

(No Model.)

2 Sheets—Sheet 1.

R. C. WRIGHT.
COMPOUND LOCOMOTIVE.

No. 500,788.

Patented July 4, 1893.

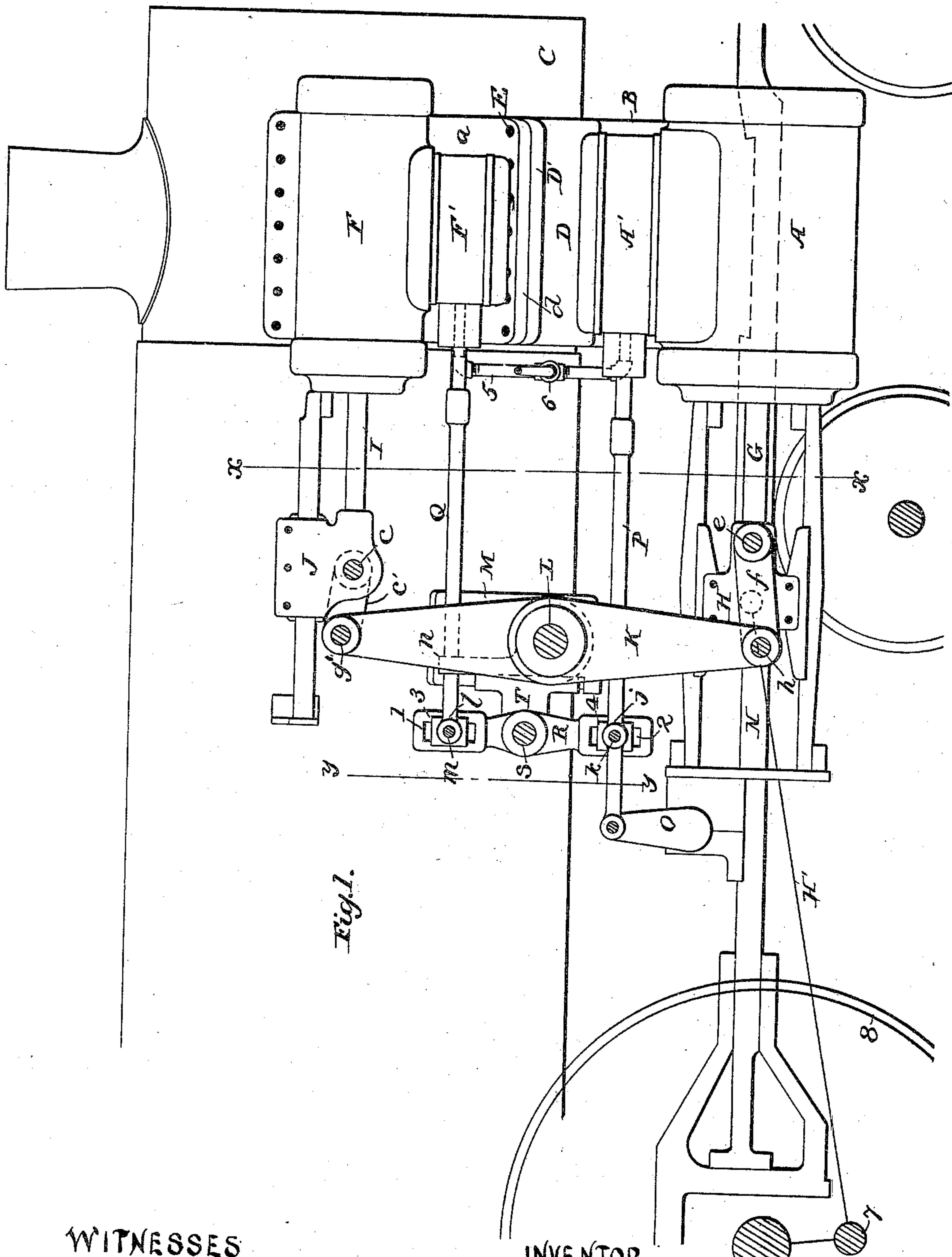


Fig. 1.

WITNESSES

John G. Hinkel

Alce N. Dobson

INVENTOR

Ransom C. Wright

By

Foster Freeman
Att'y

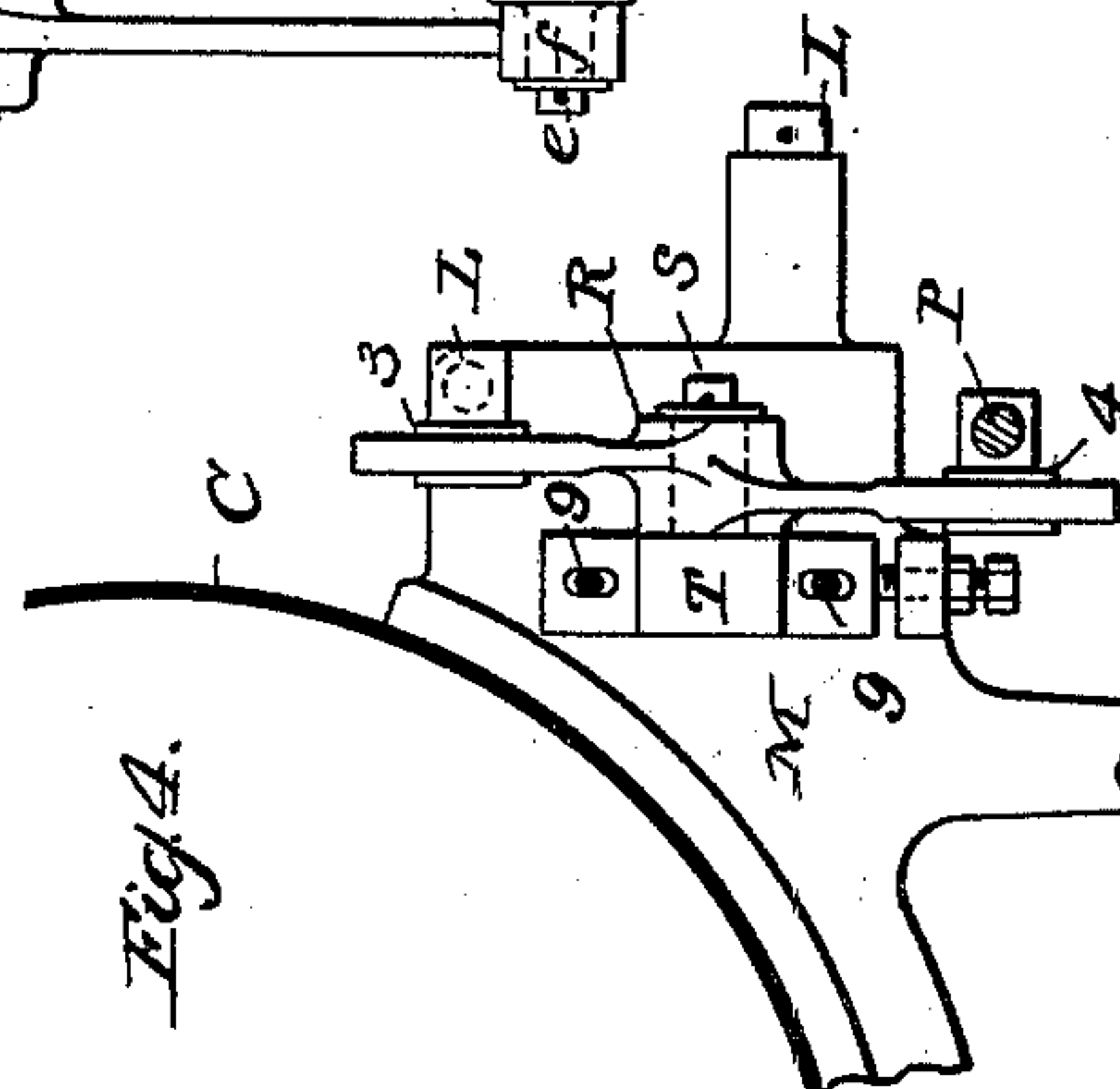
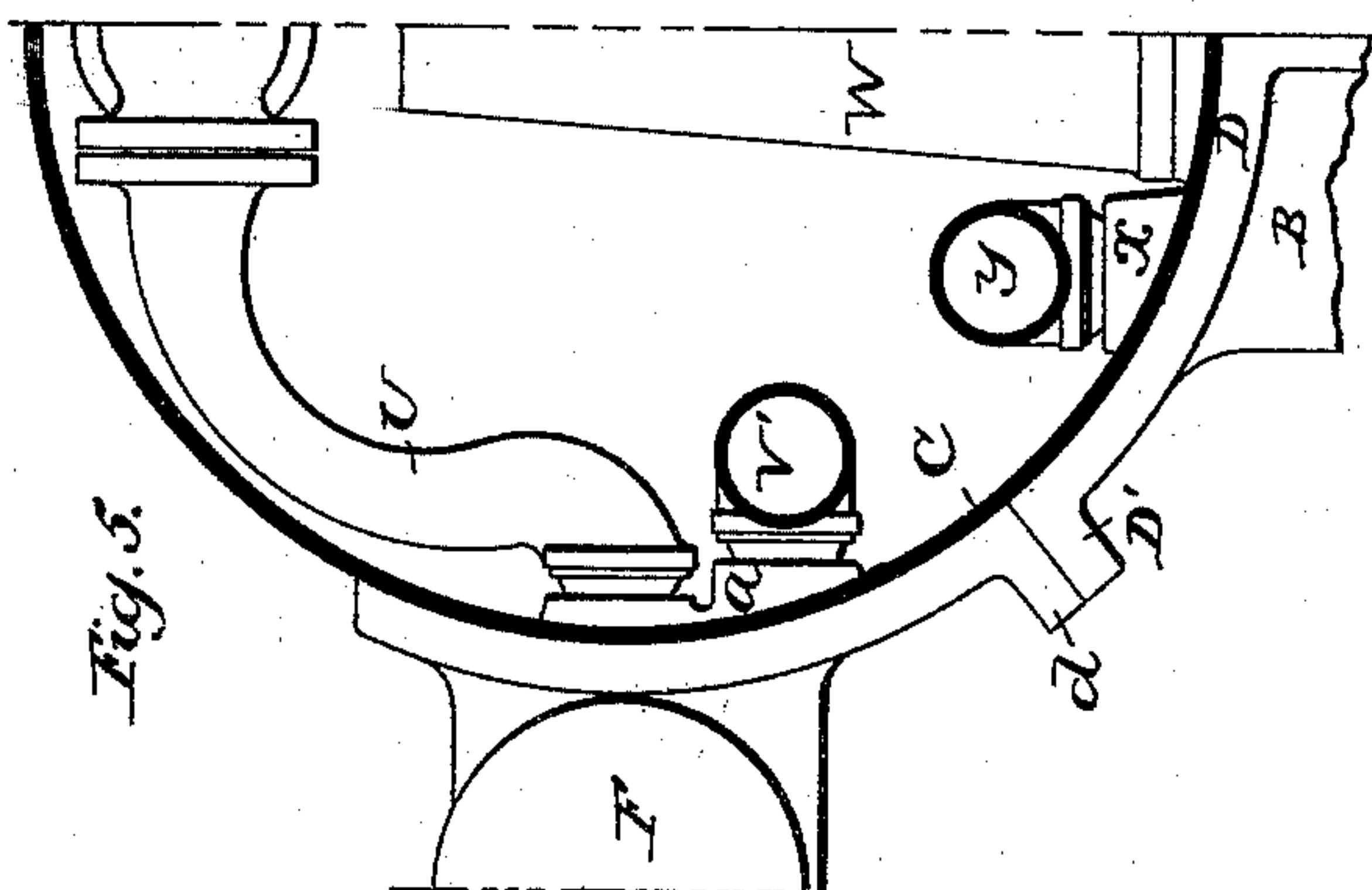
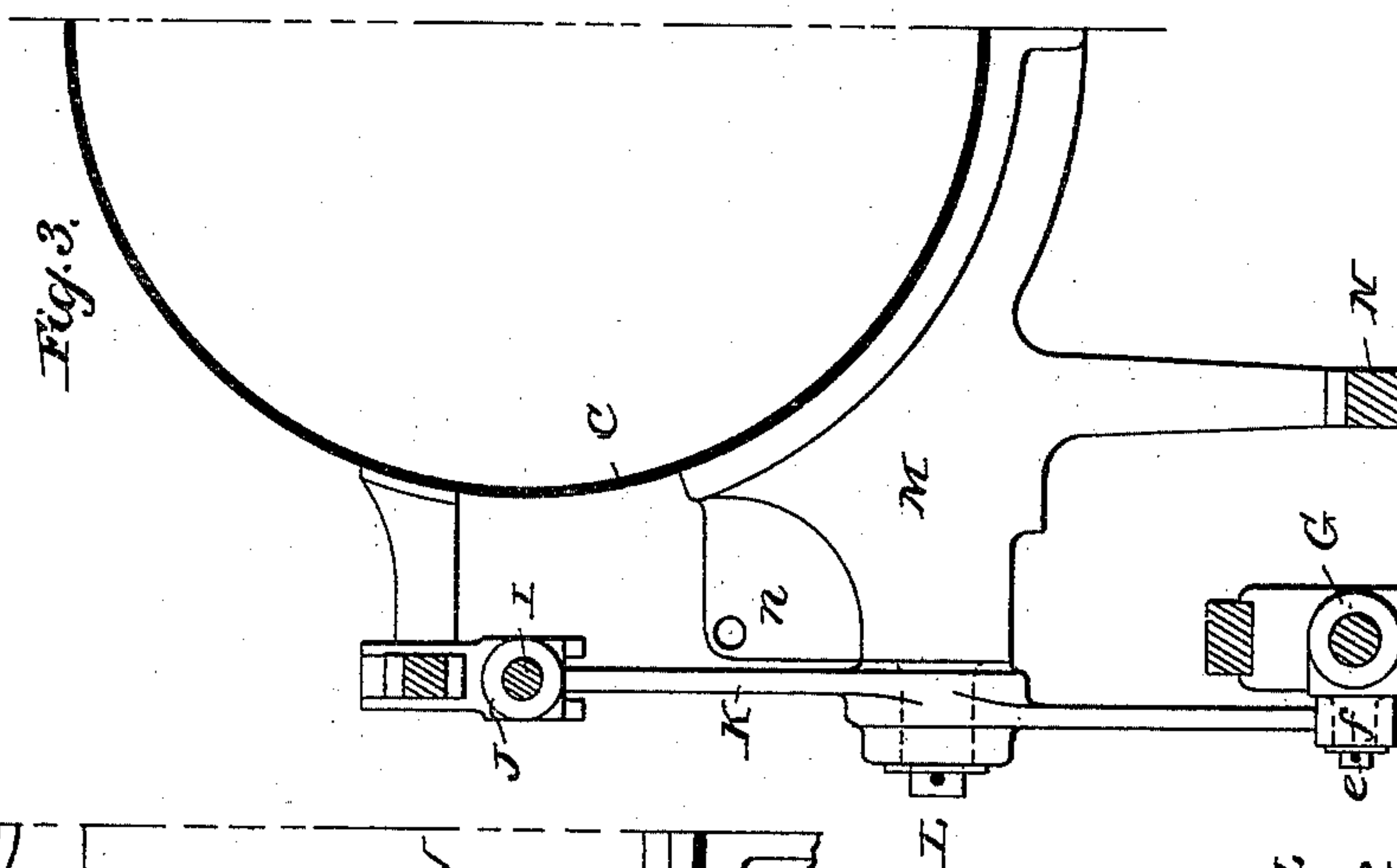
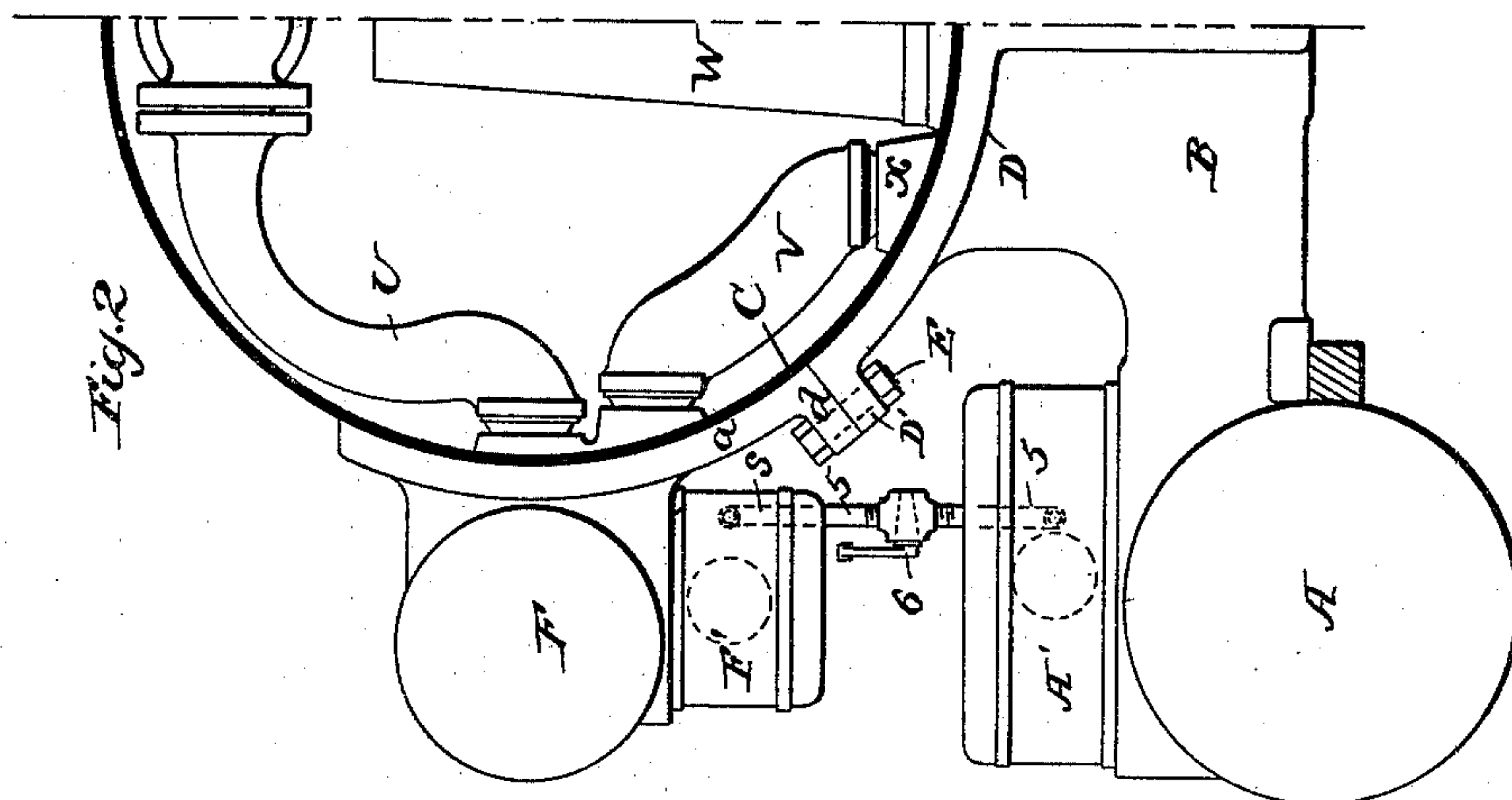
(No Model.)

2 Sheets—Sheet 2.

R. C. WRIGHT.
COMPOUND LOCOMOTIVE.

No. 500,788.

Patented July 4, 1893.



WITNESSES
Jno. G. Hinkel
Allen N. Dobson

INVENTOR
Ransom C. Wright
By
John Freeman
attys

UNITED STATES PATENT OFFICE.

RANSOM C. WRIGHT, OF PHILADELPHIA, PENNSYLVANIA.

COMPOUND LOCOMOTIVE.

SPECIFICATION forming part of Letters Patent No. 500,788, dated July 4, 1893.

Application filed March 4, 1892. Serial No. 423,775. (No model.)

To all whom it may concern:

Be it known that I, RANSOM C. WRIGHT, a citizen of the United States, and a resident of Philadelphia, Philadelphia county, Pennsylvania, have invented certain new and useful Improvements in Compound Locomotives, of which the following is a specification.

My invention relates to improvements in locomotives to enable the use of the steam first at high pressure and second at low pressure before its release to the atmosphere, to obtain greater efficiency and economy than can be had by passing it through high pressure cylinders only, and my mechanism is such that ordinary simple locomotives can readily be changed to compound locomotives by the substitution of my cylinders and their connections making an engine of which both sides are alike in construction and power—and in which the forces are applied centrally, avoiding undue friction. I attain these objects by the mechanism illustrated in the accompanying drawings, in which—

Figure 1, is a side elevation of the part of the locomotive with my improvements attached. Fig. 2, is a front elevation of one half of the locomotive. Fig. 3, is a section on line *x*, Fig. 1, looking backward. Fig. 4, is a section on line *y*, looking forward. Fig. 5, is a front elevation of a part of the engine.

Similar reference signs refer to similar parts throughout the several views.

The usual simple locomotive has on each side a cylinder A, cast with a "half saddle" B, reaching to the center of the engine, meeting the cylinder of the opposite side, to which it is bolted. It also has a seat at its upper part for the reception of the boiler C, to which it is also bolted through the flange D. At the upper part of the flange D, I construct the flange D' outward to enable a line of bolts E, to be inserted through it. The cylinder A, would ordinarily be used in my construction for low pressure, but would be made of larger diameter, if so used, than if for high pressure.

Above the cylinder A, and about or near the horizontal center of the boiler C, I place another cylinder F, which will ordinarily be

used for high pressure, and when so used, will be smaller in diameter than the low pressure cylinder A; the cylinder F, has cast upon it a seat *a*, which is made to conform to the shape of the boiler C, and by means of which it is secured and bolted to the boiler C. This seat passes downward until it reaches the flange D of the cylinder A at the point of contact with the flange D', and the seat *a* has constructed upon it a flange *d*, similar to the flange D' to which it is secured by the bolts E, as well as to the boiler C.

If the cylinders A and F were made to change places, the high pressure below, and the low pressure above it would not change my invention, but I prefer them as here arranged.

The cylinder A has a steam chest A', in which is the usual valve, and the cylinder F, has also a steam chest F', within which is a valve; the steam chest A', is placed above the cylinder A, and the steam chest F', is placed below the cylinder F, but it might, if room permitted, be otherwise arranged, although I consider the arrangement shown to be preferable. Within the cylinder, A, is a piston, attached to a piston rod G, and this piston rod G, to a crosshead H. From the crosshead H, is the connecting rod H', attached to the crank pin 7, in the driving wheel 8. These are the usual parts of the simple locomotive, and convey the power from the cylinder to the wheel. Within the cylinder F, is a piston attached to a rod I, and this piston rod, I, is connected to a crosshead J. The crosshead J has a pin *c*, which carries a link *c'*. The crosshead H, has a pin *e*, which carries a link *f*. The link *c'* is attached to a lever K by means of a pin *g'*, and the link *f* is attached to the opposite end of the lever K, by means of a pin *h*. The lever K is fulcrumed at L, between the pins *g'* and *h*. These attachments and parts are the means of connecting the cylinder F, to the cylinder A, and so to the driving wheel of the locomotive, and are additional to the ordinary simple locomotive.

The position of the fulcrum L will be equidistant between the pins *g'* and *h*, if the stroke of the pistons is desired to be equal, but should

it be deemed desirable to have the cylinders of unequal stroke, the fulcrum L, can be placed toward the short stroke and from the long stroke to the desired distance to suit the requirements.

It will be evident that the pistons in the respective cylinders must move in exactly opposite directions.

The fulcrum L is attached to, or made part of a saddle M so constructed as to attach to the boiler C, and also to rest upon the frame N, if desired, and both or either way may be used, according to circumstances.

The valve for the cylinder A is driven in the usual way by the rockshaft arm O and valve rod P, but the valve rod P has a hub *j*, constructed upon it, or attached at a convenient position and in this hub *j*, is a pin *k*. The valve rod Q of the cylinder, F, has a hub *l*, in which is a pin *m*, and this valve rod passes through a guide, *n*, attached to or made part of the saddle M or the lever K.

As the respective pistons of the cylinders A and F move in opposite directions, it will be evident that the valves which admit steam to, and allow its escape from the respective cylinders must also move in opposite directions, and in order to make this movement, I introduce a valve lever R between the hub *l* of the valve rod Q, and the hub *j*, of the valve rod, P and fulcrum it at S, between the two valve rods; the fulcrum S is attached to or made part of a bracket or bearing T, which is secured to the saddle M, of the lever K, the relative position of the fulcrum S, being determined by the desired relative movement of the valve in the steam chest F', to that of the movement of the valve in the chest A'.

To allow for slight changes of adjustment of valve travel the bracket, or bearing T which carries the valve lever R, is made adjustable by means of slotted bolt holes 9, Fig. 4, or equivalent method so it can be moved up or down to accomplish the desired result; to provide for this movement, up or down, of the valve lever R, I provide a slot 1 at the upper end, and a slot 2 at the lower end, in which are sliding boxes 3, 4, made enough shorter than the slots 1, 2, to allow for the variations of adjustment and the rise and fall of the sliding boxes 3, 4, due to the motion of the valve lever R; the valve lever R, and its attachments are shown back of the fulcrum M, but may be as well placed and arranged forward of the fulcrum M if desired.

The cylinder F is supplied by live steam, direct from the boiler, C through the pipe U, and when the steam is exhausted from the cylinder F, it passes through the pipe V to the cylinder A, and when exhausted from the cylinder A, through the usual exhaust pipe, W to the atmosphere.

Should it be deemed preferable to use a receiver, the pipe V', Fig. 5, would lead to the receiver from the high pressure cylinder, and

another pipe *y*, from the receiver to the low pressure cylinder at *x*.

To enable the engine to have power to move more promptly and readily from a standstill than it could do if steam were admitted only to the small high pressure cylinders, I connect the high pressure steam chest F' and the low pressure steam chest A' by a pipe 5, introduced into each steam chest, and conveniently between the two steam chests, I locate a stop cock or valve 6, of suitable construction, and connect it to a convenient position within reach of the engineer, by means of suitable levers and rods, reaching to the cab, so that when it is desired to start the engine, the engineer, by opening the cock or valve 6, will establish communication between the high pressure steam chest F', and the low pressure steam chest A', when both pistons will be driven by high pressure steam, until the engineer shuts the cock, or valve, and closes the communication between the two chests, when the engine will run compound.

I have described but one half of the locomotive, but as each side is alike, each must necessarily have equal power.

Without limiting myself to the precise construction and arrangement of parts, I claim—

1. In a compound locomotive, the combination of a steam cylinder having a saddle secured to one side of the boiler, a piston within the cylinder, another steam cylinder secured to the framing and the boiler but separate from the first said cylinder, a piston therein, a piston rod and cross head for each cylinder, a coupling link for each cross head, an interposed lever fulcrumed upon a bracket on the boiler, to the opposite ends of which said links are secured, and the connecting rod which conveys power to the driving wheel, substantially as described.

2. In a compound locomotive, the combination of a steam cylinder secured to the framing and provided with a half saddle secured to the boiler, another steam cylinder having a saddle by which it is secured to the boiler, the saddle and half saddle being united, the pistons and piston rods for said steam cylinder, the lever interposed between the cross heads to which it is connected by links, substantially as described.

3. In a compound locomotive, the combination of a steam cylinder A secured to the frame and provided with a half saddle secured to the boiler, another steam cylinder F having a saddle *a*, by which it is secured to the boiler, the half saddle B and the saddle *a* being united by bolts E, the pistons and piston rods for the steam cylinders, the lever K, the links connecting the piston rods, and the rod connecting said lever with the driving wheels, substantially as described.

4. In a compound locomotive the combination of a high and low pressure cylinder both arranged on the same side of the boiler

and one above the other, the steam chests for the cylinders, the chest for the upper cylinder being below it and that for the lower cylinder being arranged above its cylinder, the
5 pistons within the cylinders, a pipe leading from the high pressure steam chest to the low pressure steam chest, a cock or valve in such pipe and means for operating said cock or valve, substantially as set forth.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

RANSOM C. WRIGHT.

Witnesses:

JESSE MOTT,
SOPHIE J. WRIGHT.