No. 657,548. Patented Sept. 11, 1900.

S. E. KELSEY.

PISTON PACKING.

(Application filed Aug. 21, 1899.)

(No Model.)

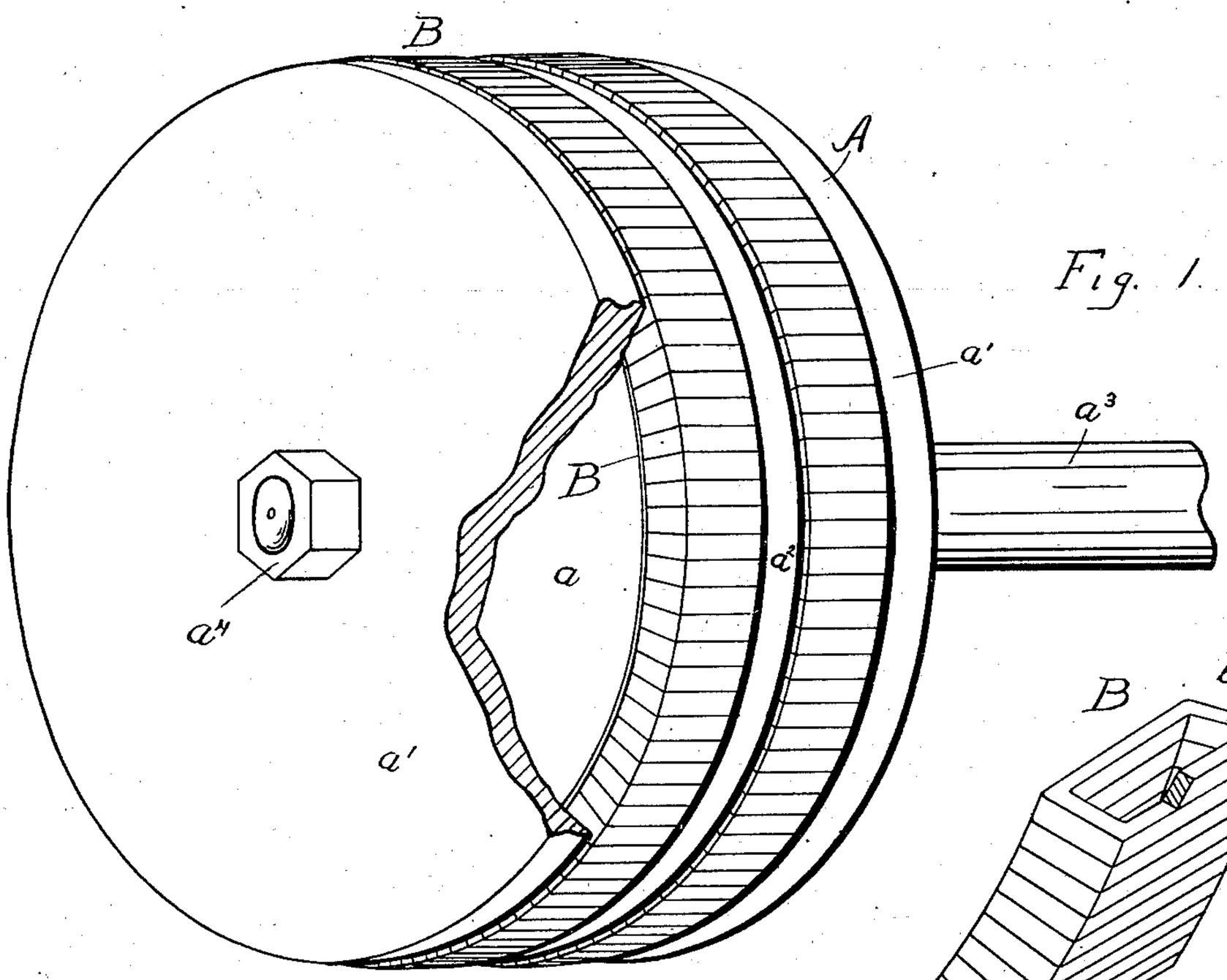

Fig. 1.

Fig. 3.

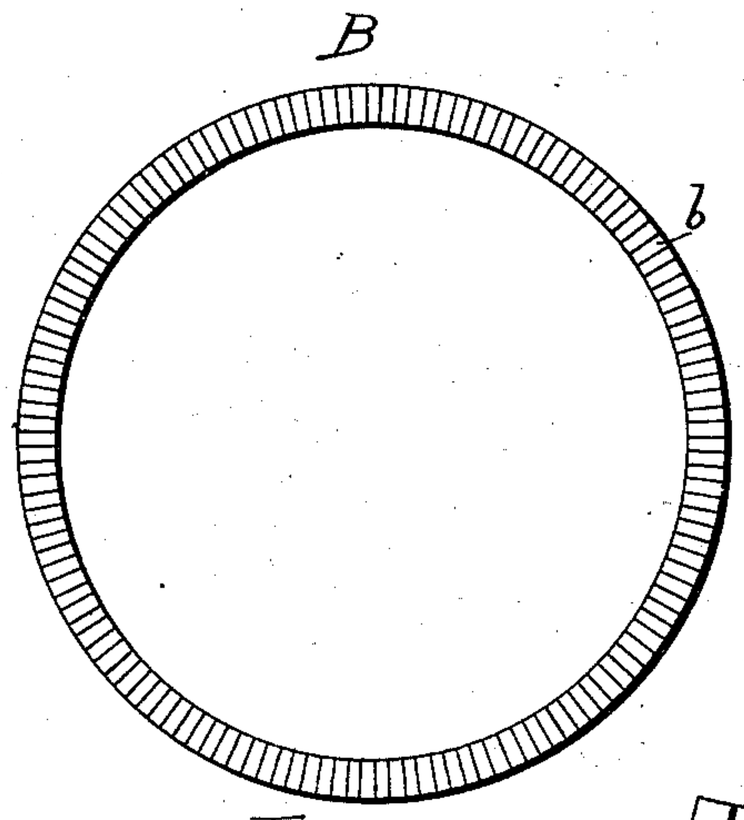

Fig. 2.

Fig. 5.

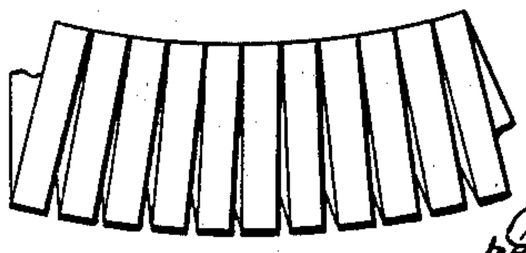

Fig. 4.

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SIDNEY E. KELSEY, OF KANSAS CITY, MISSOURI.

PISTON-PACKING.

SPECIFICATION forming part of Letters Patent No. 657,548, dated September 11, 1900.

Application filed August 21, 1899. Serial No. 727,942. (No model.)

To all whom it may concern:

Be it known that I, SIDNEY E. KELSEY, a citizen of the United States of America, residing at Kansas City, in the county of Jackson and State of Missouri, have invented certain new and useful Improvements in Piston-Packing; and I do hereby declare that the following is a full, clear, and exact description of the invention, such as will enable others to make and use the same, reference being had to the accompanying drawings, forming a part of this specification.

My invention has for its object the reduction in loss of power incident to steam-leakage in the cylinder of an engine and also a packing which will reduce the pressure between the wearing parts and the friction between the wearing surfaces, thereby reducing the loss of power incident thereto and combining with simplicity of construction self expansibility and contractibility; and to this end my invention consists of a strip of metal or other suitable material wound or folded upon itself and compressed into a compact and practically fluid-tight mass having minute openings between contiguous surfaces when in extension and having within itself the power of expansion and contraction.

The invention further consists in the novel construction and combination of parts, such as will be first fully described, and specifically pointed out in the claims.

In the drawings, Figure 1 is a view in perspective of the novel packing applied to a piston of an engine, a portion of the end plate being broken away to show the core of the piston. Fig. 2 is a side view in detail of the packing. Fig. 3 is a perspective view in detail of a portion of the novel packing. Fig. 4 is a view of a portion of the spiral packing before compression. Fig. 5 is a view of an alternate form of the packing.

Similar letters of reference indicate corresponding parts in all the figures.

Referring to the drawings, A represents a piston for the cylinder of an engine.

a represents the ordinary bull-ring or spider around which the packing extends, the packing being shown in each recess of the bull-ring.

a' a' are the front and rear clamping-plates, respectively, and a^2 the extension of the bull-ring.

a^3 is the piston-rod.

B represents the novel packing-ring, which is formed from a strip b of suitable material, which is preferably drawn through a square or rectangular die, such material being used as possesses the requisite amount of elasticity, such as brass, the strip b being wound spirally to form a helix, (see Fig. 4,) the length of which helix is considerably in excess of the circumference of the bull-ring a. The helix thus prepared is then compressed in a suitable compressing-machine upon the top, bottom, and sides, so as to reduce the helix to a rectangular form, (see Fig. 3,) and also compressed longitudinally into a substantially fluid-tight mass, so as to reduce the space between the folds of the spirally-wound strip to minute openings. In the compression of the helix from the form as seen in Fig. 4 to form the novel packing as seen in Figs. 2 and 3 the ends of each fold of the helix are upset or forced inwardly, the enlargements of said ends being upset and filling the interstices of the folds, thus forming a practically fluid-tight joint and leaving the sides of the packing with an even surface. The packing is then given the proper or slight extension, after which the packing is trimmed and is the proper length to extend around the ring a of the piston, the ends being brought together in contiguity. The width of the packing will then be nearly the same as the recessed portion of the bull-ring a, the plates a' a' being clamped upon the ends of the packing by the tightening of the nut a^4 on the end of piston-rod a^3 and the packing held in position. The packing is taken from the compress in an elliptical, square, or rectangular cross-section or other shape, as found desirable. Before placing the helix in the compress the end coils are welded or pinched together. The compress employed is preferably such as to preserve the contour of the packing in the arc of a circle during compression, the inner edges receiving a greater degree of compression than the outer edges of the packing.

Instead of winding the strip of which the packing B is composed into a spiral form or helix, as before described, I attain the result

of my invention in another form, as seen in Fig. 5, in which the strip *f*, of which the packing is made, is in excess of the width of the strip *b* and of the same material. In this construction the strip *f* is pleated or folded back and forth upon itself in parallel planes and then compressed into a practically fluid-tight mass, the strips being shown progressively in Fig. 5, the scalloped sides at the bent portions or joints of the folds being upset, leaving an even surface with the interstices filled with the upset portions of the scalloped ends of the folds. The packing is then given the proper set in extension and is also ground to accommodate it to the steam-fitting surface of the cylinder and is in readiness for use.

In the operation of the piston within the cylinder of an engine the improved packing has a tendency to press outward, and therefore to be constantly in close contact with the inner surface of the cylinder. This result is obvious from the elasticity of the packing, so that at whatever place the cylinder becomes worn the packing exerts a pressure outwardly in the direction of such place, preventing the loss of steam, and consequently obtaining a greater steam-pressure efficiency, and thus a direct saving in the amount of steam required to operate the engine and in the cost of fuel to produce the steam.

It will be evident that my novel packing depends for its packing properties upon its elasticity and upon the fact that many minute openings, which in the aggregate are equivalent to a large opening, may be practically fluid-tight, while the large opening will permit the free passage of a fluid, and, further, upon the fact that these minute openings must of necessity become filled with the particles of matter from the frictional surfaces, in combination with such extraneous substances as oil, water, or fluid of any kind with which the packing may come into contact. When the packing is placed in the cylinder, it is under compression, and the joints are closed. Any slight expansion of the packing will produce minute openings between the contiguous surfaces of the packing, which will be covered with a film of fluid as soon as the openings are increased enough to admit it. It will therefore be seen that the packing may expand, incident to the wear, and still remain practically fluid-tight.

Having fully described my invention, what I now claim as new, and desire to secure by Letters Patent, is—

1. An annular packing composed of a strip of suitable material folded upon itself, forming self extensible and contractible parts, compressed together in a substantially fluid-tight mass, and with the outer sides of the folded parts of the packing upset to fill the interstices, the ends of said packing being in contiguity.

2. A metallic packing-ring, comprising a coiled strip having its end coils connected together, and the contacting surfaces of the parts of the coils compressed into a substantially fluid-tight mass.

3. A metallic packing-ring, comprising a helically-wound strip with its ends joined together, and the contiguous parts of the coils compressed into substantially fluid-tight joints, and said joints upset to fill the interstices.

4. A metallic packing-ring composed of a suitable helically-wound spring, the end coils of which spring are joined together and the contiguous parts of the coils compressed into substantially fluid-tight joints, and enlarged at their ends to fill the interstices.

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