

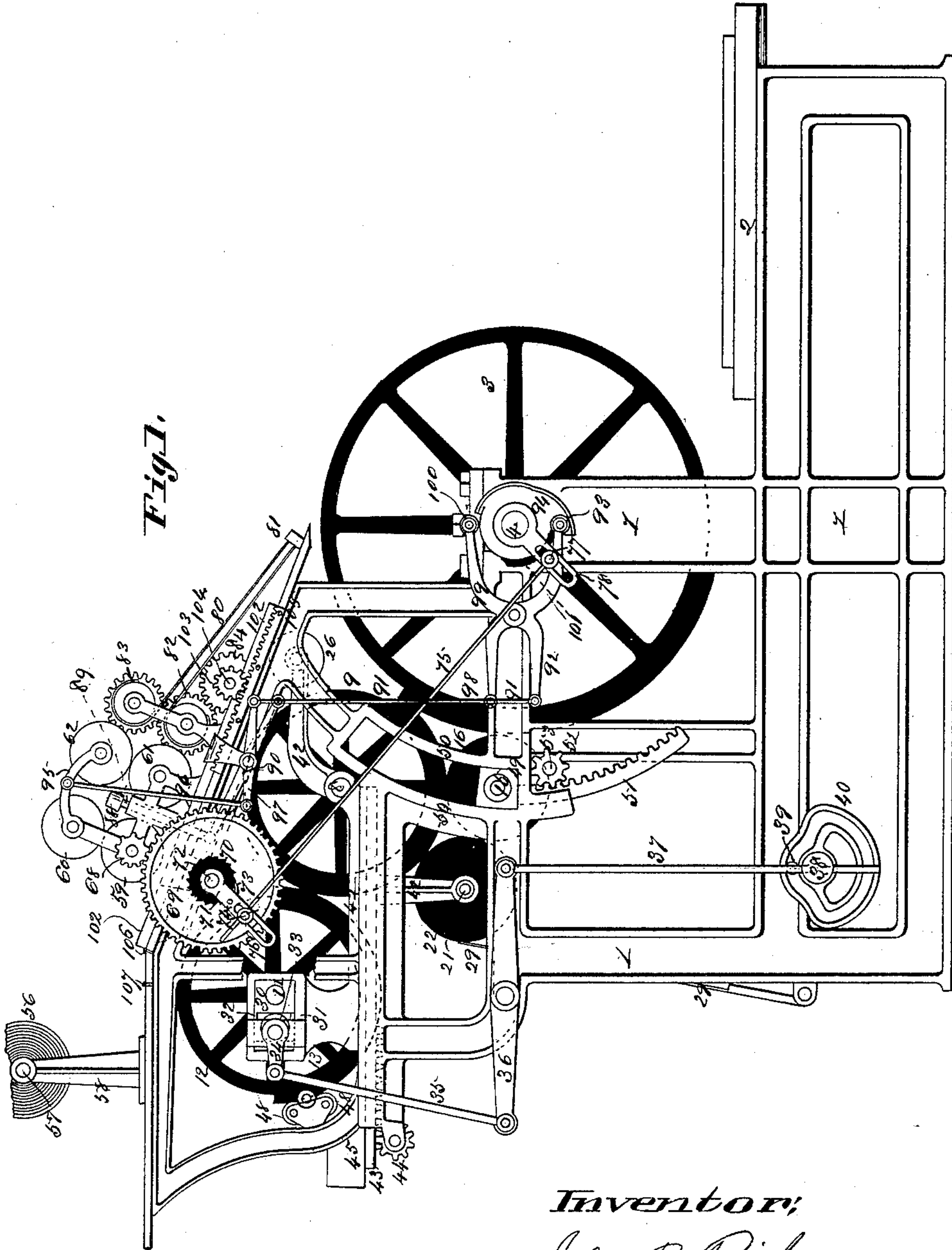
(No Model.)

3 Sheets—Sheet 1.

J. P. RICHARZ & S. SCOTT.
PRINTING MACHINE.

No. 339,014.

Patented Mar. 30, 1886.



Attest:

Edward Stear

Geo. L. Wheelock

Inventor:

John P. Richarz
Stewart Scott
By *Wm. H. B. B.*
Atty.

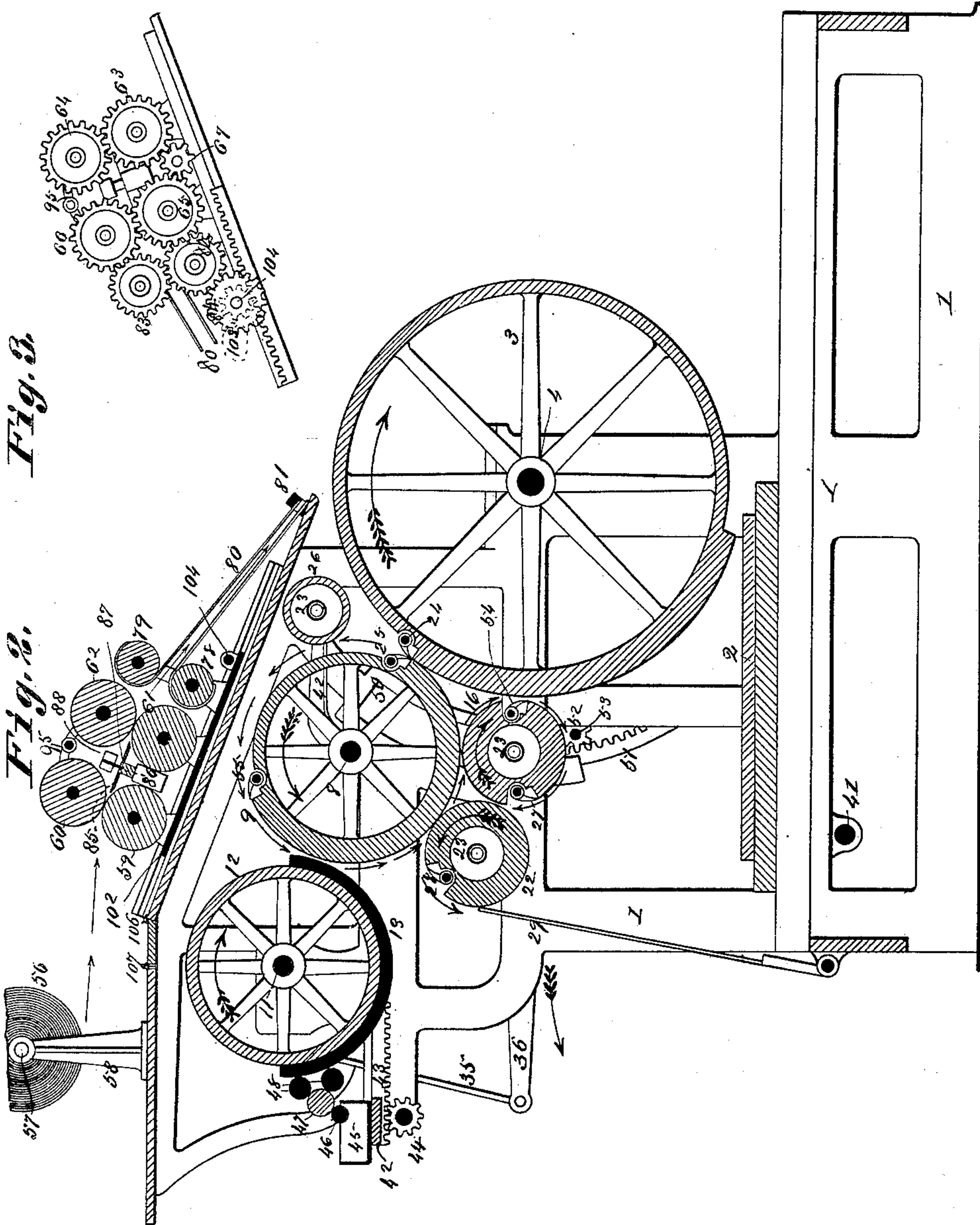
(No Model.)

3 Sheets—Sheet 2.

J. P. RICHARZ & S. SCOTT.
PRINTING MACHINE.

No. 339,014.

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Attest;

Edmund Swan,
Geo. Wheelock

Inventor;

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By Knight Bros.
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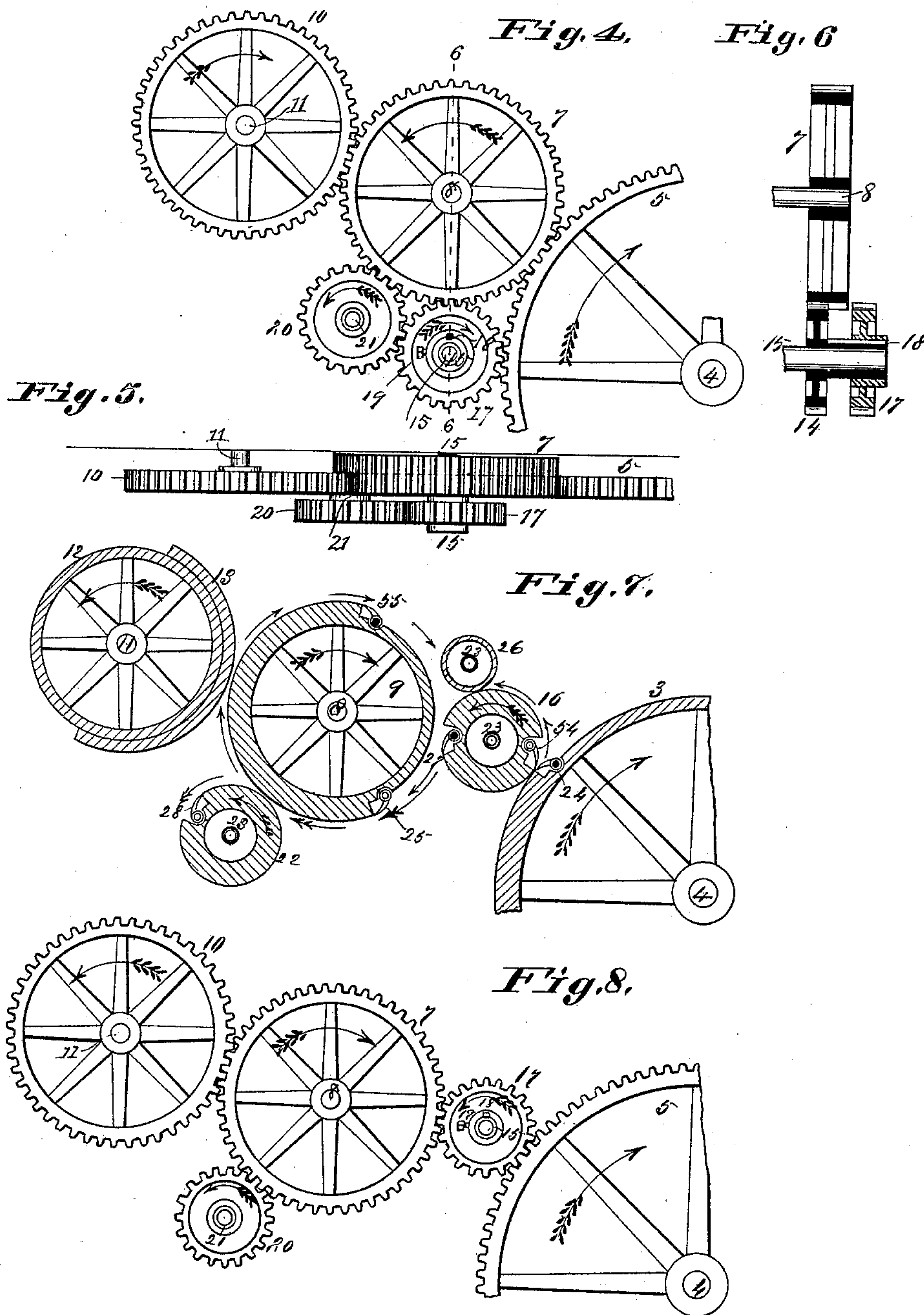
(No Model.)

3 Sheets—Sheet 3.

J. P. RICHARZ & S. SCOTT.
PRINTING MACHINE.

No. 339,014.

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Edward Stearns
Geo. S. Wheelock

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Atty

UNITED STATES PATENT OFFICE.

JOHN P. RICHARZ AND STEWART SCOTT, OF ST. LOUIS, MISSOURI.

PRINTING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 339,014, dated March 30, 1886.

Application filed April 9, 1884. Serial No. 127,191. (No model.)

To all whom it may concern:

Be it known that we, JOHN P. RICHARZ and STEWART SCOTT, both of the city of St. Louis and State of Missouri, have invented a certain new and useful Improvement in Printing-Machines, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this specification.

10 Our improvement relates to a printing machine or press on which both sides of the sheet are printed at one operation, or by which two impressions may be made upon one side at a single operation.

15 Our improvement also relates to a printing machine or press having drying-rolls by which the sheet is heated and dried between the impressions.

Figure 1 is a side view of the machine, the gearing and heating-pipes being omitted. Fig. 2 is a longitudinal section. Fig. 3 is an end view of the feed-rolls. Fig. 4 is a detail side view, and Fig. 5 a top view, showing the cog-gear connection between the cylinders and heating-rolls. Fig. 6 is a vertical section at 6 6, Fig. 4. Figs. 7 and 8 are respectively a longitudinal section and side elevation, showing the arrangement of parts when the machine is used for the printing of two impressions on the same side of the sheet of paper.

1 is the main frame of the machine.

2 is a reciprocating type-bed containing the flat type-form by which the first side of the sheet is printed. The bed has its longitudinal reciprocation imparted to it by means not shown.

3 is the impression-cylinder that works in conjunction with the type-form of bed 2. This cylinder is supported on a shaft, 4, that is caused to rotate by any suitable means. The shaft 4 carries a cog-wheel, 5, that engages a cog-wheel, 7, upon the shaft 8 of the second-impression cylinder 9, as shown in Figs. 1, 2, 3, 4, 5, and 6. The cog-wheel 7 engages a cog-wheel, 10, upon the shaft 11 of the type-cylinder 12, which carries the type form or plate 13, by which the second impression is made on the sheet. The cog-wheel 7 engages a cog-wheel, 14, as shown in Fig. 6, upon the shaft or journal 15 of a hot roller or drum, 16, over which the paper sheet passes to dry the

ink. The shaft 15 also carries a cog-wheel, 17, that has capacity for endwise movement on the shaft upon a feather-key or spline, 18, that causes the cog-wheel to rotate with the shaft. 19 is a set-screw passing through the hub of the cog-wheel and bearing upon the shaft, to secure the cog-wheel in its position. The cog-wheel 17 engages a cog-wheel, 20, upon the shaft or journal 21 of the hot roller 22. The shafts or journals of the hot rollers 16 and 22 are made hollow to allow the passage of heating-pipes 23, through which steam or hot air or water is passed to heat the rollers. The paper sheet is taken by grippers 24 on the impression-cylinder 3 and carried down over the type-bed 2, where the first side is printed. When the front edge of the sheet comes into the proper position, it is released by the grippers 24 and taken by the grippers 25 of the second-impression cylinder 9 and carried up beneath a hot cylinder or roller, 26, bearing on the second-impression cylinder, whose journal or shaft is made hollow, to allow the passage of a heating-pipe, 23, as described in connection with the other hot rollers. The sheet is carried forward with the impression-cylinder 9, and between it and the form 13, where the second side or impression is printed. The sheet is carried over the hot rollers 22 and 16, and as its front edge is released by the grippers 25, it is taken by the grippers 27 on the roller 16 and carried around this roller until its front edge reaches the grippers 28 upon the roller 22, when it is released by the grippers 27 and taken by those 28, and the sheet is carried on the roller 22, and its edge being released by the grippers 28, it is taken by the fly 29 at the proper time and laid on the receiving-table, as usual.

It will be observed that the relative diameters of the cylinders 3 and 12 is such that the cylinder 12 has two rotations for every rotation of the cylinder 3, so that there is only a single sheet printed for two rotations of the cylinders 9 and 12.

To avoid the inking of the tympan-sheet on the cylinder 9, the cylinder 12 is moved away from the cylinder 9 during alternate rotations, when there is no sheet passing between them. To accomplish this movement of the cylinder 12, its journal-boxes 30 are supported in frames

31, in which they have movement longitudinally of the machine. Each journal box or block has a yoke, 32, embracing a cam, 33, whose oscillation gives the described movement to the box. The cam 33 has an arm, 34, connected by a rod, 35, with one end of a lever, 36, fulcrumed to the frame.

37 is a cam-rod connected to the other end of the lever and working in a guide, 38.

39 is a cam-stud upon the cam-rod, carrying an anti-friction roller that occupies the cam-groove of the rotary cam 40 on a shaft, 41, having rotation imparted to it by any suitable mechanism. (Not shown.)

It will be understood that the mechanism for giving the described movement to the cylinder 12 is duplicated upon the sides of the machine. This movement of the cylinder is very slight, not sufficient to disengage the wheels 7 and 10.

The course of the sheet of paper through the press when both sides are printed has been described.

In many cases it is required that one side shall be printed in two colors. The arrangement of the machine for this purpose will now be described.

42 is a frame movable longitudinally upon the frame 1, having a rack, 43, engaged by a cog-wheel, 44, to which rotation may be imparted by a hand crank or wrench.

The following parts have bearing in the frame 42, viz: the cylinders 9 and 12, the rollers 22 and 26, the fountain 45, fountain-roller 46, vibrating roller 47, and type-rollers 48.

The journal-boxes 49 of the roller 16 have bearing in guides 50 concentric with the cylinder 3, the arrangement being such that the roller 16 can be raised into the position shown in Figs. 7 and 8 without changing its distance from the shaft 4 or cylinder 3. To allow this upward movement of the roller, the frame 42 is moved outward, so as to carry the cylinder 9 away from the cylinder 3.

The roller is raised by means of curved racks 51, depending from its journal-boxes 49, said racks being engaged by cog-wheels 52 upon a shaft, 53, extending transversely across the machine. When the roller 16 is in its upper position, the set-screw 19 is loosened and the wheel 17 moved inward upon its shaft, so as to engage with the cog-wheel 5, then the set-screw is tightened. The frame 42 is then moved inward until the cog-wheel 7 engages the cog-wheels 14 and 17, so that the wheel 7 is actuated by means of the wheel 17, instead of the wheel 5, directly; consequently the rotation of both the cylinder 9 and roller 16 are reversed. The cog-wheel 20 is brought into engagement with the cog-wheel 7. In this case the first impression is printed on the sheet, as before described; but the second impression, although printed by the cylinder 12, is printed upon the same side of the sheet as the first impression.

The course of the sheet through the press is as follows: When the front edge of the sheet is released by the grippers 24, it is taken by the grippers 54 of the roller 16 and carried to the cylinder 9, when the grippers 54 release, and the sheet is taken by grippers 55 and carried around between the cylinder 9 and the type-form 13. When the sheet is released by the grippers 55, it is taken by the grippers 28 of the roller 22 and carried to the fly, as before.

The paper, in a continuous roll, is shown at 56 supported on a shaft, 57, resting on standards 58. The paper from the roll passes first between two feed-rolls, 59 and 60, and then between a pair of feed-rolls, 61 and 62. The feed-rolls 59 and 60 are connected together by gear-wheels 63 and 64, and the rolls 61 and 62 are connected in like manner by gear-wheels 65 and 66, the wheels 63 and 65 being connected by an intermediate pinion, 67.

68 is a cog-pinion upon the journal of feed-roll 59, that engages a cog-wheel, 69, having intermittent rotary motion by means of a ratchet-wheel, 70, fast to wheel 69, an arm, 71, vibrating upon the journal or pin 72, and a spring pawl or dog, 73, on the arm engaging the ratchet-teeth of wheel 70. The arm 71 is slotted to receive a pin, 74, that is movable in the slot.

75 is a rod passing through an eye in the pin and secured by a set-screw, 76. This rod 75 is connected at the other end to a wrist-pin, 77, secured in the slot of a crank-arm, 78, upon the shaft 4. It will be seen that the rotation of shaft 4 will cause the oscillation of the arm 71, and that the more distant the pin 77 is from the center of the shaft the greater the oscillatory movement of the arm 71 will be. The oscillatory movement is also increased by fixing the pin 74 near the axis 72. It must be borne in mind that the pin 74 must always be at least as far from the point 72 as the pin 77 is from the point 4. The movement of the feed-rolls is adjusted to suit the length of the sheet of paper being printed, so as to draw the proper amount of paper from the roll 56. As the paper leaves the feed-rolls 61 62, it passes between two stationary rolls, 78 79, around which are coiled guide-wires 80, fixed at the other end to the upper and under bars of a frame, 81, through which the paper passes to reach the impression-cylinder 3. Although the rolls 78 79 are stationary when the machine is at work, they may be turned in their bearings to wind up or let out the guide-wires 80 to suit the length of sheet of paper that is being printed. For this purpose they carry cog-wheels 82 83, that engage together, and the wheel 82 engages with a cog-wheel or pinion, 84, that is upon a shaft turned by hand. The paper between the rolls 59 and 61 passes over a table, 85, having a groove, 86, transverse to the machine, to receive the drop-knife or shear-blade 87. This blade at the proper time is allowed to fall and cut a sheet from the roll. The fall of the blade may be assisted by

a spring. It is proposed to set the blade with one end a little lower than the other, so that it shall commence to cut at this end and cut across the paper to the other end of the blade.

5 The blade is fixed to a sash, 88, each end of which is connected by a rod, 89, to one end of a lever, 90, whose other end is connected by a rod, 91, to a cam-lever, 92, having an anti-friction roller or wheel, 93, that bears upon
10 the top of a cam, 94, upon the shaft 4. The arrangement is such that the knife or blade is held up while the paper is being fed forward, and descends when the feeding movement ceases, the wheel 93 dropping from rear end
15 of cam 94. After the sheet of paper has been cut from the roll, and as it is about to be taken from the grippers 24, the roll 62 is lifted from the paper, to allow the same to be freely drawn forward by the grippers 24. For this
20 purpose the roll 62 is carried on two hinged arms, 95, to each of which is hinged a rod, 96, whose lower end is connected to one end of a lever, 97, the other end of the lever being connected by a rod, 98, to a cam-lever, 99, whose
25 other end carries an anti-friction wheel, 100, that is acted on by a cam, 101, on shaft 4, to lift the wheel and throw up the roller 62.

Allusion has been made to the adjustment of the guide-wires 80 in length to suit the
30 length of the sheet. As the guide-frame 81 is fixed, it is evident that the rolls 78 79 must be movable. It is also evident that the cutting-blade and feed-rolls would have to be made movable for the same reason. For this
35 purpose the feed-rolls and feed-wheels 69 are, with the rolls 78 and 79 and the cutting mechanism, supported on a longitudinally-movable frame, 102. This is moved by means of cog-wheels 103 upon the transverse shaft 104 and
40 cog-racks 105, fixed to the main frame 1. The shaft 104 being the same that carries the pinion 84, it will be seen that the rolls 78 79 are turned simultaneously with the movement of the frame 102, and the relative size of the rolls
45 and the cog-wheels is such that the wires 80 are in a stretched condition in all positions of the frame 102.

The ink-rollers 48 and vibrating roller 47 should be made to move with the boxes 30 of
50 cylinder 12.

The fountain and fountain-roller 45 46 may be stationary on the frame 42.

In place of making the cylinders 9 and 12

movable relatively to the cylinder 3, the former may be stationary and the latter movable; but we consider the described construction preferable. 55

The feeding mechanism may be dispensed with, and the sheets of paper fed by hand, as is common. 60

It will be seen that if either of the type-forms is removed the press may be used to print one side of the paper without any other change, except the removal of the inking-rollers belonging to the removed form. 65

The feed-board is hinged at 106 and 107, to allow either of its ends to be lifted to enable the interior parts of the machine to be readily reached.

We herein claim as new and of our invention— 70

1. The combination of first-impression cylinder 3, second-impression cylinder 9, type-cylinder 12, and a movable cylinder, 16, the impression-cylinders being separable and the
75 movable cylinder adjustable to and from a position between the impression-cylinders.

2. The combination of the first-impression cylinder 3, second-impression cylinder 9, and heating-roller 26, bearing on the second-im- 80
pression cylinder.

3. The combination of the first-impression cylinder 3, second-impression cylinder 9, heating-roller 26, type-cylinder 12, and a movable roller, 16. 85

4. The combination of the first-impression cylinder 3, second-impression cylinder 9, heating-roller 26, type-cylinder 12, movable roller 16, and heating-roller 22.

5. The combination of impression-cylinders 9c 3 and 9, reciprocating form-bed 2, form-cylinder 12, and heating-rollers 16 and 22, having grippers 27 28.

6. The combination of type-bed 2, cylinder 3, a movable frame, 42, supporting cylinders 95 9 and 12, rollers 22 and 26 and the roller 16.

7. The combination of impression-cylinder 3, impression-cylinder 9, type-cylinder 12, having journals 11, frames 31, journal-boxes 30, yokes 32, cams 33, arms 34, and rods 35.

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Witnesses:

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GEO. H. KNIGHT.