

W. SMITH.

DIE FOR TAPERED PIPES AND TUBES.

(Application filed June 10, 1902.)

(No Model.)

2 Sheets—Sheet 1.

Fig. 1.

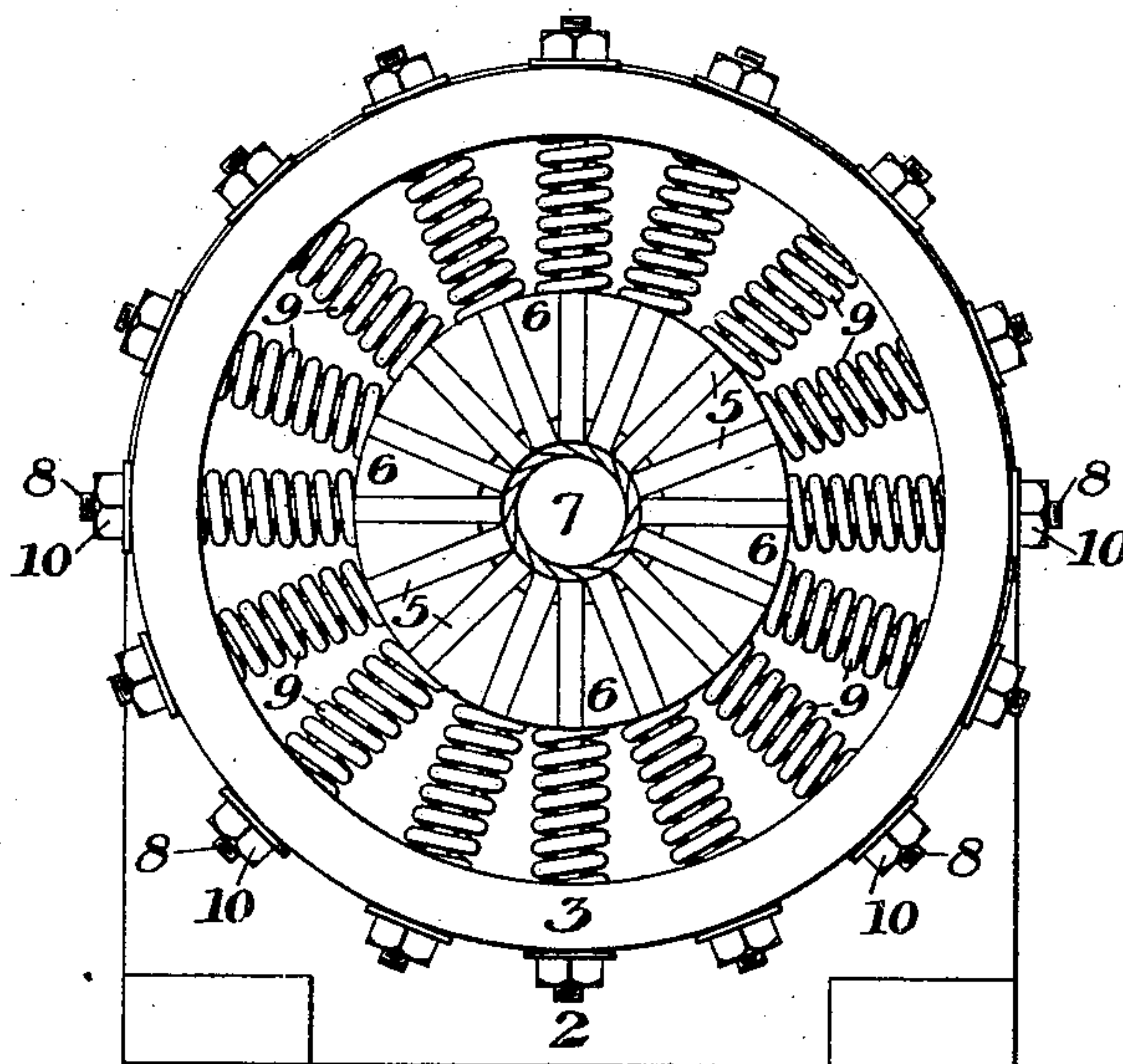


Fig. 2.

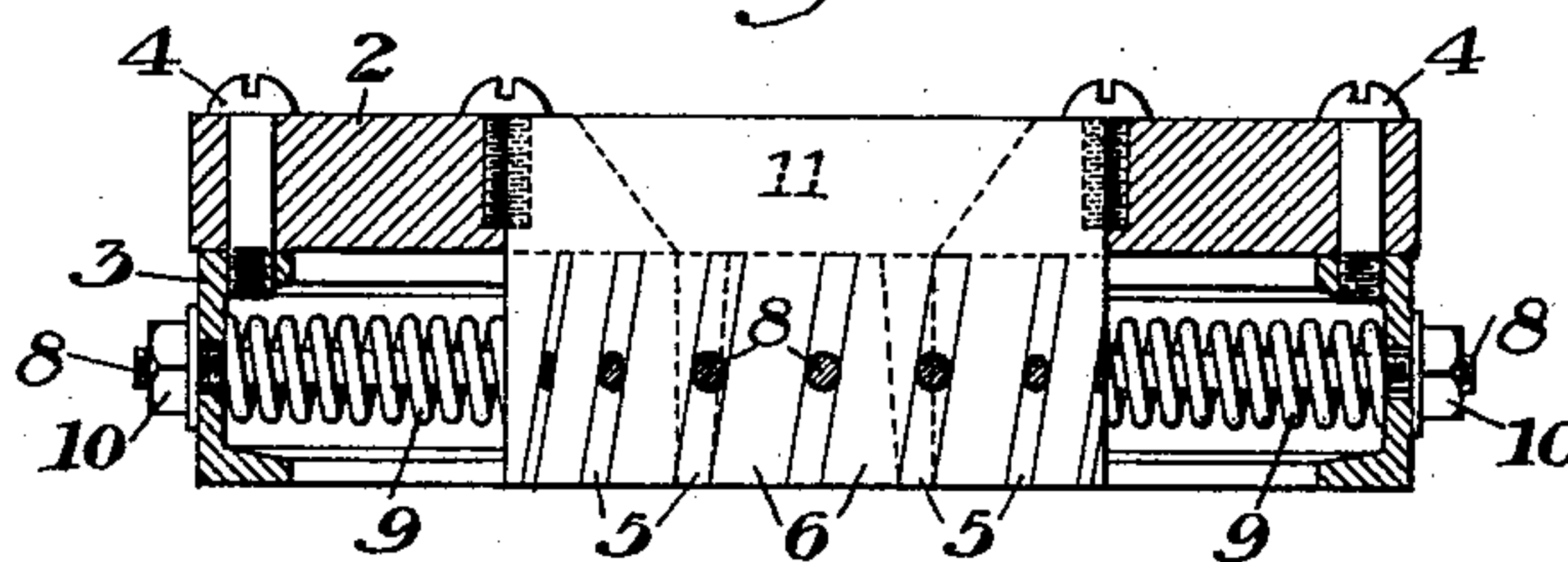
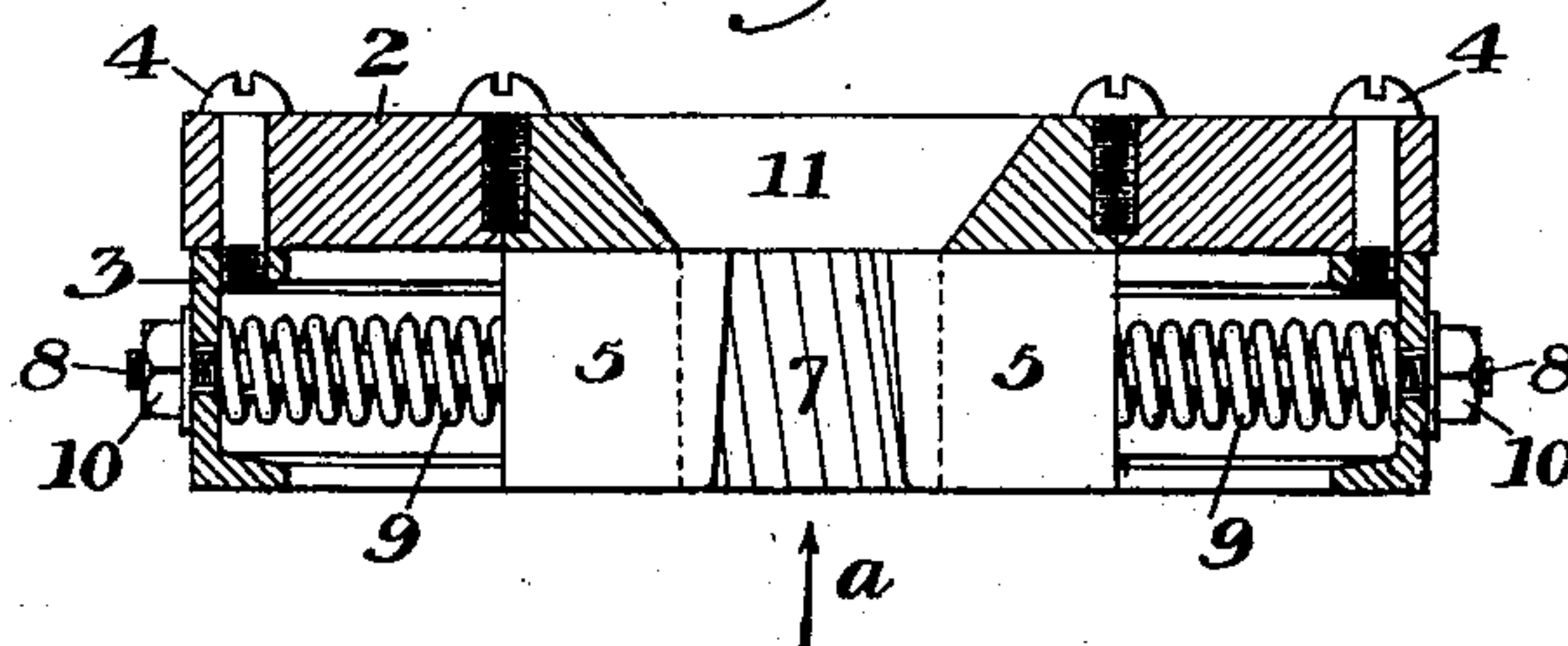


Fig. 3.



WITNESSES

Warren W. Swartz
AFM Corvallis

INVENTOR

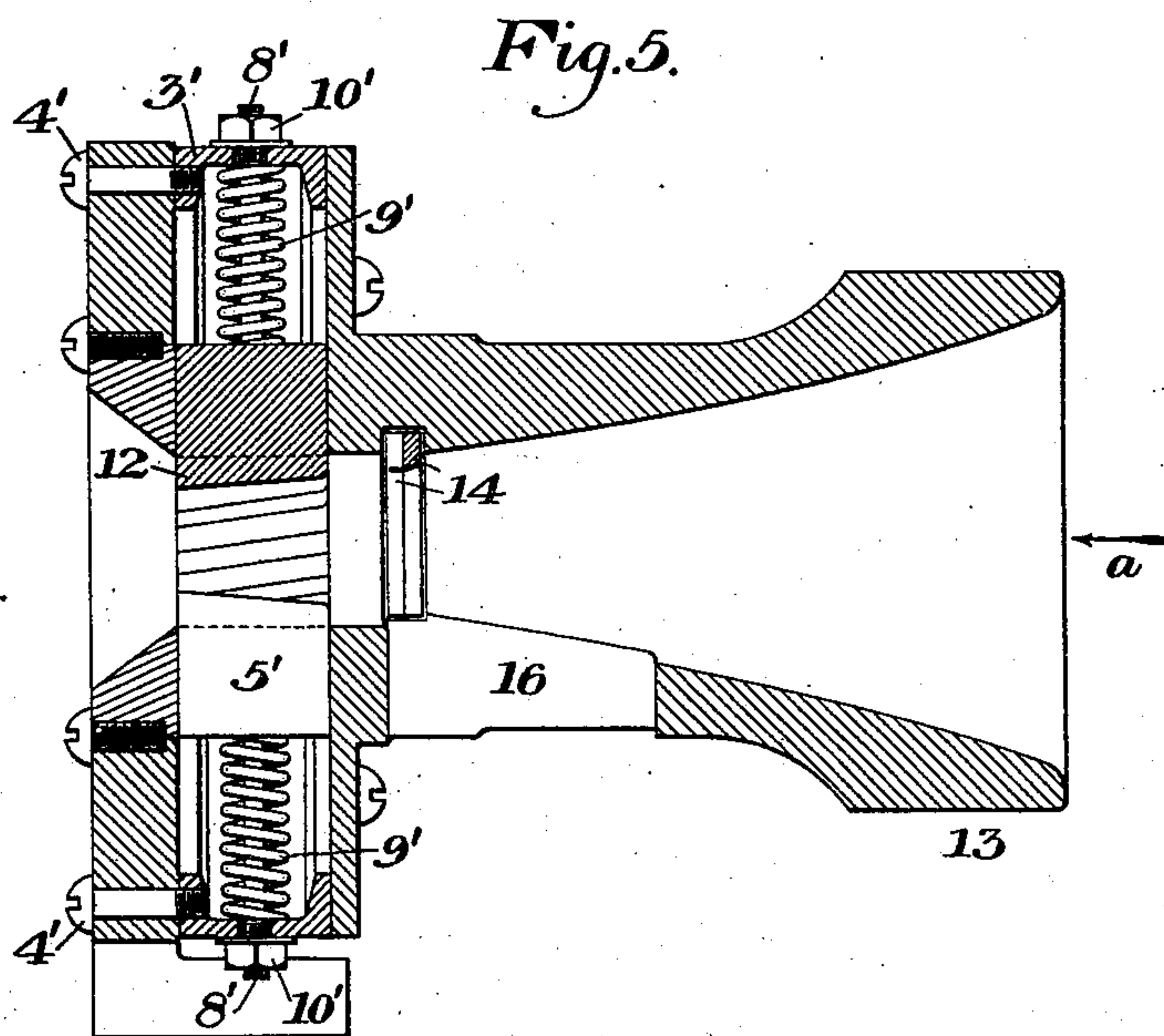
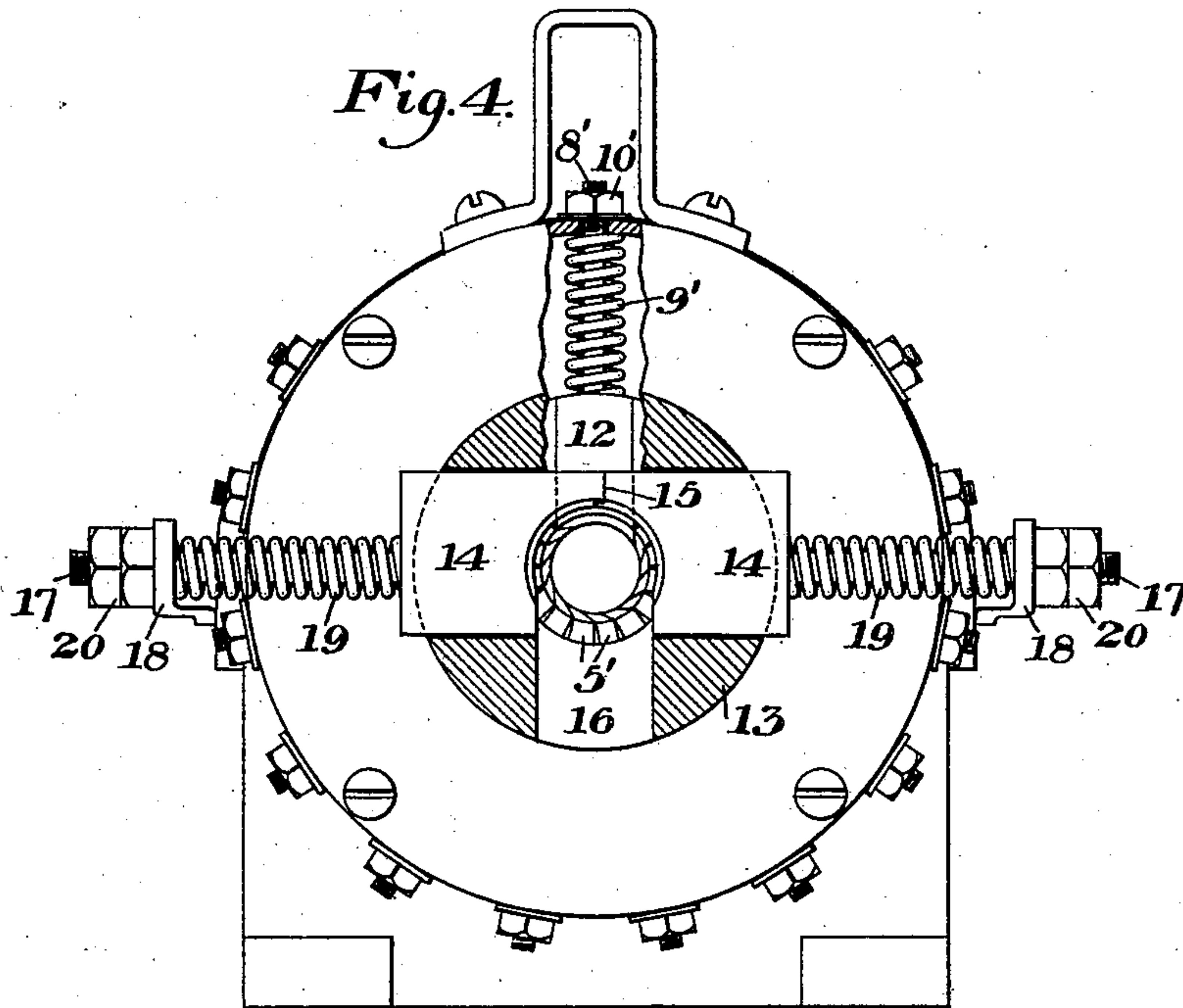
William Smith
by Nathaniel Byrnes
his atty.

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2 Sheets—Sheet 2.



WITNESSES

Warren W. Swartz
H. M. Corwin

INVENTOR

William Smith
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UNITED STATES PATENT OFFICE.

WILLIAM SMITH, OF MCKEESPORT, PENNSYLVANIA.

DIE FOR TAPERED PIPES OR TUBES.

SPECIFICATION forming part of Letters Patent No. 712,974, dated November 4, 1902.

Application filed June 10, 1902. Serial No. 110,969. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM SMITH, of McKeesport, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Die for Tapered Pipes or Tubes, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a front elevation of a pipe-welding die constructed in accordance with my invention. Fig. 2 is a sectional top plan view of the same. Fig. 3 is a central cross-section. Fig. 4 is a rear elevation showing a modified form arranged for bending a tapered blank into skelp form, and Fig. 5 is a central longitudinal section of the form of Fig. 4.

My invention relates to the bending and welding of tapered pipes or tubes, and more especially to the apparatus shown and described in United States Letters Patent No. 529,280, granted to S. Leek and J. Norton on November 14, 1894, for pipe-welding apparatus. In using the die described in this patent it has been found that as the spring-backed sections are forced outwardly the blank will be pressed into the interstices between these sections and crimps thus formed on the pipe or tubes. My invention overcomes this difficulty; and it consists, broadly, in the employment of rifled sections for the die—that is, sections arranged so that their joints are not parallel with the line of movement of the blanks, but are curved or inclined from one end to the other. These rifled dies may be used for bending the tapered blank or welding it, or both, and are found to avoid the difficulty above mentioned.

In the drawings, referring to the form of Figs. 1 to 3, inclusive, 2 represents a metal plate, to the rear face of which a recess-ring 3 is secured by cap-screws 4. The die-sections 5 are arranged in a circumferential series between the wedge-shaped filler-pieces 6. These filler-pieces are secured to the plate 2 and are stationary. The slots between these fillers do not extend parallel with the bore, but at an angle to it, and the die-sections are correspondingly inclined, their inner edges extending at an angle to the line of the bore. The die-sections when in their normal position are preferably in contact at their inner

edges, forming a round hole or eye 7, which is preferably tapered. Each section has an outwardly-projecting stem 8, which extends through the recessed ring 3 and around which is a spiral spring 9, one end of which presses on the die-section, while the other end presses on the inner face of the recess in the ring 3. These springs exert a constant inward pressure upon the dies, the inward movement and the spring tension of each section being adjustably limited by nut 10 upon the outer screw-threaded portion of the stem. The hole formed by the dies is converging, and the plate 2 is provided with a flaring hole or mouth 11.

In the operation of the device a tapered skelp-plate which has been previously bent roughly to form is heated and introduced with the small end first into the eye, through which it is drawn by a suitable tang or tongs in the direction indicated by the arrow *a*. As the skelp passes through the hole its edges are forced together and welded, and as the cross-section of the skelp increases toward the larger end the die-sections are forced outwardly against the pressure of the springs, thus presenting a constantly-enlarging hole. The springs are of sufficient strength to force the edges of the skelp together in firm contact, so that the welding action is continuous throughout the length of the skelp. The skelp may be passed through the die once or as many times as desired.

In Figs. 4 and 5 I show a modified form of the invention, which is arranged for bending the tapered plate into skelps. In this form the parts are similar to those of the welding-die except that the wedge-shaped pillars need not be used between the die-sections 5'. At the top of the hole through the die a special die-section 12 is provided having a concave inner end which is much wider than the ends of the other die-section. This die is spring-backed in the same manner as the others and insures the proper turning and bending of the stub-plate. I further prefer to employ a long bell-shaped or inwardly-converging tube 13, fastened to the front of the device and having two spring-pressed sections 14, which fit together with a lapped joint at the top of the die-hole, while their edges are curved to partially surround the hole. The

bell-shaped tube is preferably provided with a bottom hole 16 at the rear to allow the exit of scale, &c., during the bending of the skelp. The stem 17 of each section 14 extends through a bracket 18 and is provided with a spring 19 and adjusting-nuts 20. In using this form the flat plate is drawn through the bending-die by tongs or other devices, and the dies act to bend it into a tapered skelp in proper form for welding in the die of Figs. 1 to 3, inclusive. The long bell-mouth gives a preliminary bending, assisted by the front spring-sections 14. The wider top die-section brings the edges into proper shape and prevents them entering the spaces between the ordinary die-sections as they are forced back.

The advantages of my invention result from the use of the spring-backed die-sections, which are rifled or inclined relatively to the axis of the bore, since any crimping action on the tapered skelp or plate is thus obviated.

Other devices, such as hydraulic or pneumatic cylinders, may be used for forcing the die-sections inwardly and causing their gradual outward movement as the plate or skelp is drawn through them, and many other variations may be made in the form and arrangement of the parts without departing from my invention.

I claim—

1. A die having a series of outwardly-mov-

able sections whose inner edges are arranged in a circle and extend at an angle to the line of draft; substantially as described.

2. A die having rifled outwardly-movable die-sections with their inner ends arranged in a circle, the inner joints extending at an angle to the line of draft; substantially as described.

3. A die having a series of outwardly-movable spring-backed sections whose inner edges are arranged in a circle and extend at an angle to the axis of the hole and the line of draft; substantially as described.

4. A skelp-bending die having outwardly-movable spring-backed die-sections with their inner edges arranged to form part of a circle, the circle being completed by a wider spring-backed section; substantially as described.

5. A bending-die having a series of outwardly-movable spring-backed sections with their inner edges arranged in a circle, and a bell-mouth having spring-backed die-sections arranged in front of the main die; substantially as described.

In testimony whereof I have hereunto set my hand.

WM. SMITH.

Witnesses:

C. P. BYRNES,
H. M. CORWIN.