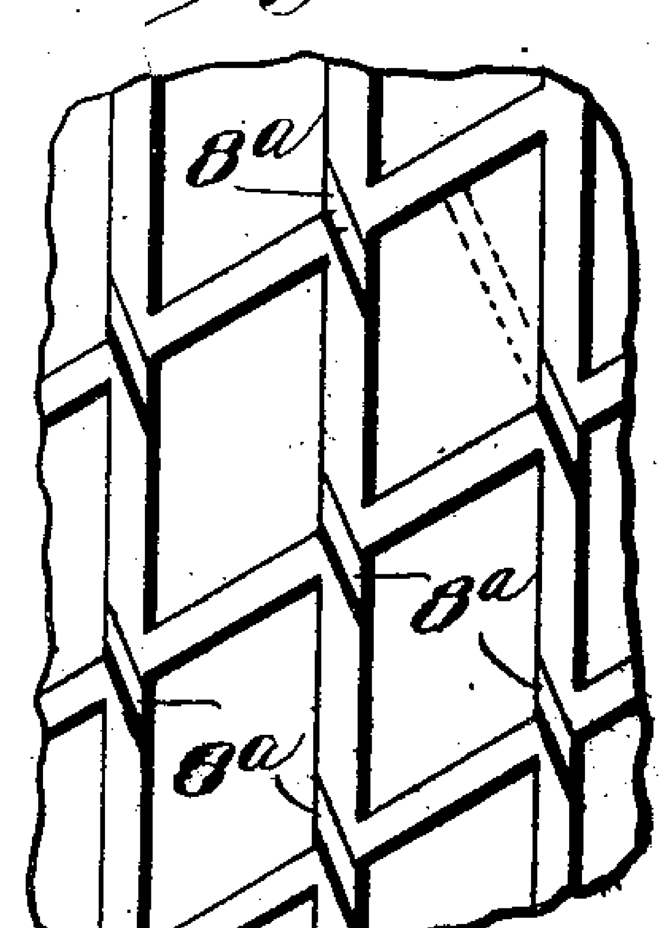


Fig. 5.



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UNITED STATES PATENT OFFICE.

ADELBERT SAUER, OF PITTSBURG, PENNSYLVANIA.

ROTARY MOTOR.

No. 887,700. Specification of Letters Patent. Patented May 12, 1908.

Application filed January 31, 1907. Serial No. 355,038.

To all whom it may concern:

Be it known that I, Adelbert Sauer, a citizen of the United States, and resident of Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented an Improved Rotary Motor, of which the following is a specification.

My invention relates to improvements in that class of motors or turbines in which a rotary piston is driven by the impact and reactionary force of steam or other motive fluid. It is more particularly an improvement upon the motor for which I have received Letters Patent No. 783,984, dated February 28, 1905. I have devised and put in successful use several improved features of construction, whereby new and superior results are obtained.

The details of construction, arrangement and operation of the improved motor are as hereinafter described and illustrated in the accompanying drawings, in which

Figure 1 is a central vertical longitudinal section of the motor. Fig. 2 is a perspective view of the rotary piston a portion of the peripheral sleeve or cylinder thereof being shown broken away. Fig. 3 is a vertical transverse section on the line 3—3 of Fig. 1. Fig. 4 is a diagrammatic plan view showing a peripheral portion of the piston in section and extended in the flat. Fig. 4^{a} is a detail section illustrating the arrangement of induction slots or openings in the casing, through which the motive fluid has access to the rotatable body of the motor. Fig. 5 is a corresponding view showing modification.

A cylindrical shell A is supported upon parallel vertical plates 1 that form the ends of a condensing chamber. Within the said shell is arranged concentrically a casing B which is spaced from the shell by circumferential ribs 2 between which is formed the space for reception of the steam or other motive fluid through the pipe 3. Thus the casing B is fixed with the shell. The latter has caps 4 which are chambered to form passages for steam or other motive fluid, and the bottom or under side of the shell is provided with slots 5 through which the spent steam or other fluid escapes into the condenser. In respect to the construction and arrangement of the parts thus far described, my present invention is similar to that for which I have obtained Letters Patent as aforesaid.

The rotary motor C—see Figs. 1, 2 and 3—is mounted upon a shaft D having its bearings in the shell caps 4 as in my former invention, but the said piston is distinguished by novel and improved features of construction as will now be described. Steam is admitted to the piston through slots 6, one of which is shown in Figs. 1 and 4^{a}. There is a series of said slots, all inclined tangentially to the wheel or body of the engine and spaced apart equidistantly, and extending around the casing circumferentially formed in that portion of the casing B which lies between the circumferential ribs 2, and as in the former invention the steam thus admitted acts upon a series of longitudinal wings 7, and passes thence through side ports 8 formed in circumferential ribs 9 that abut the ends of the wings 7—see Figs. 1 and 4. There is a series of such peripheral ribs 9 arranged radially and parallel to each other and duly spaced apart, as will be seen by reference to Figs. 2 and 4. The several ribs are connected transversely by wings, as each are arranged alternating in position, that is to say, each one being opposite a pocket or space on each side.

The ports 8 in the several ribs 9, are arranged at an angle, say 45°, and in such relation to one of the wings of an adjacent pocket that steam or other motive fluid passing through a port will strike upon the center of said wing, see dotted lines Fig. 4. The steam or other fluid thus acting by impact on a wing 10, passes through the next port 8 in an adjacent rib, and then impinges on the next wing, as will be readily understood. Thus, the steam leaving the middle pockets formed between the central radial wings 7, passes spirally around a considerable portion of the piston on both sides of the central pockets and by its reactionary effect as in turbines of well known construction, the cylinder is propelled with corresponding rapidity. By the diagonal or inclined arrangement of the several ports 8 in the peripheral ribs 9 and the arrangement of the wings 10, I secure a maximum propulsive effect, and thoroughly utilize whatever pressure the motive fluid may have.

In place of arranging the ribs and wings of the piston to work in contact with the casing B, as in my former invention, I incase them by a cylindrical sleeve E, save only the outermost series of wings 10^{a}—see Figs. 1 and 2. The main advantage attained by the use of the sleeves, is that steam or other motive fluid cannot escape or leak between the piston proper and the surrounding casing B, but must pass the entire length of the piston from the center outward, whereby the greatest propulsive effect is produced and the pressure of the steam is fully utilized. The terminal wings 10^a are not incased by the sleeves E, but extend radially to the casing B, and no ribs close the ends of the pockets or spaces between said wings whereby the largest available space is left for their expansion and escape of the steam or other fluid which has acted upon all the other wings 10. Thus while the steam acts by impact on the terminal wings 10^a in the same manner as on the wings 10, it also has free escape into the passages by which it reaches the discharge openings or slots 5 in the under side of the shell A.

As shown diagrammatically in Fig. 5, wings 11 may be arranged at an inclination instead of a right angle to the ribs, and steam ports 9^a may be arranged at the intersection of the ribs and wings and at such an angle that if their axes be extended they would be at a right angle to the wings 11, as indicated by dotted lines in Fig. 5. Thus in either form of construction, the periphery of the piston C is provided on each side of the center or middle portion with a series of ribs and wings which are cast integrally with the shell or body of the piston and in every case the ports whereby steam passes through the ribs are arranged to deliver it directly upon the central portion of a wing in the adjoining pocket. By this mode of construction also the cylinder may be produced cheaply.

The condenser proper F is constructed as in my previous invention, cool or cold water being received through pipe 12 into a space or chamber 13, passing thence through horizontal pipes 14 into a corresponding space or chamber 13^a, and escaping in a heated condition through pipe 15. A pipe 16 is shown connected with the pipe 15 at one end, and with the condensing chamber proper F at its other end. The pipe 15 will in practice extend to the boiler, and a vacuum pump will be connected therewith for forcing heated water obtained directly from the chamber 13^a and also the water of condensation drawn through pipe 16.

I claim:

1. The improved rotary motor comprising a cylindrical shell, an interior casing fixed concentrically therewith but spaced therefrom, and provided centrally with openings for admission of motive fluid, a rotary piston and shaft arranged concentrically within said casing and having on each side of the middle a series of parallel peripheral ribs spaced apart and a series of parallel longitudinal wings connecting said ribs and arranged at an angle thereto, thus forming a series of rows of rectangular pockets, the several ribs having a series of inclined ports leading from one pocket into another, the inclination of the ports being such that their axes if extended would pass through the center of the wings in the adjacent pockets, as shown and described.

2. The improved rotary motor comprising a cylindrical shell, an interior concentric casing provided with steam inlet ports in its middle portion, a rotary piston and its shaft arranged concentrically within the casing, and having parallel peripheral ribs spaced apart and arranged at right angles to the axes of the piston, a series of radial wings arranged between the ribs at right angles thereto and alternating in position so that each is opposite the pockets in the adjacent rows, the ribs being provided with ports which are inclined so that if their axes be extended they would strike the center of the wings in adjacent pockets, the ports being thus arranged in a general spiral direction around the piston, substantially as described.

3. The improved motor comprising a cylindrical shell, an interior concentric casing fixed thereto and spaced therefrom, a rotary piston and shaft inclosed by the casing and having in its center portion a series of radial wings, and on each side of the center a series of parallel peripheral ribs and connecting wings arranged between the ribs, the latter being provided with ports whereby steam or other motive fluid passes through the ribs and acts successively upon the several wings, and cylindrical sleeves inclosing the ribs and wings and thus forming the outer side of the several rows of pockets formed by the ribs and wings, the said sleeves working in frictional contact with the casing, substantially as described.

4. In a rotary motor of the class indicated, the combination with the concentric shell and casing, of a rotary piston having its periphery provided with ribs and connecting wings thus forming a series of pockets for receiving the motive fluid, and the ribs having ports whereby the fluid passes from one pocket to another in a spiral direction, cylindrical sleeves inclosing the said ribs and wings and forming the outer sides of the several pockets, and a terminal series of wings arranged exterior to the sleeves, the same being free at their outer ends, thus forming pockets in which the steam or other motive fluid has free expansion, substantially as described.

5. In a motor of the class indicated, the improved rotary piston having on each side of the middle portion a series of peripheral ribs and connecting wings, the ribs having ports inclined so as to direct steam or other motive fluid directly upon the wings, cylindrical sleeves inclosing the ribs and wings and forming the periphery of that portion of the piston, and a series of terminal wings arranged exterior to the sleeves, the outer ends of the pockets thus formed being open, as shown and described.

6. In a motor of the class indicated, the improved rotary piston having its middle portion provided with a series of peripheral radial wings, and on each side of the same a series of parallel ribs spaced apart and provided with inclined ports extended in a general spiral direction around the periphery, a series of wings connecting the several ribs and thus dividing the peripheral portions of the piston into a series of pockets, and cylindrical sleeves inclosing the said ribs and wings and thus forming the outer or peripheral sides of the several pockets, substantially as described.

ADELBERT SAUER.

Witnesses:
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H. BUNGERT.