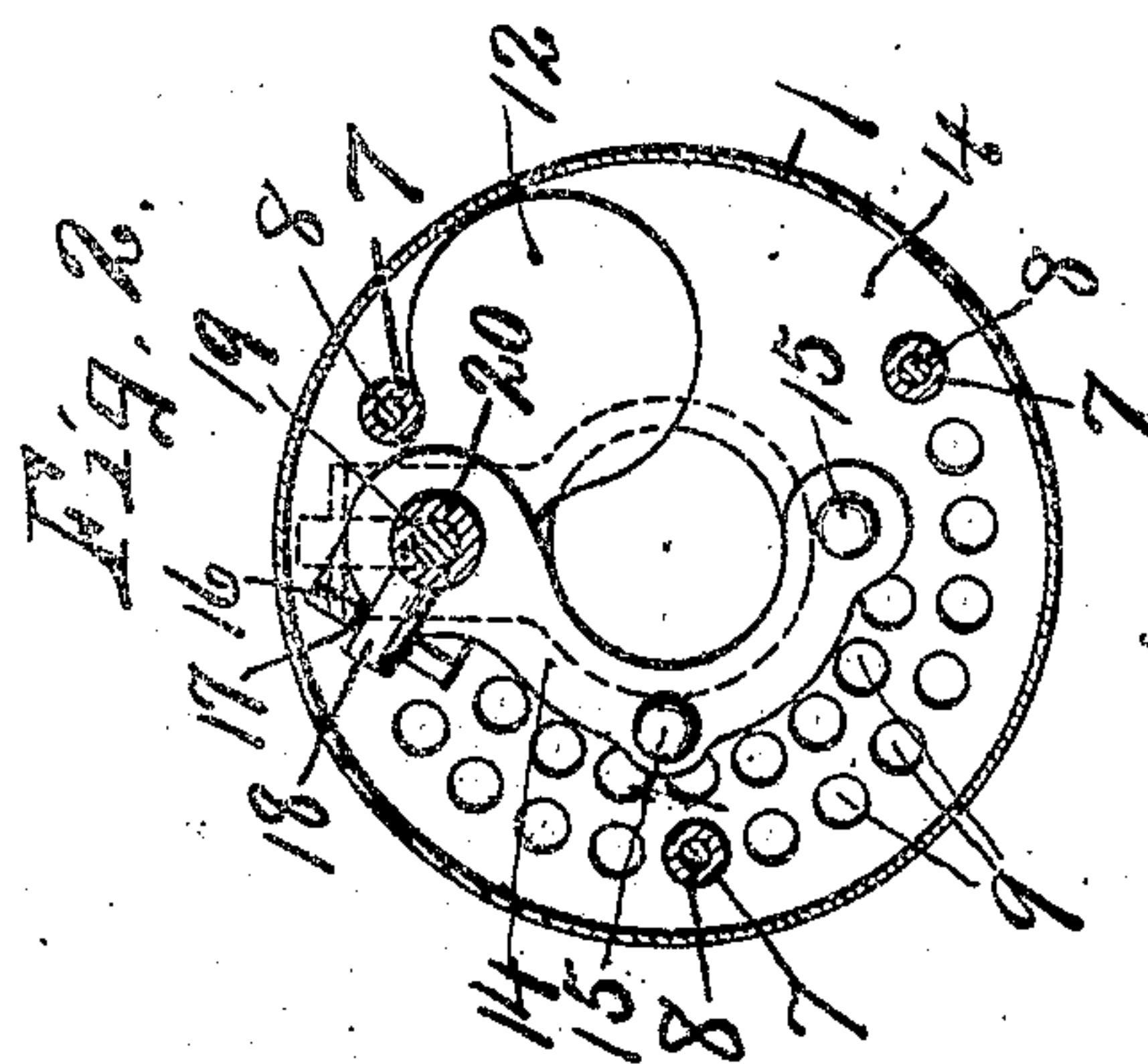
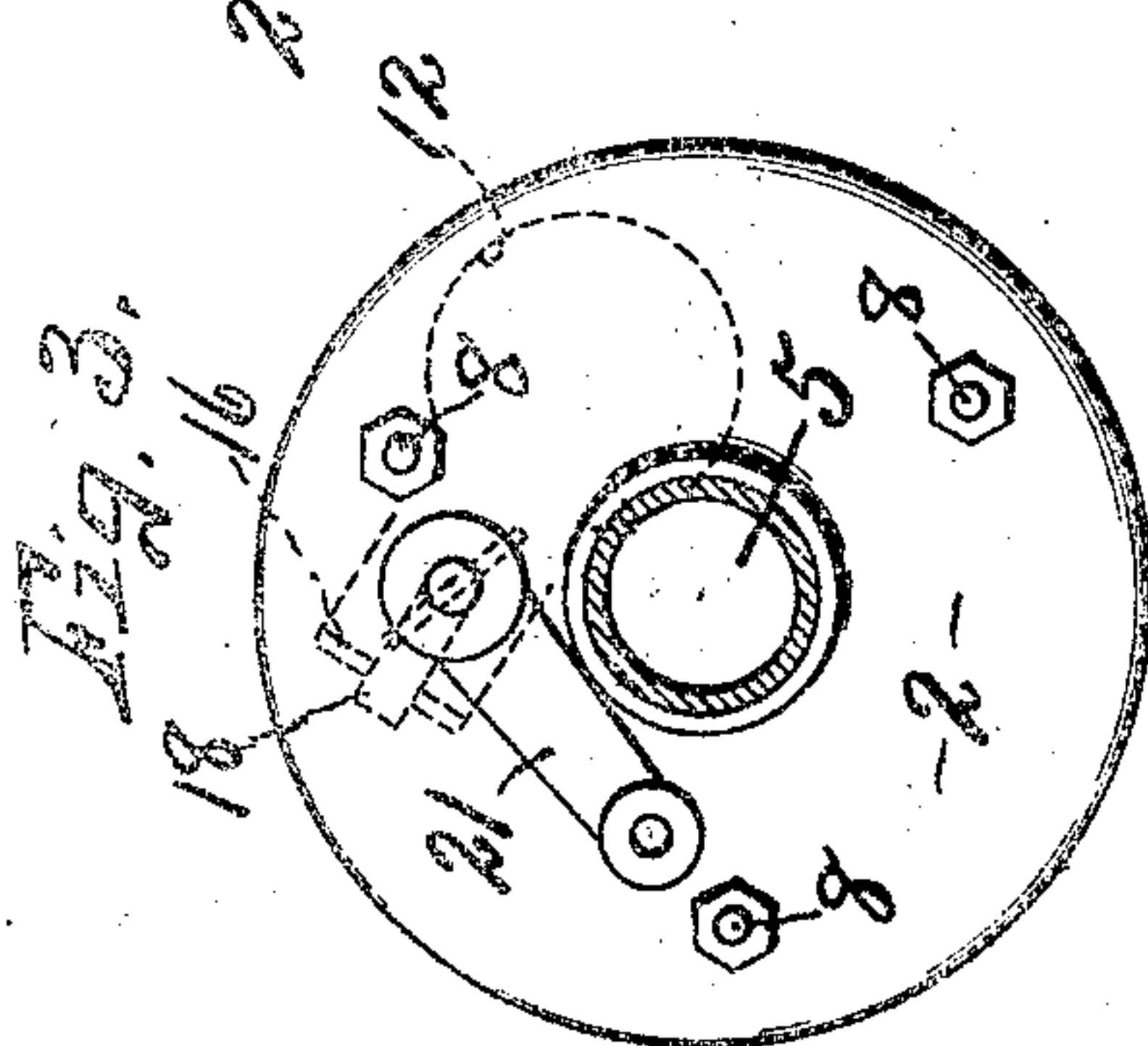
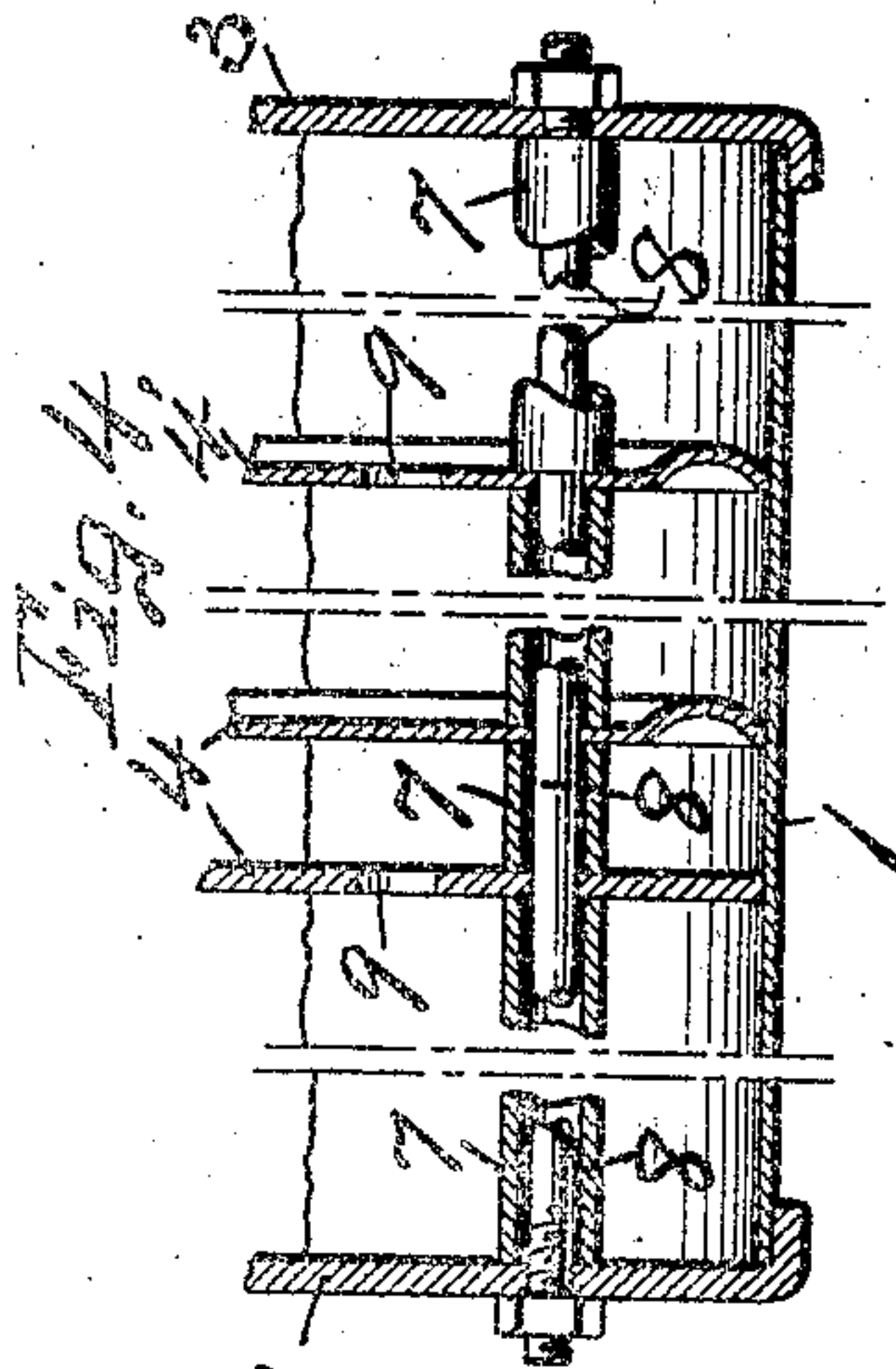
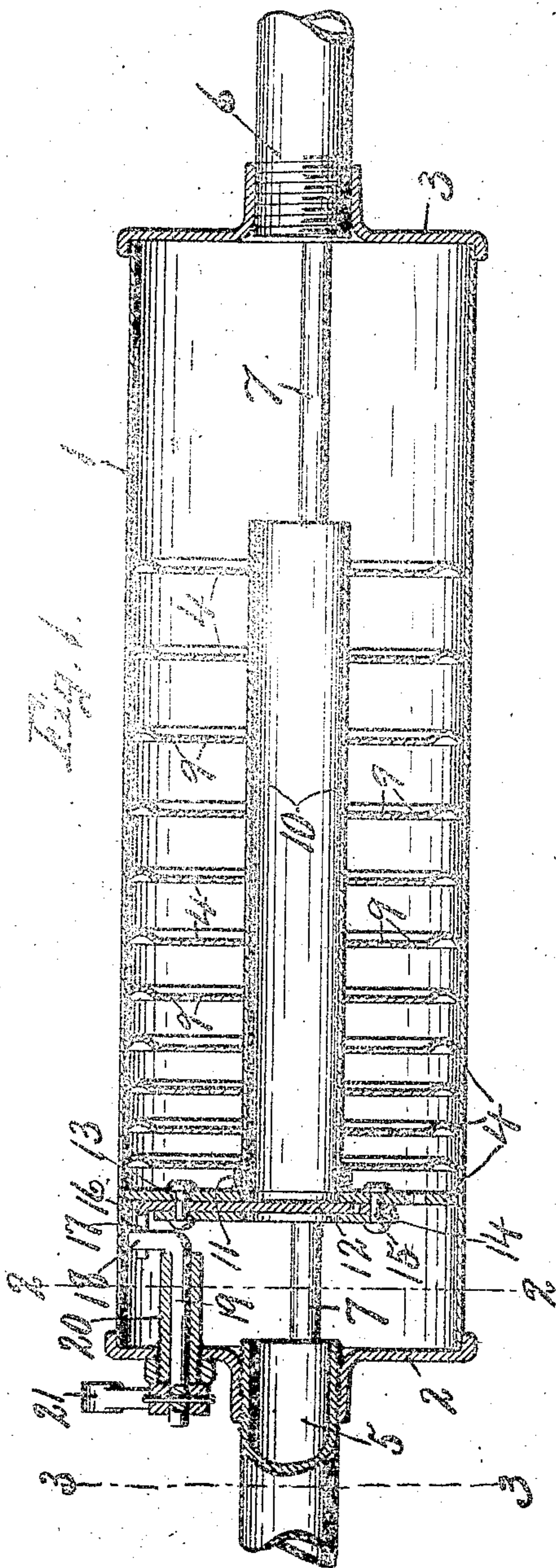


No. 895,697.

PATENTED AUG. 11, 1908.

B. W. SNOW.
MUFFLER.

APPLICATION FILED MAR. 7, 1907.



Witnesses.
H. C. Thomas
H. C. Chace

Inventor.
Benjamin W. Snow
By
Howard P. Knison
Attorney.

UNITED STATES PATENT OFFICE.

BENJAMIN W. SNOW, OF SYRACUSE, NEW YORK.

MUFFLER.

No. 895,697.

Specification of Letters Patent.

Patented Aug. 11, 1908.

Application filed March 7, 1907. Serial No. 361,160.

To all whom it may concern:

Be it known that I, BENJAMIN W. SNOW, of Syracuse, in the county of Onondaga, in the State of New York, have invented new and useful Improvements in Mufflers, of which the following, taken in connection with the accompanying drawings, is a full, clear, and exact description.

This invention relates to certain improvements in mufflers adapted to be connected to the exhaust of a gas or steam engine to reduce the noise incidental to such exhaust, and in some respects is somewhat similar to that set forth in my Patent 825,010 of July 3rd, 1906, in which a series of transverse perforated partitions or disks are fitted snugly within the cylindrical casing and spaced gradually increasing distances apart from the inlet toward the outlet to gradually retard the passage of the exhausted gases through the cylinder from which they escape to atmosphere. My present invention makes use of some of these elements, except that I have added thereto a tube passing centrally through the cylinder, and disks in exact alinement with the inlet and outlet of the cylinder, and have provided a movable gate or closure adapted to be shifted to and from a position across the inlet end of the tube between the first baffle plate of the series and inlet of the cylinder, whereby a direct passage for the exhaust products may be established through the cylinder and disks, thereby relieving all back pressure upon the engine to utilize the full degree of power in climbing hills and other places where an excess of power is required.

My main object therefore, is to improve upon my former patent previously referred to the extent of establishing a direct passage for the exhaust gases through the cylinder and centers of the disks, and to provide means for opening and closing the direct passage to permit the use of the muffler and disks when an excess power is not required. Other objects and uses will appear in the following description.

In the drawings—Figure 1 is a longitudinal sectional view of a muffler embodying the various features of my invention. Figs. 2 and 3 are sectional views taken respectively on lines 2—2, and 3—3, Fig. 1. Fig. 4 is an enlarged detail sectional view through a portion of the cylinder and the disks of the muffler showing a portion of one of the clamping rods and spacing sleeves for holding the disks apart.

This muffler comprises essentially a cylindrical sheet metal casing —1— having end heads —2— and —3— of similar material, within which is closely fitted a series of circular diaphragms or partitions —4—, the latter being spaced apart gradually increasing distances from the inlet, as —5—, toward the outlet —6— and are held in fixed relation by spacing sleeves —7— and clamping rods —8— passing through the spacing sleeves and apertures in the disks alined therewith.

The end heads —2— and 3— are fitted over and upon the opposite ends of the cylinder —1— and are clamped thereto by the bolts —8— which are co-extensive with the length of the cylinder, the heads being spaced apart from the first and last diaphragm or disk —4— of the series by spacing sleeves —7—.

The first disk —4— of the series is preferably flat and disposed a distance inwardly from the inlet head —2— somewhat greater than the widest space between the last disk and the one adjacent thereto while the last disk of the series is spaced apart from the end head —3— a greater distance than the intervening space between the first disk and inlet head, the object of which is to provide ample room for the expansion of the gases after passing through the perforations of the several disks, from which latter chamber the gases are exhausted nearly at atmospheric pressure.

Each disk —4— is provided with a series of apertures —9— usually arranged in concentric rows at one side of the center, those in one disk being arranged out of alinement with those of the next adjacent disk to cause the products of combustion to travel in tortuous paths through the several disks before finally discharging from the cylinder —1—, and owing to the fact that the disks are spaced gradually increasing distances apart from the inlet end toward the outlet end the gradual increasing spaces permits a gradual increase in the expansion of the gases before reaching the enlarged expansion chamber at the discharge end of the cylinder. In other words, this arrangement of the plates or disks permits the gases to gradually expand so that by the time they reach the last chamber of the cylinder the expansive force is reduced practically to atmosphere. I find, however, that it is desirable to provide means for opening direct communication between the inlet —5 and outlet —6—, particularly when the

full power of the engine is required in the propulsion of the vehicle, and for this purpose I have provided a center tube 10— running centrally through the baffle plates or diaphragms —4—, and therefore, centrally through the intermediate portion of the cylinder, said tube being of substantially the same diameter as and alined with the central openings —5— and 6— in the opposite end heads —2— and —3— and extends from the first plate —4— to a point slightly beyond the last plate —4— of the series, thereby permitting the discharge of the exhaust products in a direct line from the inlet to the outlet through the cylinder and centrally through the baffle plates.

One end of the tube —10— is provided with an out-turned annular flange abutting against the inner face of the first plate —4— of the series, and between this flange and the second plate of the series is interposed a sleeve —11— by which the tube 10— is clamped in place against endwise movement when the tie rods —8— are drawn up.

A gate or closure 12— is pivoted at 13— to the inlet side of the first plate —4— of the series and is movable across the inlet end of the tube —10— between the first plate and an additional cut off plate or segment —14— which is also secured by rivets 15— to the first plate. The object of this segmental plate or cutoff 14— is to protect the adjacent surface of the first baffle plate of the series against accumulation of carbon or other products of exhaust thereon so as not to interfere with the free sliding movement of the gate or closure 12—, and at the same time to afford a suitable guide into which the gate is moved to its closed position. This gate may be operated by any suitable mechanism and for this purpose it is provided with a radial extending arm having an offset —16— provided with a slot 17— which receives one end of a crank-arm —18— on a rock-shaft —19—, said rock-shaft being journaled in a suitable bushing —20— in the inlet head —2— at one side of the inlet —5—, and is provided at its outer end with a second crank-arm —21— adapted to be connected to any operating mechanism not necessary to herein illustrate or describe, or the crank-arm 21— may serve as a means for operating the closure 12—.

In operation, under ordinary conditions when but little power is required, the gate 12— is closed allowing the products of combustion to pass through the apertures in the several baffle plates before finally discharging through the outlet —6— to atmosphere, but when the full power of the engine is required the valve 12— is open allowing the exhaust products to pass in a direct line from the inlet —5— through the tube —10— and —6— to atmosphere through the outlet —6—. The invention, however, lies particularly in passing the tube centrally

through a series of baffle plates fitted within a cylindrical casing having end heads provided with central inlet and outlet openings, in direct alinement with opposite ends of the tube, in combination with a closure or gate movable across the inlet end of the tube.

What I claim is:

1. A muffler for gas engines comprising a cylindrical casing having removable end heads, each provided with a substantially central opening of less diameter than the interior diameter of the casing, a series of circular disks spaced gradually increasing distances apart from the inlet toward the outlet and of substantially the same diameter as the interior diameter of the casing, said disks having central openings in direct alinement with the central openings in the end heads and a gate movable across the central opening of the disk nearest to the inlet.

2. A muffler for gas engines comprising a cylindrical casing having removable end heads each provided with a substantially central opening, one being the inlet and the other the outlet and the outlet being of less diameter than the interior diameter of the casing, a series of circular disks spaced gradually increasing distances apart from the inlet toward the outlet and of substantially the same diameter as the interior diameter of the case, said disks having central openings in direct alinement with the central openings in the heads, a gate movable across the central opening of the first disk of the series nearest the inlet, clamping bolts passed through said disks and end heads, and spacing sleeves between the disks and heads holding said disks a fixed distance apart from each other and from the heads.

3. In a muffler for gas engines, a cylindrical casing having an inlet in one end and an outlet in the opposite end, separate transverse disks fitting snugly within the casing and arranged at progressively increasing distances apart from the inlet toward the outlet, said disks having central openings in direct alinement with the inlet and outlet of the cylinder, each disk having an opening therethrough at one side of its central opening, and a gate movable across the central opening of the first disk nearest the inlet.

4. In a muffler for gas engines, a cylindrical casing having an inlet in one end and an outlet in the opposite end, separate transverse disks fitting snugly within the casing and arranged at progressively increasing distances apart from the inlet toward the outlet, said disks having central alined openings in direct alinement with the inlet and outlet, and also provided with additional openings at one side of the central opening, a tube passing through the central opening of the disks and a gate movable across the inlet of the tube.

5. In a muffler for the purpose described, a

cylindrical casing and a series of transverse disks or partitions fitting within the casing and spaced gradually increasing distances apart from the inlet toward the outlet, the
 5 space between the last disk of the series and the outlet being greater than that of the other spaces between the disks, said disks being provided with central openings in
 10 direct alinement with the inlet and outlet, and a gate movable across the central opening of the first disk of the series nearest the inlet.

6. In a muffler for the purpose described, a cylindrical casing and a series of transverse
 15 disks of substantially the same diameter as the interior diameter of the casing, and arranged at progressively increasing distances apart from the inlet toward the outlet, each disk having a central opening in direct
 20 alinement with the inlet and outlet, a tube passed through the central openings in the disks, a gate movable across the inlet end of the tube, said disks being provided with
 25 additional openings at one side of the central opening.

7. A muffler for the purpose described comprising a single tubular casing and a series of transverse partitions, each separate therefrom, but of substantially the same
 30 cross sectional area as the cross sectional area of the interior of the casing and having a circular row of apertures at one side of its center, said disks being provided with central openings in direct alinement with the inlet
 35 and outlet and a gate movable across the central opening of the first partition of the series nearest the inlet.

8. In a muffler of the character described, a cylindrical casing and a series of circular disks fitted therein and spaced gradually in- 40
 creasing distances apart, said disks having alined central openings, a tube passed through said openings, and a gate movable across one end of the tube, the disks being provided
 45 with additional openings at one side of their central openings.

9. In a muffler of the character described, a cylindrical casing provided with end heads, one head having a central inlet and the other head having a central outlet, a tube within 50
 the cylinder between said heads, but spaced apart therefrom and having a central opening therethrough in direct alinement with the inlet and outlet, a gate movable across the
 inlet end of the tube and a series of disks en- 55
 circling the tube and provided with openings therethrough at one side of the tube.

10. A muffler of the character described comprising a cylindrical casing and end heads therefor, one head having a central inlet and 60
 the other having a central outlet, a series of perforated disks fitted within the cylinder and provided with central openings in direct alinement with the inlet and outlet, a gate
 movable across the central opening of the 65
 first disk nearest the inlet, and means for opening and closing said gate.

In witness whereof I have hereunto set my hand this 4th day of March 1907.

BENJAMIN W. SNOW.

Witnesses:

H. E. CHASE,
 C. M. McCORMACK.