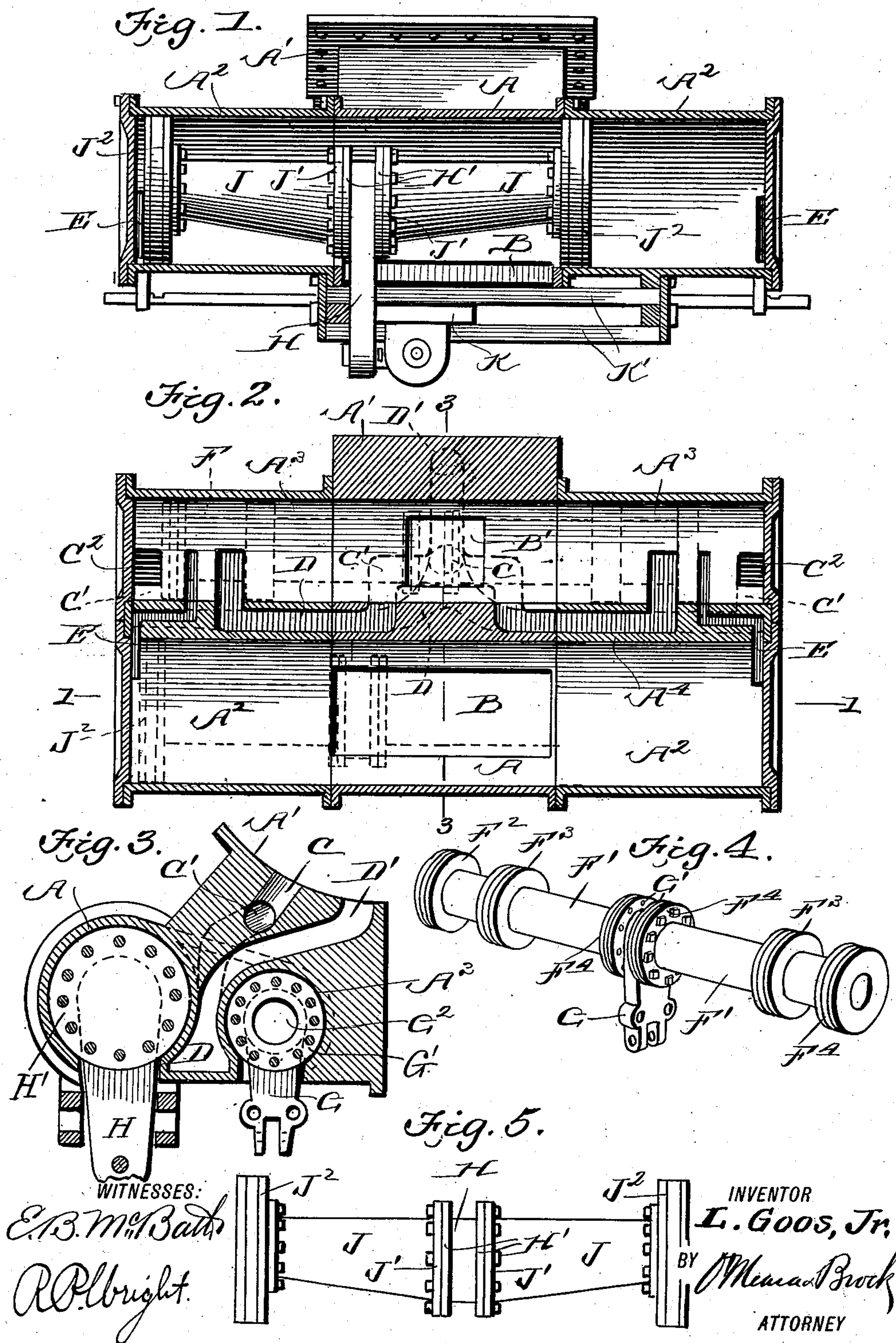


No. 889,676.

PATENTED JUNE 2, 1908.

L. GOOS, JR.  
LOCOMOTIVE.  
APPLICATION FILED MAR. 24, 1906.





# UNITED STATES PATENT OFFICE.

LOUIS GOOS, JR., OF ATLANTIC CITY, NEW JERSEY.

## LOCOMOTIVE.

No. 889,676.

Specification of Letters Patent.

Patented June 2, 1908.

Application filed March 24, 1906. Serial No. 307,862.

*To all whom it may concern:*

Be it known that I, Louis Goos, Jr., a citizen of the United States, residing at Atlantic City, in the county of Atlantic and State of New Jersey, have invented a new and useful Improvement in a Locomotive, of which the following is a specification.

This invention is an improvement on the engine for which a patent was granted me April 19, 1904, Number 757,452.

The object of this improvement is to adapt the engine for use with locomotives, as the changes in construction permit it to be better placed upon the supporting frames and trucks.

A further object of the invention is to construct the same in three sections, that is, a central section, and two end sections, the pistons working only in the end sections and the end sections being detachable from the central section. By this construction if either of the end cylinders become worn, it can be easily removed and a new one put into position, making it easier and cheaper to keep the engine in repair than would be the case if the entire cylinder was in one piece.

Another advantage in the present construction over the construction shown in the patent referred to, is that the driving and piston valve arms are brought into a better position for connection with the driving mechanism.

In these drawings forming a part of the specification:—Figure 1 is a longitudinal section on the line 1—1 of Fig. 2. Fig. 2 is a horizontal section, the piston valves and a portion of the piston being shown in dotted lines. Fig. 3 is a transverse section on the line 3—3 of Fig. 2. Fig. 4 is a detail perspective view of the piston valve. Fig. 5 is a detail side elevation of one of the pistons.

In these drawings A represents the central section which is provided at its ends with suitable flanges and which carries a boiler saddle A'.

A<sup>2</sup> represents the end sections and these sections are duplicates of each other and are bolted to the ends of the central section A.

Arranged parallel to and adjacent the sections A and A<sup>2</sup> and constructed sectionally in the same manner is a steam chest A<sup>3</sup>. The section A of the cylinder is longitudinally cut out in the bottom as shown at B, and the steam chest A<sup>3</sup> is cut out midway its ends as shown at B'.

A steam inlet C is formed in the boiler

saddle and is provided with branch passages C' which extend in opposite directions and communicate with steam ports C<sup>2</sup> arranged at opposite ends of the steam chest A<sup>3</sup>, and opening into said chest.

An exhaust port D' divides in the branches D, which extend longitudinally in opposite directions in a wall A<sup>4</sup> which wall divides the steam chest A<sup>3</sup> from the cylinder sections A and A<sup>2</sup> and the exhaust passages D open into the steam chest at points between angled steam ports E.

As shown in Fig. 2 the steam ports E open into the steam chest A<sup>3</sup> between the ports C<sup>2</sup> and the inner ends of the exhaust passages D. The steam ports E also open respectively, into the extreme end portions of the cylinder sections A<sup>2</sup>. To control the passage of steam through the said steam chest to the cylinders and to regulate the exhaust, I provide a piston valve F. This valve is provided with two hollow stems F' fitted at their ends with piston valves F<sup>2</sup> and intermediate their ends with similar valves F<sup>3</sup>. A valve operating arm G extends upwardly through the opening B' in which it works, and the upper end of this arm is provided upon opposite sides with circular flanges G' and the inner ends of the stems F' are also provided with flanges F<sup>4</sup> which are secured to the flanges G'. By this construction one of the stems can be removed and one set of valves repaired or replaced without disturbing the other set.

In the cylinder sections, a drive arm H extends upwardly through the opening B and works back and forth in said opening. This arm H is provided with flanges H' and I provide castings J, which are provided at their inner ends with suitable flanges J', which are bolted to the flanges H' of the arm H. The castings J have mounted upon their opposite ends, suitable pistons J<sup>2</sup>. The arm H is connected to a cross-head K which slides in a suitable guide-way K'. The manner of connecting up the cross head K and of connecting the arm will be made clear by referring to the patent above mentioned.

In operation, steam is admitted through the ports C and passes through the branches C' into the steam chest A<sup>3</sup> through the ports C<sup>2</sup>. Assuming that the parts are in position, as shown in Fig. 2, and bearing in mind that the stems F' are hollow, and that the arm G is also provided with an opening G<sup>2</sup> registering with the hollow stems F', it will be obvious that the steam passing through the



ports C<sup>2</sup> at the left hand end of the engine, will be cut off by the piston valve F<sup>2</sup> from the steam port E and will pass through the stems F', and opening G<sup>2</sup> into the right hand end of the steam chest A<sup>3</sup>. The steam passing through the right hand port C<sup>2</sup> will also come into this same end and as the piston F' on the right hand end of the valve F is in a position midway the exhaust passage D and the steam port E, the steam will be cut off by said piston from the exhaust passage and will enter the right hand cylinder section A<sup>2</sup>. As soon, however, as the valve F is reciprocated the passage E at the right hand end will be cut off from the steam port C<sup>2</sup> and put into communication with the exhaust port D, in other words, the valve at the right hand will assume the same relative position to the ports as the left hand parts had assumed at the commencement of the cycle. The steam in the right hand section A<sup>2</sup> will therefore, be exhausted through the steam port E and the right hand branch or exhaust passage D while steam will be admitted to the left hand section A<sup>2</sup>, through the passage C<sup>2</sup>, the hollow valve stem and the port E at that end.

From the above description, it is thought that the operation of the engine will be clear, and it will be obvious that the valve stem being hollow, there will be no back steam pressure for the piston F to work against, and it will further be understood that any suitable means may be employed for reciprocating the said piston F.

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

1. An engine of the kind described, comprising a cylinder and a steam chest, said cylinder and steam chest being parallel to each other and formed in three detachable sections, said sections consisting of a central section and two duplicate end sections, the central section being cut out in both the cylinder and steam chest, a drive arm extending through and working in the opening in the cylinder section, castings carried by the said arm, pistons carried by the said castings, and working respectively in the end sections of

the cylinder, an arm extending into the steam chest, through the said opening, said arm having an opening formed in its inner end, hollow valve stems carried by opposite sides of said arm and alining with the opening in the arm and piston valves carried by the said stems, the said steam chest and cylinder sections being provided with suitable inlet and exhaust passages controlled by the said piston valves.

2. A cylinder comprising a central and outer sections detachably secured together, the central section being longitudinally cut out at the bottom, a drive arm working in said cut out portion, castings detachably secured to opposite sides of said drive arm, pistons carried by the castings and working respectively in the end sections, and means for alternately admitting and exhausting steam from the same end sections.

3. In an engine of the kind described, a cylinder and a steam chest arranged parallel to each other, a boiler saddle supported thereby, the said boiler saddle having a steam inlet therein, and the steam chest being provided at each end with a steam port having direct communication with the steam inlet formed in the boiler saddle, said steam chest having also exhaust passages opening into the steam chest adjacent the ends and exhausting substantially midway the ends of the steam chest, the said steam chest and cylinder being provided with angled steam ports opening into the steam chest between the first mentioned steam ports and the inner ends of the exhaust passages, and into the clearance space at the cylinder ends, and a reciprocating piston valve working in the steam chest and adapted to bring the steam port at one end and the angled steam port at the same end into communication and to simultaneously bring the angled steam port at the opposite end of the cylinder into communication with the inner end of the adjacent exhaust passage.

LOUIS GOOS, JR.

Witnesses:

JOSEPH ENGELKS,  
ALFRED GILLISON.