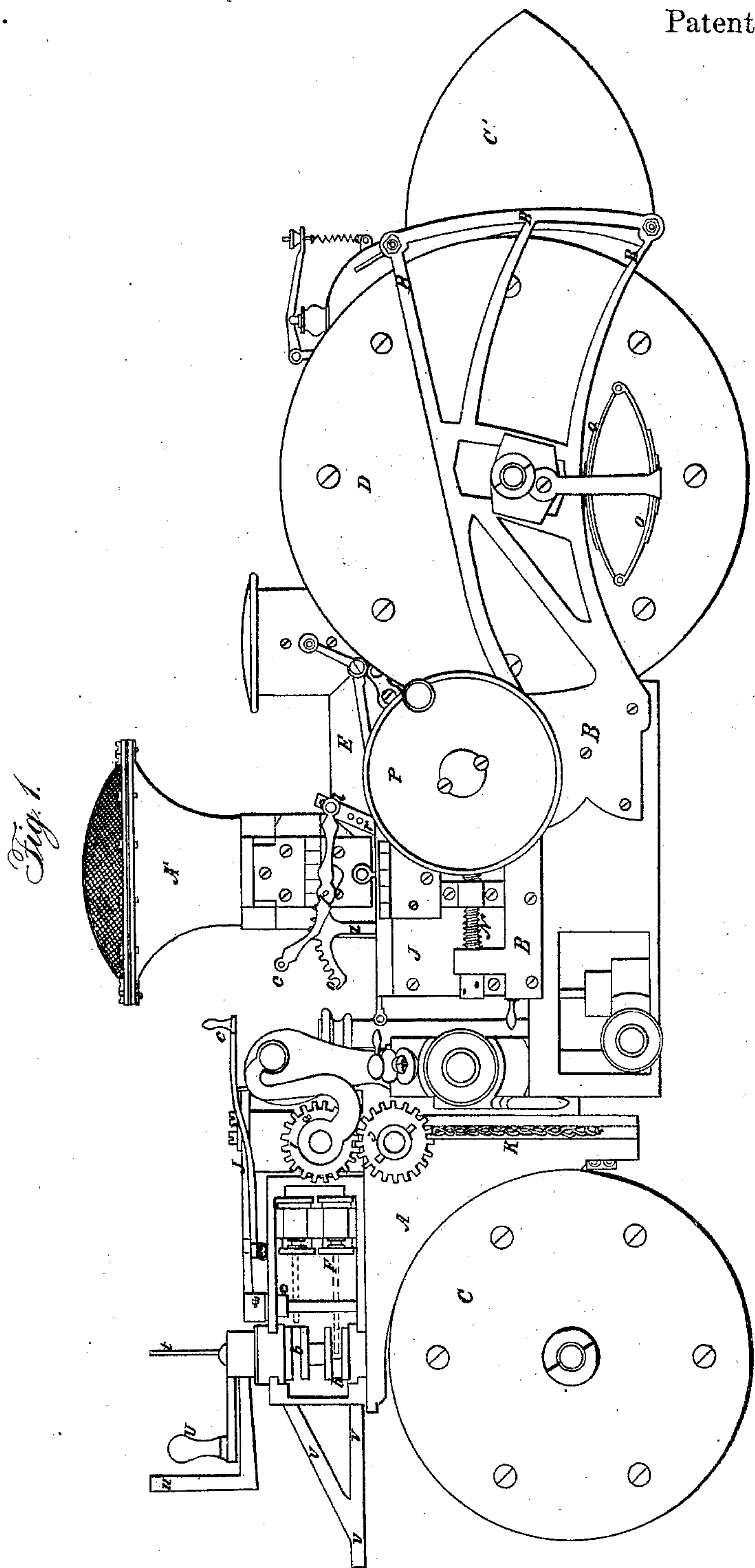


J. FRYE.

Traction-Engine.

No. 49,746.

Patented Sept. 5, 1865.



Witnesses:

J. D. Batten
H. W. Hillman

Inventor:

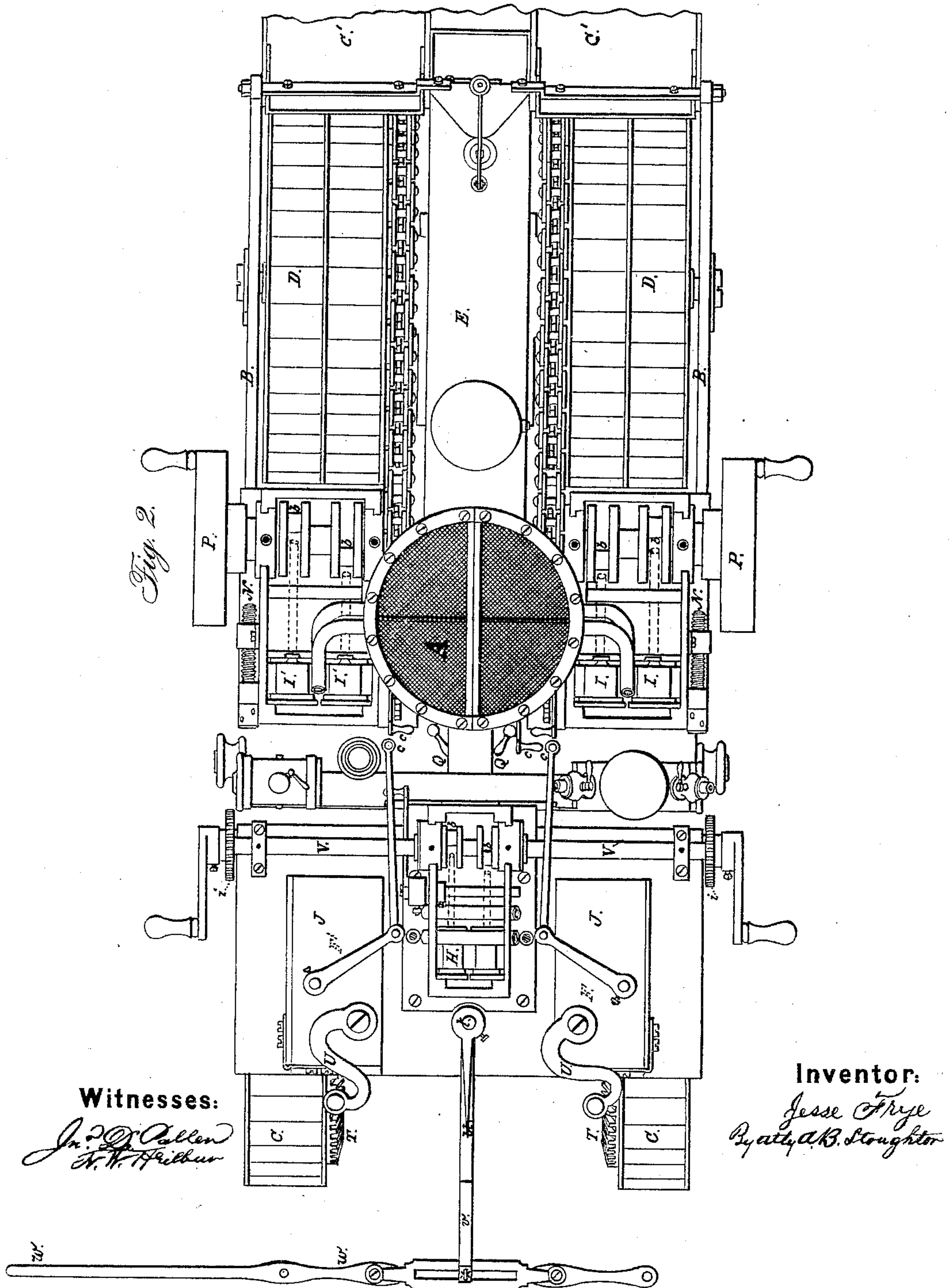
Jesse Frye
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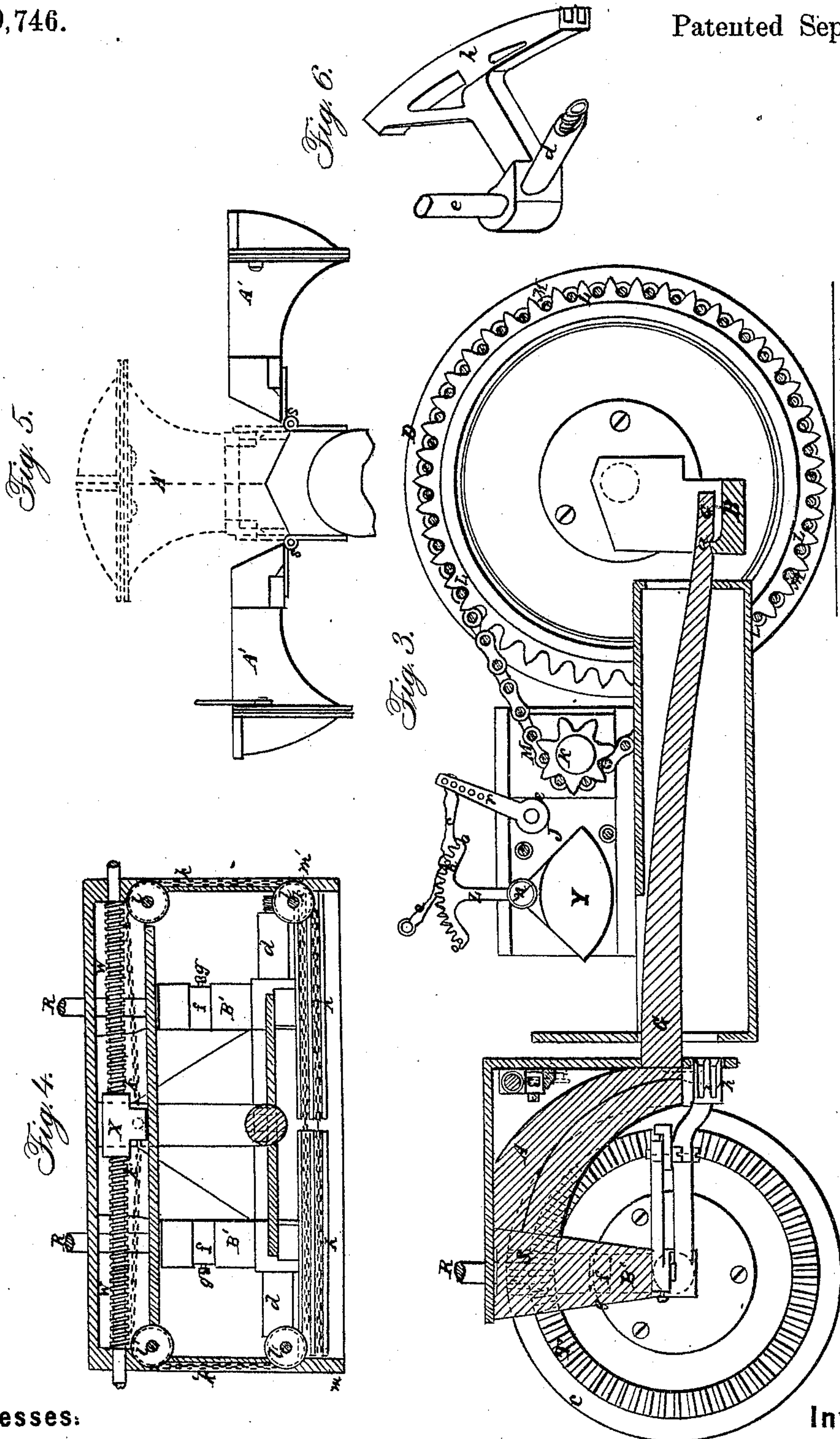


J. FRYE.

Traction-Engine.

No. 49,746.

Patented Sept. 5, 1865.



Witnesses:

J. P. Allen
H. W. Hilbur

Inventor:

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UNITED STATES PATENT OFFICE.

JESSE FRYE, OF BROOKLYN, NEW YORK.

IMPROVED TRACTION-ENGINE FOR COMMON ROADS.

Specification forming part of Letters Patent No. 49,746, dated September 5, 1865.

To all whom it may concern:

Be it known that I, JESSE FRYE, of Brooklyn, in the county of Kings and State of New York, have invented certain new and useful Improvements in Traction-Engines for Common Roads, Agricultural and other Purposes; and I do hereby declare the following to be a full, clear, and exact description of the construction and operation of the same, reference being had to the accompanying drawings, making a part of this specification, in which—

Figure 1 represents a side elevation of the engine. Fig. 2 represents a top plan, and Fig. 3 represents a longitudinal vertical section through the same. Figs. 4, 5, and 6 represent detached portions of the engine not distinctly seen in the other figures.

Similar letters of reference, where they occur in the separate figures, denote like parts of the engine in all the drawings.

The object and purpose of my invention is to produce an efficient traction-engine for common roads, for agricultural and other purpose or purposes to which a horse is generally applied or to which manual labor is applied, or for driving machinery of any kind; and my invention consists, mainly, in making each wheel a driving-wheel independent of its mate or fellow, and driving each driving-wheel by its own independent and separate engine, so that there may be no lost power, especially when turning curves or not moving in a straight line; and my invention further consists in the peculiar connection between the front truck and the rear or main driving or carrying frame, whereby the said front truck may not only be turned to the right or left to lead the rear frame, but also rock or roll in a lateral direction as it passes over any intervening obstacle, without impairing in the least the effective driving force of its special engines; and it further consists in the mode of hanging the wheels to the front truck, so that they may be turned upon said truck to adapt themselves to the curvature of the path or road over which the engine may be running; and it further consists in a self-acting grade-governor, which regulates the steam according to the ascent or descent of the ground over which the engine is working; and my invention further consists in certain mechanical arrangements and combinations whereby I apply and make available the above-named more essential features of my invention,

as I shall hereinafter fully describe in connection with the accompanying drawings.

To enable others skilled in the art to make and use my invention, I will proceed to describe the same with reference to the drawings.

This engine is supported upon two carrying-frames—viz., a front one, A, and a rear one, B—and each frame has respectively its supporting and driving wheels C and D, which are so hung as to be driven each by its own engine or cylinder, though the cylinders may be furnished with steam from a common source, as from the boiler E. The two cylinders or engines F F', that drive the two front wheels C C, must be supplied through a flexible steam-pipe, as the front frame is free to accommodate itself to the inequalities of the ground over which its wheels may be passing. All the driving and supporting wheels are made broad in the tread, and may be corrugated transversely or otherwise roughened, so as to hold firmly and not slip as they are turned by their respective engines.

The front and rear frames are connected by a coupling or stem, G, which is fast to the front frame, A, and extending backward, as shown in Fig. 3, is united by a simple notch or saddle, a, to the rear frame, B. Any other simple means of holding the coupling G will answer, as there is no tendency of the front frame to leave the rear one.

The above are a few of the leading characteristics of my traction-engine, designed for all kinds of work. Its specialities I will point out and describe in detail.

The engines F F', H, and I I', I propose to inclose in steam-tight chests J, suitably arranged upon the frames A B, and to construct them of two cylinders, as shown more particularly in Figs. 1 and 2, with their piston-rods (shown in red lines) attached to double cranks b b upon the shafts which are to communicate motion to their respective wheel or to the shaft by which the engine is guided or turned, as the case may be. To the shafts driven by the engines I I' there are attached sprocket-wheels K, Fig. 3, over which and over a sprocket-rim, L, on the main drive-wheels D endless chains M pass to drive said wheels D, and these chains can be strained up, should they become loose, by the screw and devices shown at N, Figs. 1 and 2.

The frame B is hung to the axles or journals of the wheels through the intervention of springs O, as seen in Fig. 1, so that the engines and boiler may not be violently shaken or jarred in passing over rough ground.

The crank-wheels P are simply applied to show how, by the working of the engines I I', the drive-wheels will be turned. The engines, of course, have suitable steam-chests and valves and valve-rods, and each of them is furnished with a crank or crank-arm, as seen at c, by which these engines may be reversed or changed at pleasure by the engineer, whose position is at or near the point Q, from which position he can seize and manage any or all of the reversing-levers c, so as to guide and direct the engine or any of its parts.

The engines F F' each work a vertical shaft, R, and each vertical shaft carries a bevel-pinion, S, (in dotted lines, Fig. 3,) which meshes with or into the bevel-gear rims T on the front wheels, C, and thus turn said wheels. The cranks U, connected to the vertical shafts R, are designed to show how the wheels would be driven by their engines when steam was applied. These front wheels, C C, are peculiarly hung to the front frames. They are independent of each other to a great extent, and each has its own engine, as before stated. They must be turned so as to guide the engine or turn it around, as the case may be, and for this purpose each of the front wheels is hung to the front frame by a piece made as shown in Fig. 6, in which d is the journal upon which the wheel C is placed and turns. e is a vertical journal or shaft by which the piece, as well as its connected parts, are hung to the front frame, as shown in Fig. 4—viz., by a collar, f, through which it passes and is fastened to by the set-screw g or otherwise, said collar resting upon the frame B'. h is an arc connected to this piece, that carries the wheel, and grooved, as seen, so as to receive a chain for turning this piece, which might properly be called the "axle" of the engine, as well as the opposite piece, which carries the opposite wheel and is identical with the one just described.

The shaft V, which is driven by the engine H, extends clear across the frame, and has upon each of its ends a pinion, i, that gears into similar pinions, j, on the ends of a screw-shaft, W, suitably supported in the frame A. Upon this shaft W there is a traveling nut, X, Fig. 4, to which the ends of the chains k k' are fastened, each chain passing respectively over its pulleys l l', and fastened to the arcs h at m m', respectively, so that as the nut X moves along on the screw-shaft W it will turn both arcs, and consequently both of the front wheels, C C, either to the right or left, as the case may be, to guide and direct the machine.

An important element in this machine consists in the arrangement of the separate front wheels driven by separate engines, for when these wheels are turned out of a straight line with regard to the rear portion of the machine

the power is not lost upon such a cramped position of the wheels. It continues to be applied directly to the wheels, and though the outside wheel has farther to run than the inside one in turning a curve, it is not checked nor retarded by, nor does it drag, the inside wheel. On the contrary, the greater or less the resistance on the wheels respectively the greater or less is the direct propelling-power of the engine. The faster, of course, that the wheel turns the oftener will the steam-valve work, and the more freely will its special engine take the steam and the more freely act. In a word, the power is applied at each of the four corners of the machine in proportion to the demand upon one or either of said corners, and thus, instead of losing power by turning the wheels from a direct line, as would be the case if a single axle and a single engine were used for both wheels, I actually make a gain by the separate and independent axles and wheels, one not being able to retard or drag the other.

As this traction-engine is designed for running upon common roads or over the natural undulations of the ground, where the amount of steam applied to the rear driving-wheels must vary with the ascent or descent thereof, I have applied what I term a "self-acting grade-governor," which regulates the amount of steam. This grade-governor is seen in Figs. 1, 3, where a pendulum, Y, or weight, is suspended at n to the side of the steam or engine box J. The upper arm, Z, of this pendulum has a curved rack, o, upon it, into either of the teeth of which a pin, p, in the lever c may rest. The lever c is pivoted at q (where it can also be adjusted) to the arm r, which is connected to the valve-chest of the engine I, so that when the machine is moving on ascending ground the pendulum, swinging into a vertical line, opens the ports and admits a greater volume of steam, and when moving on descending ground the pendulum, swinging into a vertical line in an opposite direction, closes the ports partially, and thus the apparatus regulates and defines the amount of steam required on rising or descending inclinations.

For the purpose of passing over or under bridges or elsewhere, where an ordinary smoke-stack would be too high, and must be let down or lowered, I provide as follows: I divide the smoke-stack A' vertically in the line of the length of the machine and hinge the two sections as at s, Fig. 5, so that they may swing to the right and left—one half to the right and the other half to the left—and thus lie very close on top of the steam-boxes J, occupying a height but just equal to half the diameter of the stack. In said Fig. 5 the red lines show the stack in its upright position and the black lines represent it as laid down.

The stack may, if preferred, be divided by a transverse line, so that the sections may swing, one forward, the other rearward.

Of the boiler, steam-dome, safety-valve, and

its many other appliances, it is unnecessary to say more than that they may be constructed in any of the usual well-known ways.

To guide the engine—as, for instance, in plowing—I have arranged as follows:

t is a permanent sighting-post, located on the forward part of the frame, and *u* an adjustable sighting-post, which, when adjusted, is also permanent.

v is a hinged frame, to which a measuring rod or bar, *w*, is attached adjustably, said rod or bar having a turned down-end, which may move along in a previously-marked furrow or line which is to be the guide for the plowing. A sighting-bar, *x*, on the hinged arm or frame *v* projects upward so as to range in height with the two others, *t* and *u*. As the hinged sight *x* moves to the right or left by the measuring-rod *w* the engineer or conductor guides the machine until the two sights *t* and *u* range with *x*. This done, the machine moves (and the plows will follow) in a line parallel to the first marked outline.

A coal or wood box, *O'*, is arranged at the rear of the machine for carrying the fuel. This box is hinged to the frame *B*, and can be swung close up to the frame when so desired.

I have shown several appliances connected with this “engine of all work” for forcing or pumping water, for spreading liquid manures, &c. I am aware that they are not patentable in connection with this specially-constructed engine, and hence make no further reference to them.

Where the front part of the frame *B* rests upon the stem or bar *G* a spring is introduced, so that the shocks and jars of the front truck or frame shall not be injuriously communicated to the other frame or truck, and so that the more delicate parts of the engine and the engineer may ride with more steadiness.

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

1. Driving each wheel of the engine by a separate and independent cylinder or cylinders and their actuating appliances, substantially as and for the purpose described.

2. The separate engine or steam cylinders *H*, for operating the mechanism that turns the front wheels of the engine to guide or direct its movements, substantially as described.

3. Connecting the front and rear frames, trucks, or portions of the engine by means of the stem or bar *G*, substantially as and for the purpose described.

4. Attaching the front wheels to the front frame by means of the axles, substantially as shown and described, so that said wheels may be freely turned, and yet remain in gear with their respective driving-cylinders, substantially as described.

5. In combination with an engine for working on common roads or on the natural surface of the ground, a self-acting grade-governor for regulating the supply of steam on ascending or descending grades, substantially as described.

6. Dividing the smoke-stack vertically into two sections and hinging the sections so that it may be brought close down in passing over or under bridges, &c., substantially as described.

7. In combination with a steering mechanism worked by steam, as described, the stationary sights *t* and *u* and the moving one, *x*, for running the engine on defined lines, as set forth.

JESSE FRYE.

Witnesses:

WM. HARSEN,

FREDERICK W. WARD.