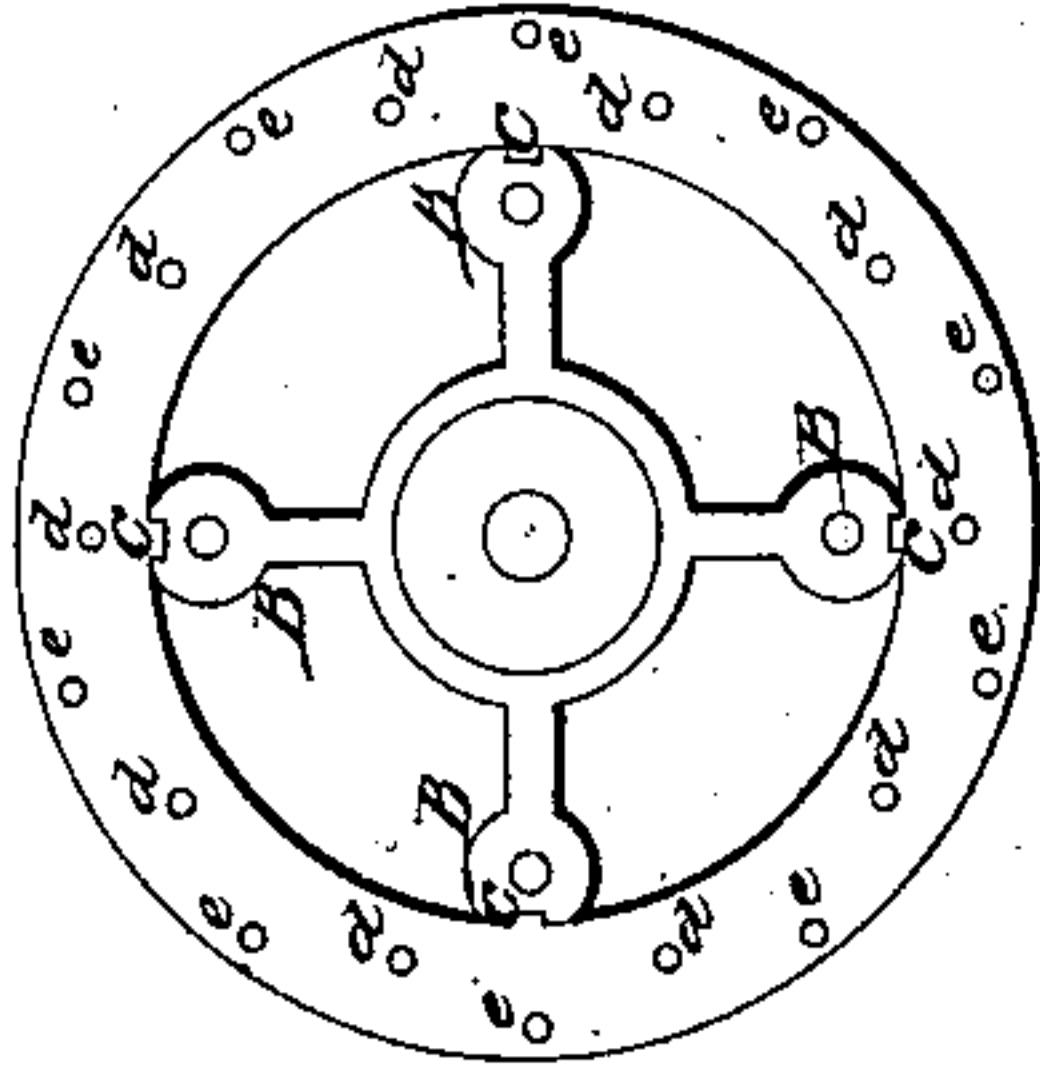


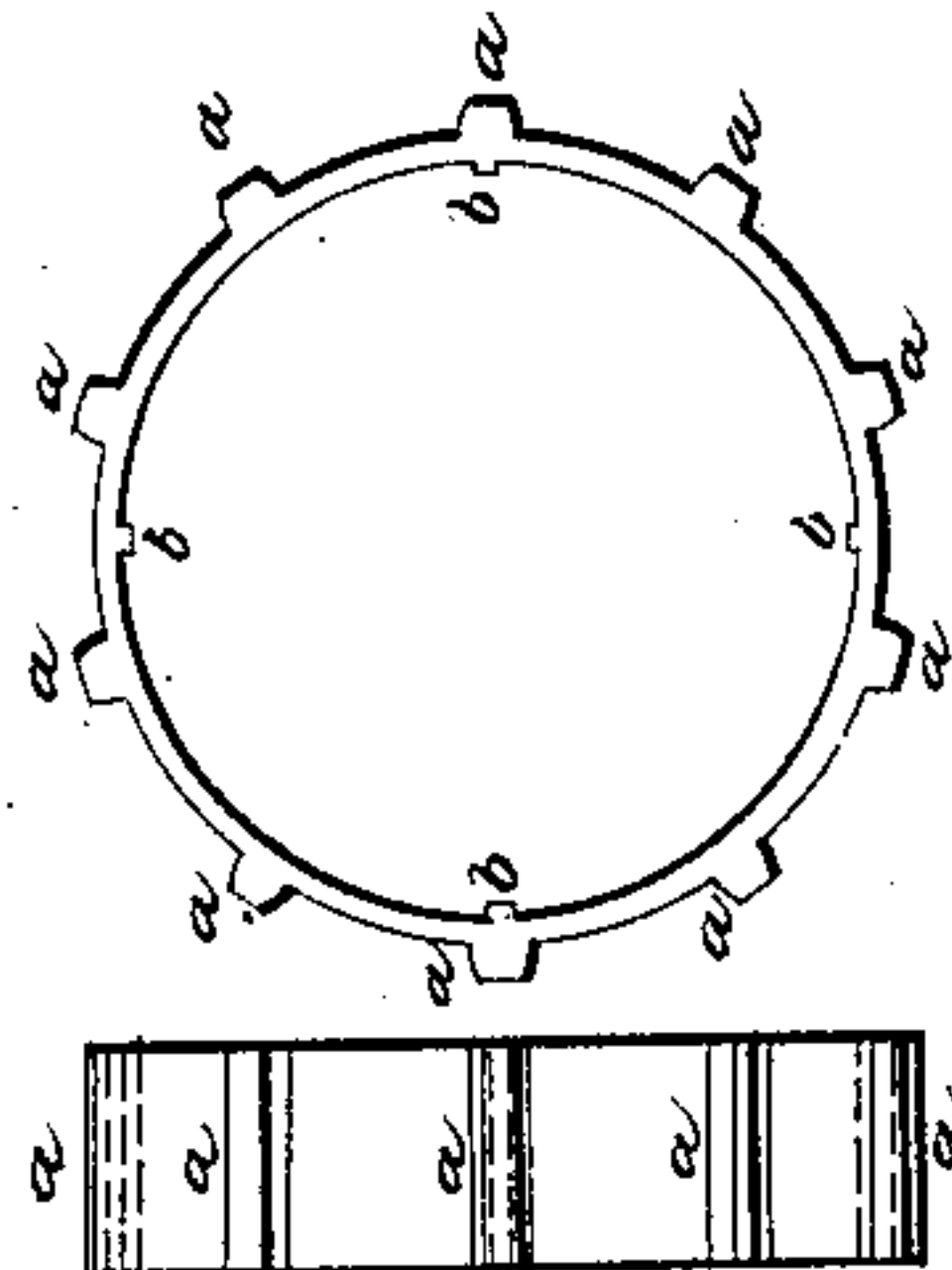
*Scoville & De Clercq,*  
*Steam Engine Piston.*

*N<sup>o</sup> 34,552.*

*Patented Feb. 25, 1862.*

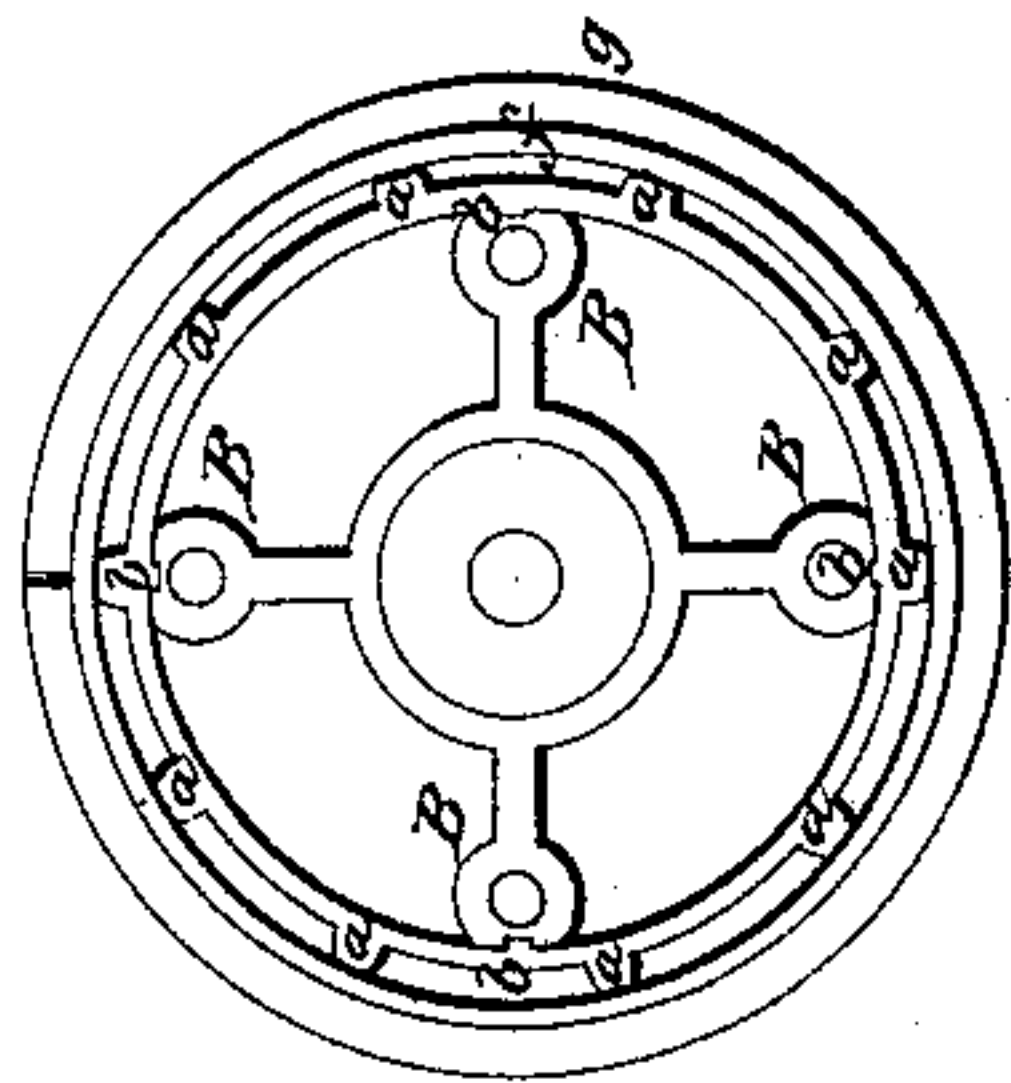


*Fig. 3.*

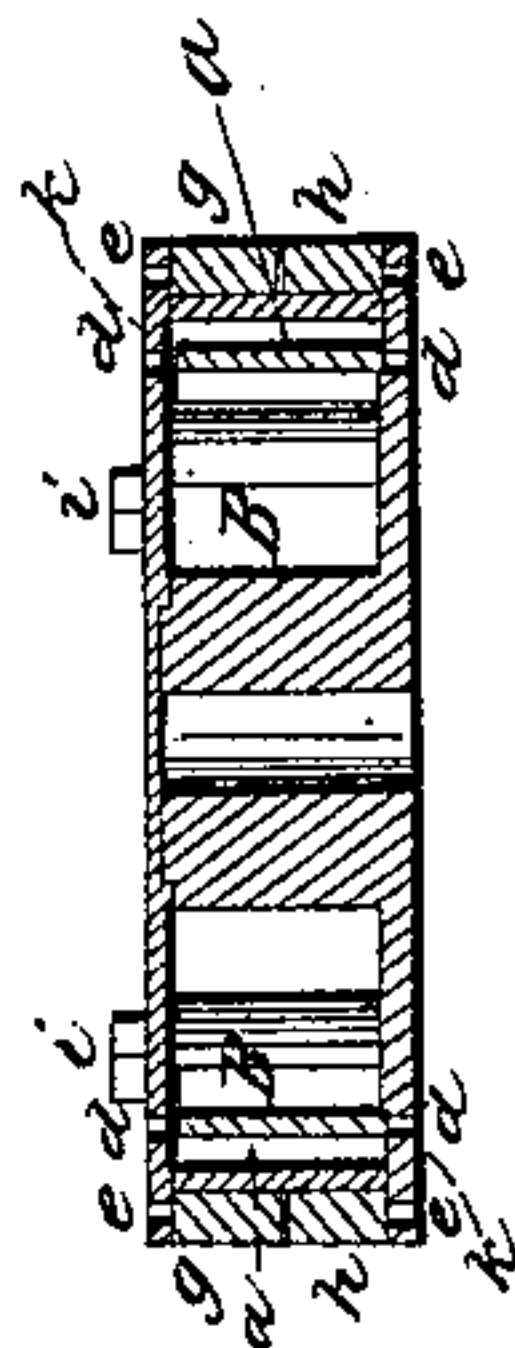


*Fig. 1.*

*Fig. 2.*



*Fig. 4.*



*Fig. 5.*

*Witnesses:*

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# UNITED STATES PATENT OFFICE.

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## IMPROVEMENT IN PISTONS FOR STEAM-ENGINES.

Specification forming part of Letters Patent No. 34,552, dated February 25, 1862.

*To all whom it may concern:*

Be it known that we, AUGUSTUS J. SCOVILLE and AUGUSTUS H. DE CLERCQ, of Bloomington, in the county of McLean, in the State of Illinois, have invented certain new and useful Improvements in Pistons for Steam-Engines; and we do hereby declare that the following is a full and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon.

The object of our invention is to simplify and perfect the use and application of metallic packing for pistons of steam-engines, and to dispense with the use of springs or other mechanical contrivances for adjusting and regulating such packing, substituting steam therefor by means of a simple mechanical arrangement.

To enable others skilled in the art to make and use our invention, we will proceed to describe its construction and operation.

We do not make any alteration in the metal rings in ordinary use in the pistons of locomotive and other steam-engines, and of which there are commonly three to each piston, two known as the "outside rings" next the cylinder and one known as the "inside ring," it being equal in width to both the outside rings and lying on the inside of them; but instead of the rings in common use in locomotive-pistons, which are ordinarily made of brass and what is known as "Babbitt metal," and are consequently very expensive, cast-iron rings may be used with our improvements, and work as well or better than any other metal.

As the rings in common use are so well known, we do not deem it necessary to describe them minutely, but only to say that in locomotive-engines ordinarily the two outside rings are made alike, about three-quarters of an inch thick and wide enough so that the two when in position will fill the space between the flange of the piston-head and the follower and work freely. Each ring is cut across diagonally, severing the ring, so as to allow expansion when pressed upon from the inside.

The inside ring in the piston of the ordinary locomotive-engine is usually one-quarter

of an inch thick and of the same width as both the outside rings, cut open in the same manner, and when in position between the flange of the piston-head and the follower rests on the inside surface of the outside rings, the openings in all the rings being at different places, so as to break joints. At this point the application of our improvement commences. Instead of springs or any other mechanical contrivance for pressing the rings out against the cylinder, we make of cast-iron or other metal a fourth ring, which may be termed a "valve-ring," and which is placed within the ring commonly known as the "inside ring," as aforesaid, and is constructed as follows, to wit: The width of this valve-ring when finished is a very little less than the distance between the flange of the piston-head and the follower—say one thirty-second of an inch less—and it is turned off on the edges in a lathe. This valve-ring is made with bosses on the outside and large enough so that when in position the bosses will touch the inside ring. There may be any number of bosses, from three or four up to twenty or more. This should be regulated partly by the size of the cylinder, the larger ring requiring more of them.

In the description here given we have reference to the piston of the ordinary locomotive-engine with a cylinder sixteen inches in diameter; but it will answer with slight variations for all sizes of pistons. We have found ten bosses on the valve-ring to be sufficient and to be a convenient number. The object of these bosses is to strengthen the valve-ring without making it heavy and to form spaces between the valve-ring and the inside ring, so as to allow the free action of the steam on the inside ring, and at the same time to support the valve-ring while resting on the inside ring.

In the accompanying drawings, Figure 1 represents an end view of the valve-ring, showing the bosses *a a*. Fig. 2 represents a side view of the same ring, showing the bosses by the same letters. The ring itself should be about one-fourth of an inch thick and the bosses about three-eighths of an inch thick and an inch wide.

In Fig. 1 the letters *b b* show small guides



cast on the inside of the valve-ring, which are to be finished to fit corresponding grooves in the bosses of the piston-head, as shown at *c c*, Fig. 3. These guides are to keep the valve-ring in its proper position and prevent its revolving. To allow the introduction of the valve-ring in the ordinary piston, it is necessary to turn off the bosses of the piston-head *B B*, Fig. 3. An end view of the piston-head is shown by said Fig. 3. We then drill small holes—say one-fourth of an inch in diameter—through the flange of the piston-head, and also through the follower, as shown by the letters *d d* in Fig. 3, directly over or against the bosses *a a*. These holes are to allow the passage of steam from the cylinder to the inside of the piston-head, the valve-ring playing back and forth as operated on by the steam the thirty-second part of an inch, or whatever distance may be allowed for its play between the flange of the piston-head and the follower, and thus allowing the entrance of the steam to the inside of the piston-head and its pressure upon the inside ring. It will be obvious from this description that as the steam is let into one end of the cylinder it will pass through the small holes in the flange of the piston-head or follower opening against the bosses on the valve-ring, and, pressing the valve-ring over against the holes on the opposite side, will thus close those holes and be prevented from escaping or blowing through. The pressure of the steam must consequently be exerted on the inside ring, and thereby be brought to bear upon the outside rings, expanding them against the side of the cylinder and forming a perfectly-fitting piston. When the piston is forced to the other end of the cylinder and the steam let in at that end, of course the action of the valve-ring is reversed and a new pressure of the steam on the rings is exerted from the other side of the piston-head. Thus the "valve-ring," as we have denominated it, in its operation with the holes above described through the piston-flange and follower is simply a valve or series of valves for the purpose of admitting steam into the piston-head, and is made in the form aforesaid, so as to present a considerable surface against the flange of the piston-head and the follower, to prevent wear, and for simplicity of arrangement.

In the accompanying drawings, Fig. 4 shows an end view of the piston-head with the follower removed and the rings in position. *B B* are the bosses of the piston-head. The letters *b b* show the guides on the valve-ring fitting in the grooves in the bosses of the piston-head. The bosses on the valve-ring are shown at *a a*. The inside ring is marked *f* and the outside ring *g*.

Fig. 5 represents a sectional view of the piston-head with the rings all in position, and the different parts designated by the same letters as in Fig. 4.

In Fig. 5 both the outside rings are shown, and are marked *g* and *h*. The holes for admission of the steam against the outside rings are shown at *e e*. The letters *i i* show the heads of the bolts with which the follower is secured to the piston-head. The letters *k k* indicate the small space or opening for admission of steam past the valve-ring.

The valve-ring may be made with a flange on each end of the same width as the combined thickness of the ring and boss, with holes through the ring between the bosses to allow the free passage of steam to and against the inside ring. In such case the only purpose of the bosses is to strengthen the flanges of the ring. The flanges may be slightly notched or scalloped on the edges, not cutting in far enough to reach the holes through the piston-flange or follower, and thus allow the passage of the steam between the valve-ring and the inside ring. In case the valve-ring is made with flanges, as aforesaid, it is not necessary to have the guides shown by *b b*, Fig. 1, or the grooves shown by *c c*, Fig. 3.

To press the outside rings over against the flange of the piston-head and the follower that the steam may not escape between the sides or edges of the outside rings and the flange of the piston-head or the follower, the small holes, one-fourth inch in diameter, (shown by *e e*, Fig. 3,) are drilled through the flange or follower near the edge—say one-fourth of an inch from the edge—to admit steam against the edge of the outside ring. This arrangement or contrivance we do not claim as new or as our invention.

The advantages of this invention, herein described, consist in its being easily and cheaply applied to the packing of pistons in steam-engines already made in the ordinary way with springs, and in securing a uniform and even pressure upon the rings that form the packing of the piston, causing them to wear smoothly and evenly, not cutting the cylinders, and consequently lasting much longer than the metallic packing in ordinary use. It is also durable and not liable to get out of order, and is peculiarly valuable in locomotive-engines, as when running downgrade or whenever the steam is shut off the piston works freely and without friction, which is not the case when the packing is set out by any other means than the steam itself.

Having thus fully described the manner of constructing and the operation of our improvements in pistons for steam-engines, what we claim as our invention and as new therein, and desire to secure by Letters Patent, is—

1. The valve-ring with the holes opening against it through the flange of the piston-head and through the follower, constructed and operating substantially as herein described.



2. The combination of the small holes through the flange of the piston-head and through the follower, against the edge of the outside rings, with the inside and outside piston-rings and the valve-ring, and holes opening against it through the flange of the piston-head and through the follower, the whole

arranged and operating substantially as herein described.

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