L. B. Batcheller,

Steam-Engine Piston.

No. 32,174 Patented Apr. 30, 1861.

Fig: 1.

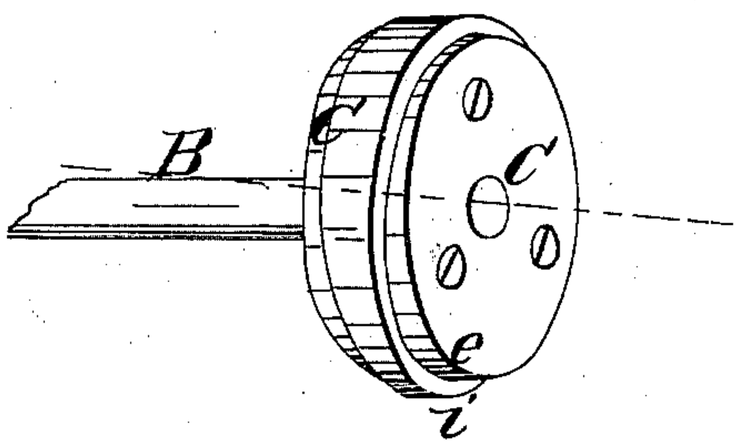


Fig: 2.

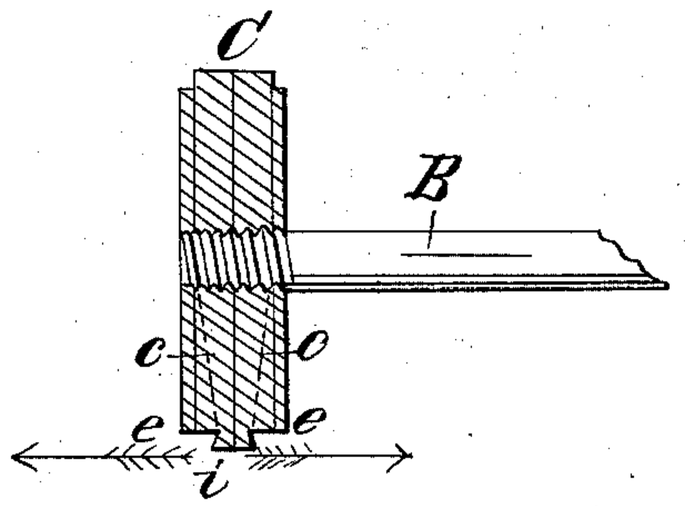
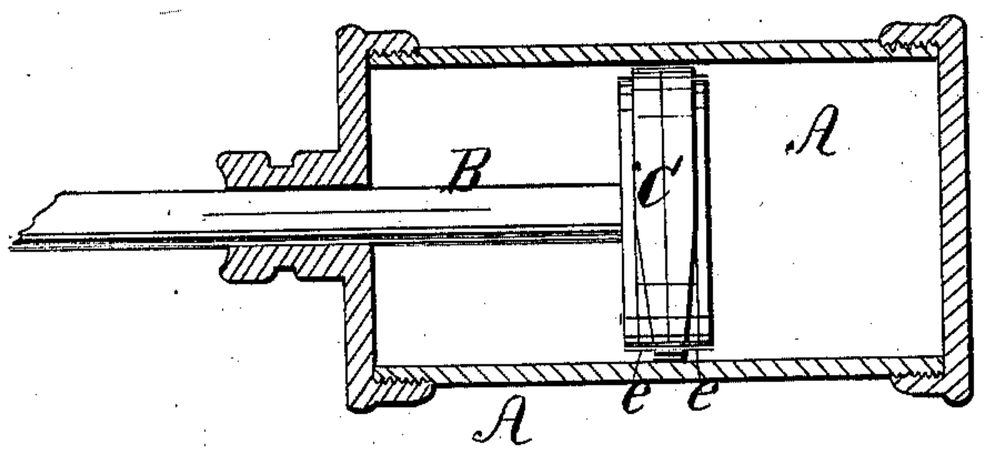


Fig: 3.



Witnesses;
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UNITED STATES PATENT OFFICE.

L. B. BATCHELLER, OF ROCHESTER, NEW YORK.

PISTON OF STEAM-ENGINES.

Specification of Letters Patent No. 32,174, dated April 30, 1861.

To all whom it may concern:

Be it known that I, L. B. BATCHELLER, of Rochester, in the county of Monroe and State of New York, have invented a new and Improved Mode of Constructing the Pistons of Horizontal Steam-Engines; and I do hereby declare that the following is a full and correct description thereof, reference being had to the accompanying drawings.

Figure 1, is a perspective view of my improved piston. Fig. 2, a transverse vertical section thereof, and Fig. 3, representing the same in elevation with the cylinder shown in section.

Like letters designate corresponding parts in all of the figures.

It is well known that when steam is used in horizontal cylinders the pistons thereof by their weight cause greater friction on the lower side, and soon wear the cylinders so as to render their bores untrue. This evil augments as the size of the engine increases, and so great is it in large engines when the weight of the pistons is necessarily great that the cylinders often require to be rebored to restore them to a perfectly cylindrical form, which is an operation attended with much trouble and expense. This unequal wear is increased incidentally by any extraneous substance that may enter the cylinder and become deposited on the bottom thereof, which acts on the surface of the metal with all the increased abrasion that the superincumbent weight of the piston will produce.

It is the object of my invention to overcome both difficulties.

My device consists first, in forming on the lower side, near the periphery of the piston, a surface exposed to the direct pressure of the steam in the cylinder, in a direction diametrically opposed to the line of gravity, of an extent which, calculated from the pressure of the steam employed shall be sufficient to equal the weight of the piston, and thus prevent an excess of friction on the under side. Secondly, I construct the angle of the under side of the piston so as to present a sharp edge, or acute angle in the direction in which it moves, which causes it to scrape up and remove any foreign matter or sediment that falls to the bottom, and thereby obviate one great cause of friction.

As represented in the drawings, A is the cylinder, B the piston rod, and, C the piston. On the lower edge of the packing rings on each side of the disk, or on the face of the disk itself, or any other convenient place for accomplishing the same result I form a recess which is greatest at the lowest point *e*, and terminates at a point on a level with the center of the rod or disk, or thereabout. I prefer to diminish this recess by a line drawn obliquely to intersect the point of termination and face of the disk, or some plane which is equivalent thereto, as indicated by dotted lines *c c* (Fig. 2) this being the most convenient mode of forming it while in the machinist's lathe, and is accomplished by merely inclining the disk to an angle equal to the depth of the recess which it is required to make. The plane of *e* being parallel with the interior of the cylinder, exposes the piston to a direct upward or lifting pressure equal to the pressure of the steam on the extent of surface thus exposed. This is easily calculated in constructing the engine by ascertaining the weight of the piston when finished. If that be one hundred pounds and the engine is designed to use steam of 50 lbs. pressure to the square inch, then it is only required to make the recess *e* to contain two superficial inches. Any other form of recess may be used that will produce this effect, or the same may be accomplished by beveling the whole surface of the disk from the lower to the upper edge, or by any other form calculated to produce an equivalent result, viz., that of securing an upward pressure of the steam in the cylinder to oppose, or counteract, the weight of the piston; but I prefer the method described as being most readily and cheaply made, and possessing all the advantages that can accrue from the employment of said principle.

I do not make the bottom of the recesses *e e* vertical, but bevel them from the periphery of the disk so as to leave a sharp edge next to the cylinder on its under side, as at *i i* Fig. 2. This has the effect to loosen and scrape up the sediment with each stroke, and carry it to the end of the cylinder, to a much greater extent than is done by the right angle of the disk as ordinarily constructed. If the gritty particles were not removed they would produce much less injury with this plan, where the friction is relieved from the whole weight of the piston, but the second

device removes this impediment to a great extent, if not entirely.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. Forming the pistons of horizontal steam engines with the recesses *e e*, or their equivalents, on the lower side thereof, for the purpose of employing the force of the steam effectively to overcome the weight of said piston, substantially as and for the purposes shown and described.

2. Forming the angles *i i* on the lower edge or periphery of the piston substantially in the manner and for the purpose set forth.

L. B. BATCHELLER.

Witnesses:

S. J. ALLIS,

J. FRASER.