

E. P. COWLES.
PISTON FOR LOCOMOTIVES.

No. 421,164.

Patented Feb. 11, 1890.

Fig. 1.

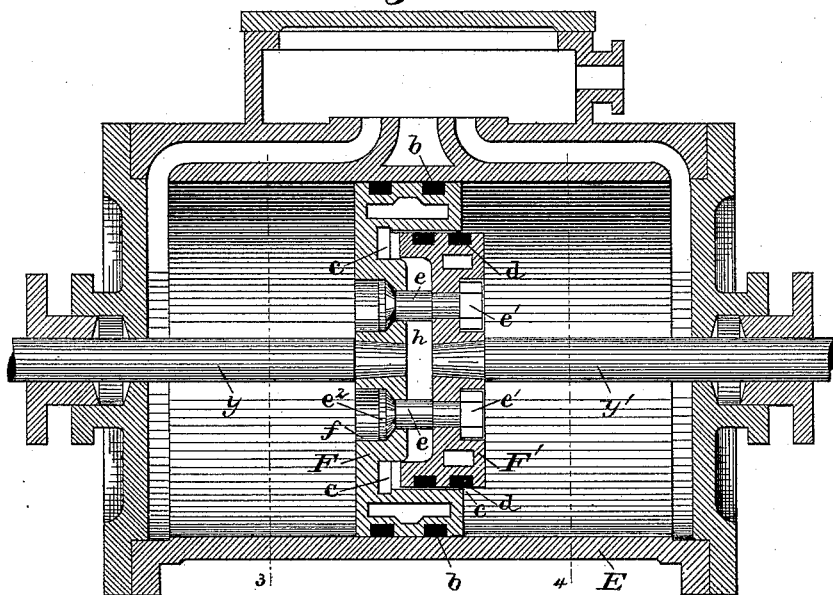


Fig. 2.

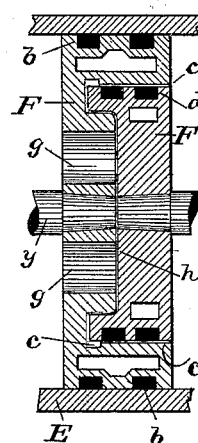


Fig. 3.

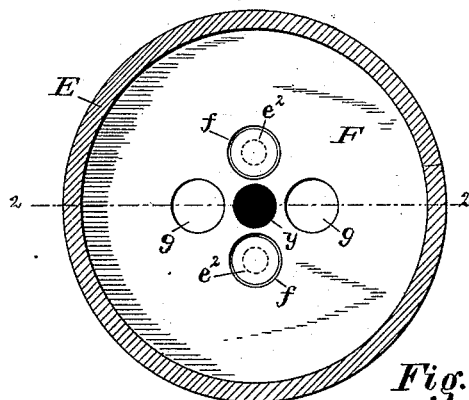


Fig. 4.

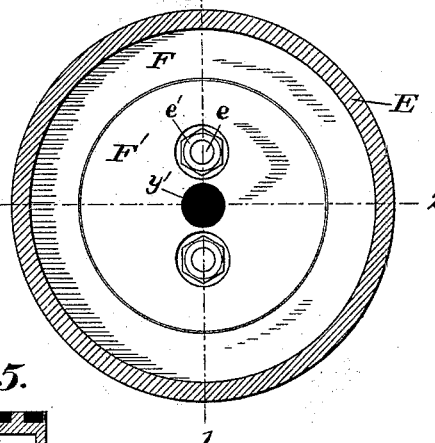
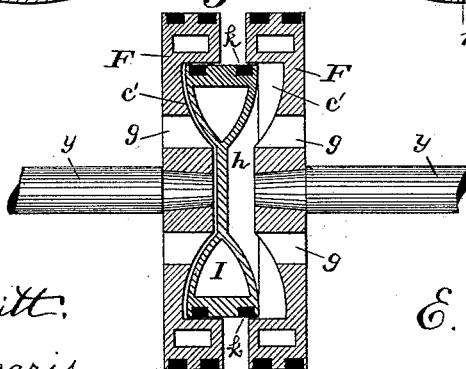


Fig. 5.



WITNESSES:

R. L. Clemmitt,
John E. Morris

INVENTOR:

E. P. Cowles

BY *Chas B. Mann*

ATTORNEY.

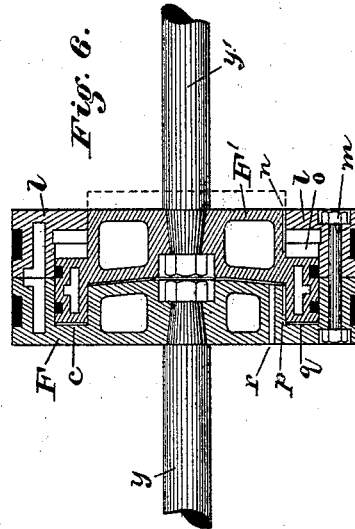
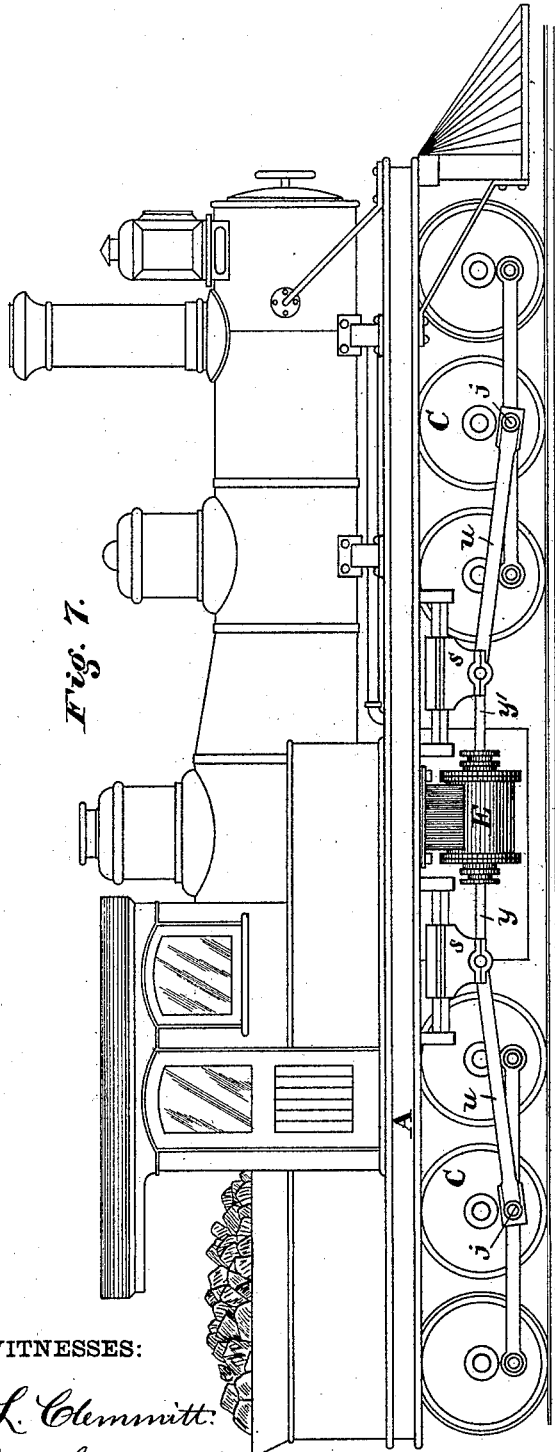
(No Model.)

2 Sheets—Sheet 2.

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UNITED STATES PATENT OFFICE.

EDWARD P. COWLES, OF NEW DECATUR, ALABAMA.

PISTON FOR LOCOMOTIVES.

SPECIFICATION forming part of Letters Patent No. 421,164, dated February 11, 1890.

Application filed April 27, 1889. Serial No. 308,818. (No model.)

To all whom it may concern:

Be it known that I, EDWARD P. COWLES, a citizen of the United States, residing at New Decatur, in the county of Morgan and State of Alabama, have invented certain new and useful Improvements in Locomotives, of which the following is a specification.

My invention relates to an improved piston for cylinders of locomotives and other engines, and is illustrated in the accompanying drawings, in which—

Figure 1 is a vertical longitudinal section of an engine-cylinder and a piston composed of two parts, as per my invention, the parts being separated, the section being taken on line 1 1 of Figs. 3 and 4. Fig. 2 is a horizontal longitudinal section of the same piston, taken on the line 2 2, the two parts being here shown close together. Figs. 3 and 4 are cross-section views of the cylinder, and show opposite sides of the piston. Fig. 5 is a diametrical section of a two-part piston of modified form. Fig. 6 shows another modification. Fig. 7 is a view of a locomotive of the class for which my invention is designed, and shows a cylinder having my improved piston.

My present invention has for its object the attainment of the same end as that for which Letters Patent of the United States were granted me November 4, 1884, No. 307,709—to wit, a piston having two rods, each of which extends through an opposite head of the cylinder, and which will provide a compensation for any variation in the distance between the cross-heads, and cranks arising from the position of angularity which the connecting-rods necessarily assume at the lower and higher points of their strokes or from any other cause.

The locomotive-frame A (see Fig. 7) is supported on two trucks, which may have either four or six wheels, and the cylinder E is secured to the said frame between the two trucks. There are two piston-rods yy' , each of which extends through an opposite head of the cylinder, and is attached to a cross-head s , and a rod u connects each piston-rod or cross-head with a crank-wrist j on the wheels C.

Further description of the locomotive is deemed unnecessary, as the above is sufficient to make clear the relative position and operation of the engine-cylinder.

The cylinder E has a piston composed of two parts $F F'$, which have a limited movement axially with respect to each other, and openings to admit steam between the two parts, and a piston-rod yy' is attached to each of said parts, and each rod extends in an opposite direction from the other through a different head of a cylinder. A piston having these features may have the two parts with an equal or an unequal area, as desired.

In the form of piston shown in Figs. 1 to 4 one part only of the two piston parts fits the bore of the cylinder E, and is provided with packing b , as usual. This part F has a recess c at one side, which is bored out, and the other part F' is fitted by means of packing d into said recess c , and is movable therein. The movement of the two parts with respect to each other may be limited in various ways. In Figs. 1 to 4 this is done by the bolts e , each of which is secured to the one part F' by a nut e' . Each bolt has a head e^2 and works in a countersunk hole f in the other piston part F. The bolt-head e^2 stops on the shoulders of the said countersunk holes and thereby limits the separating movement of the two parts. The part F, which fits the bore of the cylinder, is provided with openings g , which allows steam at that end of the cylinder to pass through freely and press on the other part F' . The steam may thus occupy the space h between the two parts, as in Fig. 1. It will be seen the two parts of the piston are free to draw apart to a limited extent or to close together, and thus they will adjust themselves to any variation that may arise in the distance between the two cross-heads, or from any other outside cause.

In the form of piston shown in Fig. 5 each of the two parts $F F'$ fits the bore of the cylinder E. A recess c' is in one side of each part, and the two recessed sides adjoin or confront each other. The recesses are bored out, and a middle head I is loose between the said two parts and is free to occupy either one or both recesses, being provided with packing k to make it steam-tight in the bore of the recesses. The two piston parts in this case may move independent of each other, and bolts may be employed, as shown in Fig. 1, to limit the separation of the two parts of the piston. The two parts will never draw

apart or separate far enough to allow the middle head I to entirely withdraw from the recess c' of either part. In the reciprocation of the piston the middle head I will be pressed alternately against the two parts F F', and said two parts are free to close together or separate to a limited extent. Each of the two parts in this form is provided with openings g , which allow steam to pass and enter the space h between them.

The piston shown in Fig. 6 is similar to that shown in Fig. 1. Two differences are to be noted. Instead of bolts to limit the separating movement of the two parts, a retaining flange or ring l on the part F may project inward, so as to confine the other part F' in the recess c . This retaining flange or ring l is secured by bolts m to the part F. A small slot n admits steam to the cushion-space o . A slot p provides for vent of the cushion-space q , and a passage or bore r vents the central space h . This construction provides a steam-cushion to prevent concussion between the two parts of the piston.

It is obvious that the details of construction may be varied or changed without departing from my invention.

Having described my invention, I claim—

The combination, with a steam-cylinder, of a piston composed of a multiplicity of parts which have a limited movement axially with respect to each other, one or more of which parts being fitted to the bore of the cylinder and perforated for the admission of steam between them, a connection to limit the separating movements of the parts, and piston-rods extending through opposite heads of the cylinder, substantially as and for the purpose specified.

In testimony whereof I affix my signature in the presence of two witnesses.

EDWARD P. COWLES.

Witnesses:

W. T. MULLIGAN,
THOS. H. MATTOCKS.