

(No Model.)

2 Sheets—Sheet 1.

D. A. DECROW.
PUMPING ENGINE.

No. 584,760.

Patented June 15, 1897.

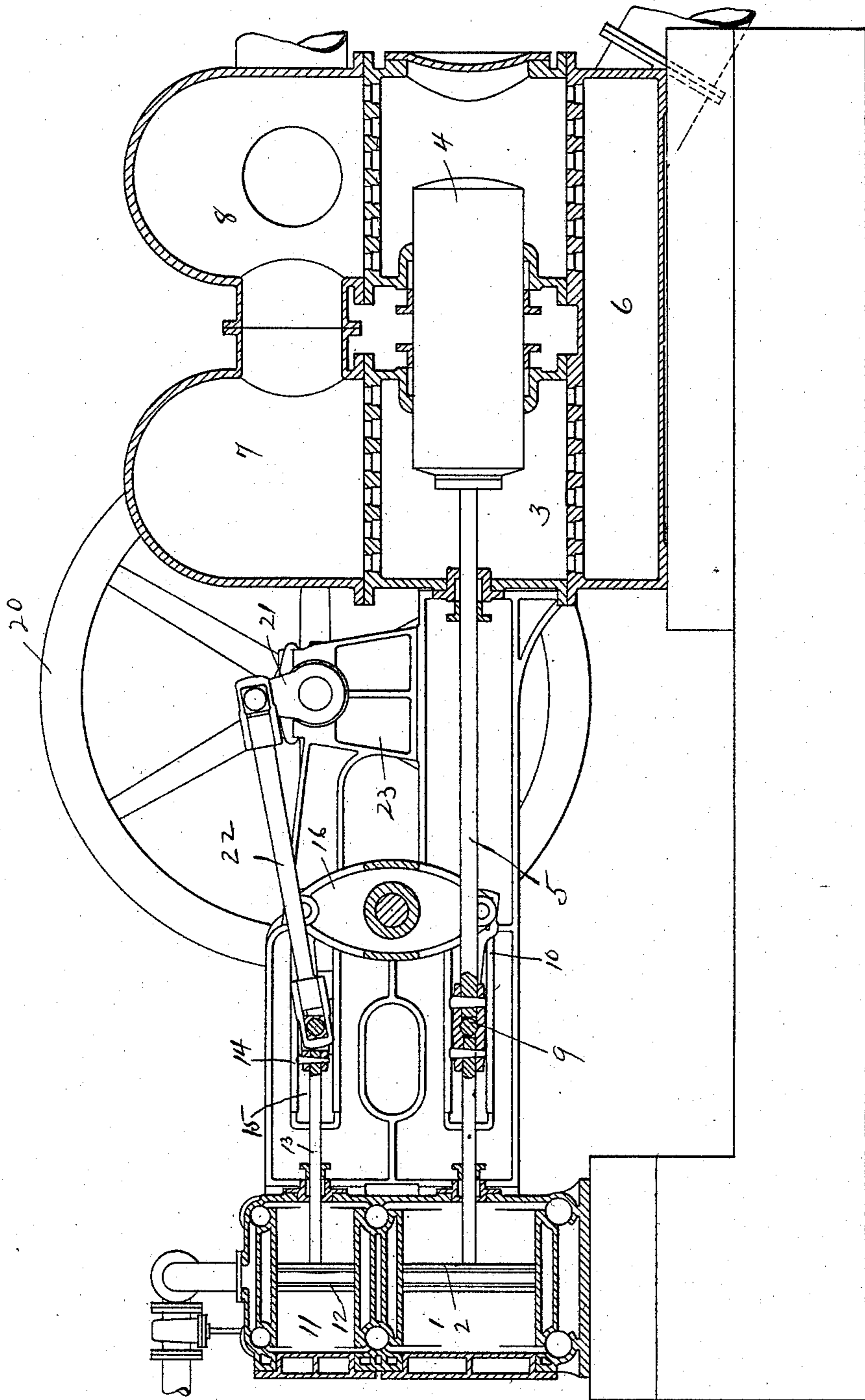


Fig. 1

Witnesses
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P. D. Bowk

Inventor
David A. Decrow
By *Proctor & Dapby*
Attorneys

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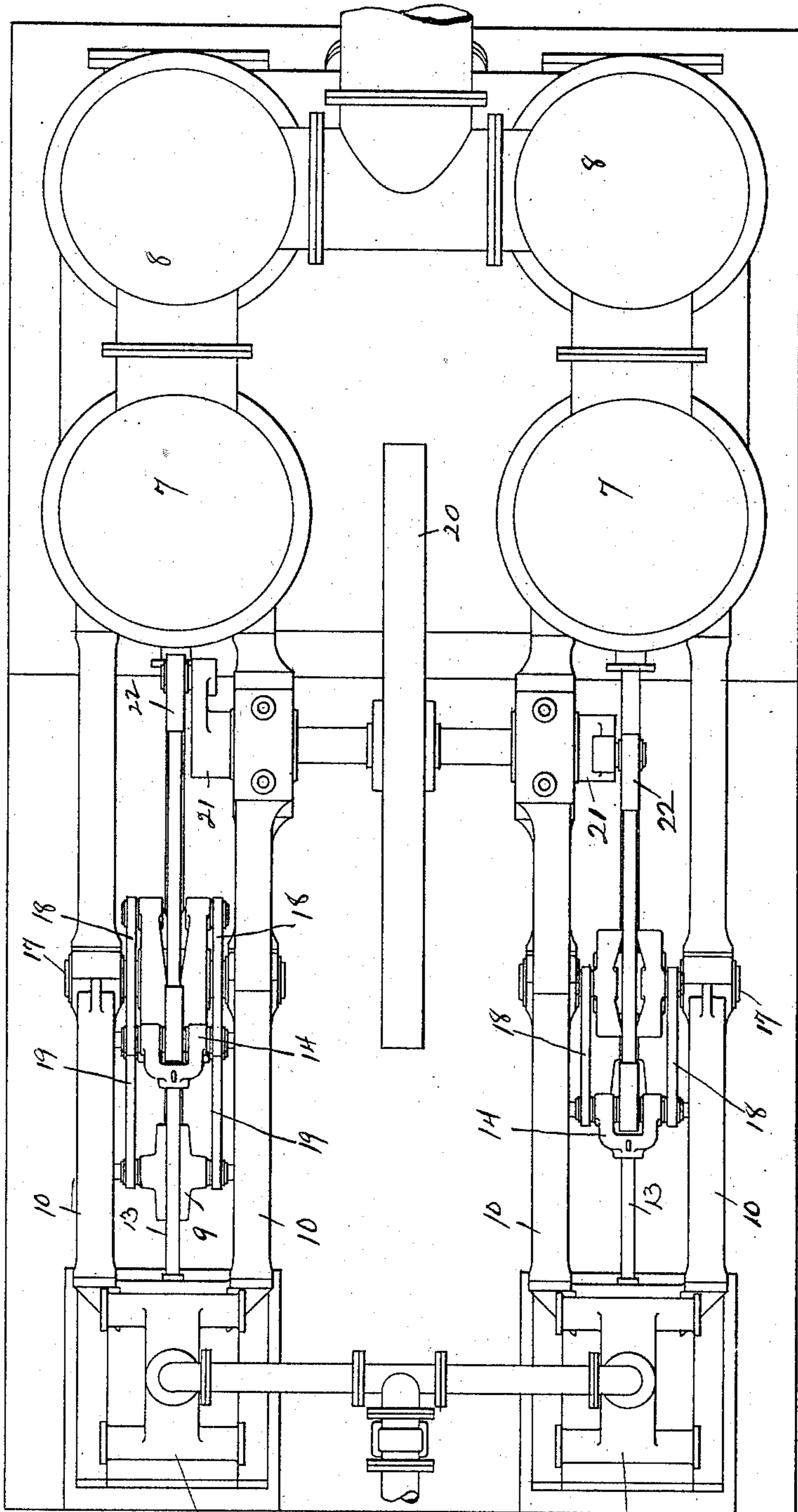


Fig. 2

Witnesses,

M. S. Cavanagh
F. L. Douch

Inventor,

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UNITED STATES PATENT OFFICE.

DAVID A. DECROW, OF LOCKPORT, NEW YORK, ASSIGNOR OF ONE-HALF
TO THE HOLLY MANUFACTURING COMPANY, OF SAME PLACE.

PUMPING-ENGINE.

SPECIFICATION forming part of Letters Patent No. 584,760, dated June 15, 1897.

Application filed September 8, 1896. Serial No. 605,128. (No model.)

To all whom it may concern:

Be it known that I, DAVID A. DECROW, a citizen of the United States, residing at Lockport, in the county of Niagara and State of New York, have invented a new and useful Improvement in Pumping-Engines, of which the following is a specification.

This invention relates to pumping-engines, and particularly to horizontal pumping-engines of the compound or Woolf type.

The object of the invention is to improve the construction of pumps of this class and to render the same more efficient in operation.

A further object of the invention is to provide an arrangement and construction whereby the size of the pump-cylinder will not be limited by the relative location and arrangement of the crank-shaft.

A further object of the invention is to provide an arrangement and construction wherein the main crank is connected directly to the cross-head of the steam-motor.

Other objects of the invention will appear more fully hereinafter.

The invention consists, substantially, in the construction, combination, location, and relative arrangement of parts, all as will be more fully hereinafter set forth, as shown in the accompanying drawings, and finally specifically pointed out in the claims.

Referring to the accompanying drawings and to the various views and reference-signs appearing thereon, Figure 1 is a view in central longitudinal section of a pumping-engine embodying the principles of my invention. Fig. 2 is a plan view of the same, showing my invention applied to two sets of engines arranged side by side and employing a single crank-shaft.

The same reference-sign is employed to designate the same part wherever it occurs throughout the several views.

Heretofore in pumping-engines of the class to which my invention relates the crank-shaft and fly-wheel have been mounted on the pump. In such constructions and in order to provide a sufficient amount of crank room above the pump-plungers it was necessary to limit the size of the pump in order to provide a sufficient vertical distance between

the center of the pump-cylinders and the center of the crank-shaft. Again, the connecting-rod from the main shaft has heretofore been attached to the upper end of the working engine-beam. Such construction necessitated the placing of the driving-motor at an objectionable distance from the pump to be actuated thereby. Examples of engines embodying these constructions are seen in Patents No. 263,694, dated September 5, 1882, and No. 289,828, dated December 11, 1883, to Gaskill, and also in No. 455,868, dated July 14, 1891, to Hall, with which patents I am familiar.

In order to avoid the objections noted and to provide a construction wherein the power of the driving steam-engine is most effectively applied to the work of actuating the pump-plunger and to provide a construction wherein the driving steam-engine may be placed in as close proximity to the pump as possible and a construction wherein the size of the pump will not be limited, I provide the following construction:

Reference-sign 10 designates a suitable frame mounted upon any suitable base and having supported thereby or formed thereon the pillow-blocks 23, in which is journaled the main crank-shaft 21, upon which is mounted the fly-wheel 20. Suitably mounted in the frame are the steam-cylinders 1 11, the one supported by the other. In the particular form shown, which I deem the preferable construction and arrangement, but to which I do not desire to be limited or restricted, the steam-cylinders 1 and 11 are of the compound type, cylinder 11 being the high-pressure cylinder and 1 the low-pressure cylinder, the high-pressure cylinder 11 exhausting into the low-pressure cylinder 1 in the usual or well-known manner.

Reference-sign 2 designates the piston of the low-pressure cylinder 1. 3 designates the pump-cylinder, arranged in alinement with the low-pressure cylinder 1; 4, the pump-plunger; 5, the rod, which serves at the same time as the pump-rod and as the piston-rod of piston 2. 6 designates the inlet-chamber of the pump, and 7 and 8 the pump discharge-chambers. Carried by rod 5 is a cross-head 9, arranged to slide in suitable guides formed in

the main frame 10. Upon the rod 13 of piston 12 of the high-pressure cylinder 11 is mounted the cross-head 14, arranged to slide in the guides 15, formed in the frame 10. In
5 suitable bearings in frame 10 is mounted a shaft 17, upon which rocks the working beam 16. This beam is connected at one end through links 18 to cross-head 14 and at its opposite end through links 19 to cross-head
10 9. The crank 21 of the main crank-shaft is connected by a connecting-rod 22 directly to cross-head 14.

It will be observed from the foregoing description, taken in connection with the accompanying drawings, that the crank-shaft
15 is arranged in the frame between the steam-cylinders and the pump, thereby affording sufficient space for the crank 21 without in any manner interfering with or limiting the
20 size of the pump-cylinder, as in the case of the patents above mentioned, and it will also be seen that by connecting the crank 21 directly with cross-head 14 instead of to the working beam, as has heretofore been cus-
25 tomary and as shown in the patents referred to, I shorten the distance between the steam-cylinders to the pump-cylinders in order to compensate for the change in the location of the crank-shaft and in order to bring the
30 steam-cylinders in as close proximity to the pump-cylinder as may be possible. It will also be observed that by arranging the low-pressure cylinder and the pump-cylinder in alinement with each other I am enabled to
35 utilize the same piston-rod for both the steam-cylinder and pump, and hence the power of the steam-cylinder 1 is more directly applied to the work of actuating the pump-plunger. It will also be seen that the same frame which
40 supports the steam-engine and pump contains the guides for the cross-heads as well as the bearings for the beam-shaft and the crank-shaft.

Of course it will be observed that an engine embodying the principles of my invention may be employed and operated as a condensing-engine; but as the air-pumps, condensers, and connections may be of the usual or ordinary type and form no part of the present invention illustration thereof has been
50 omitted in the present application.

Many variations and alterations in the details of construction and arrangement, size and proportion of parts would readily suggest themselves to persons skilled in the art and still fall within the spirit and scope of my invention. I do not desire, therefore, to be limited or restricted to the exact details shown and described; but,
55

60 Having now set forth the object and nature of my invention and a form of apparatus embodying the same and having described the construction, purpose, and mode of operation thereof, what I claim as new and useful and
65 of my own invention, and desire to secure by Letters Patent of the United States, is—

1. In a pumping-engine, a framework, a pair

of steam-cylinders mounted thereon at one end thereof, a pump mounted on said frame at the opposite end thereof and in alinement
70 with one of said cylinders, a crank-shaft mounted on said frame and arranged between said pump and steam-cylinders a fly-wheel mounted on said shaft and direct connections
75 between said crank-shaft and the piston-rod of one of said cylinders, as and for the purpose set forth.

2. In a pumping-engine, a high-pressure and a low-pressure steam-cylinder, a pump-cylinder arranged in alinement with one of said
80 cylinders, a single piston-rod common to both of said alined cylinders, a piston-rod for the other of said steam-cylinders, cross-heads carried by said piston-rods, connections between
85 said cross-heads, a crank-shaft arranged between said pump-cylinder and said steam-cylinders and carrying a fly-wheel, and a connecting-rod directly connected at the respective ends thereof to one of said cross-heads
90 and to the crank of said shaft, as and for the purpose set forth.

3. In a pumping-engine, a pair of steam-cylinders, the one arranged upon the other, a pump-cylinder, said pump-cylinder arranged in alinement with one of said steam-cylinders,
95 a piston-rod for each of said steam-cylinders, the rod for one of said cylinders also forming the pump-rod, a cross-head carried by each of said piston-rods, a working beam arranged between said steam-cylinders and said pump,
100 connections between said working beam and said cross-heads, a crank-shaft, also arranged in said framework and between said steam-cylinders and pump, a fly-wheel mounted thereon, and a connecting-rod directly connected
105 at the respective ends thereof to the crank of said shaft and one of said cross-heads; as and for the purpose set forth.

4. In a pumping-engine, a framework, a high-pressure and a low-pressure steam-cylinder
110 mounted therein, the one upon the other, a pump-cylinder, said pump-cylinder arranged in alinement with said low-pressure cylinder, piston-rods for each of said steam-cylinders, the piston-rod of said low-pressure cylinder
115 also forming the pump-rod, a cross-head mounted on each of said piston-rods, a working beam connecting said cross-heads, a crank-shaft mounted in said framework and arranged between said steam-cylinders and said
120 pump, said shaft carrying a fly-wheel, and direct communications between the crank of said shaft and the cross-head of said high-pressure cylinder; as and for the purpose set forth.
125

5. The combination of a low-pressure cylinder, the high-pressure cylinder mounted thereon, the pump in line with the low-pressure cylinder, the crank and fly-wheel mounted on the frame between the pump and steam-
130 cylinders and the working beam and direct connections between the crank of said shaft and the cross-head of said high-pressure cylinder; substantially as described.

6. In a pumping-engine, a framework, a
high and a low pressure cylinder mounted
therein, the one above the other, a pump also
mounted in said frame and in alinement with
5 said low-pressure cylinder, piston-rods for
said steam-cylinders, the rod of said low-pres-
sure cylinder also forming the pump-rod,
guides formed in said framework, cross-heads
arranged to operate in said guides, and con-
10 nected respectively to said piston-rods, a
working beam supported in said framework,
links pivotally connecting the respective ends
thereof to said cross-heads respectively, a

crank-shaft mounted in said framework ar-
ranged intermediate said steam-cylinders and 15
pump and carrying a fly-wheel and direct com-
munications between the crank of said shaft
and one of said cross-heads; as and for the
purpose set forth.

In witness whereof I have hereunto set my 20
hand this 1st day of September, 1896.

DAVID A. DECROW.

Attest:

STERLING H. BUNNELL,
WILFRED P. DAVISON.