No. 804,640. PATENTED NOV. 14, 1905.

W. H. WALDRON.

OIL CLOTH PRINTING MACHINE.

APPLICATION FILED DEC. 8, 1904.

3 SHEETS—SHEET 1.

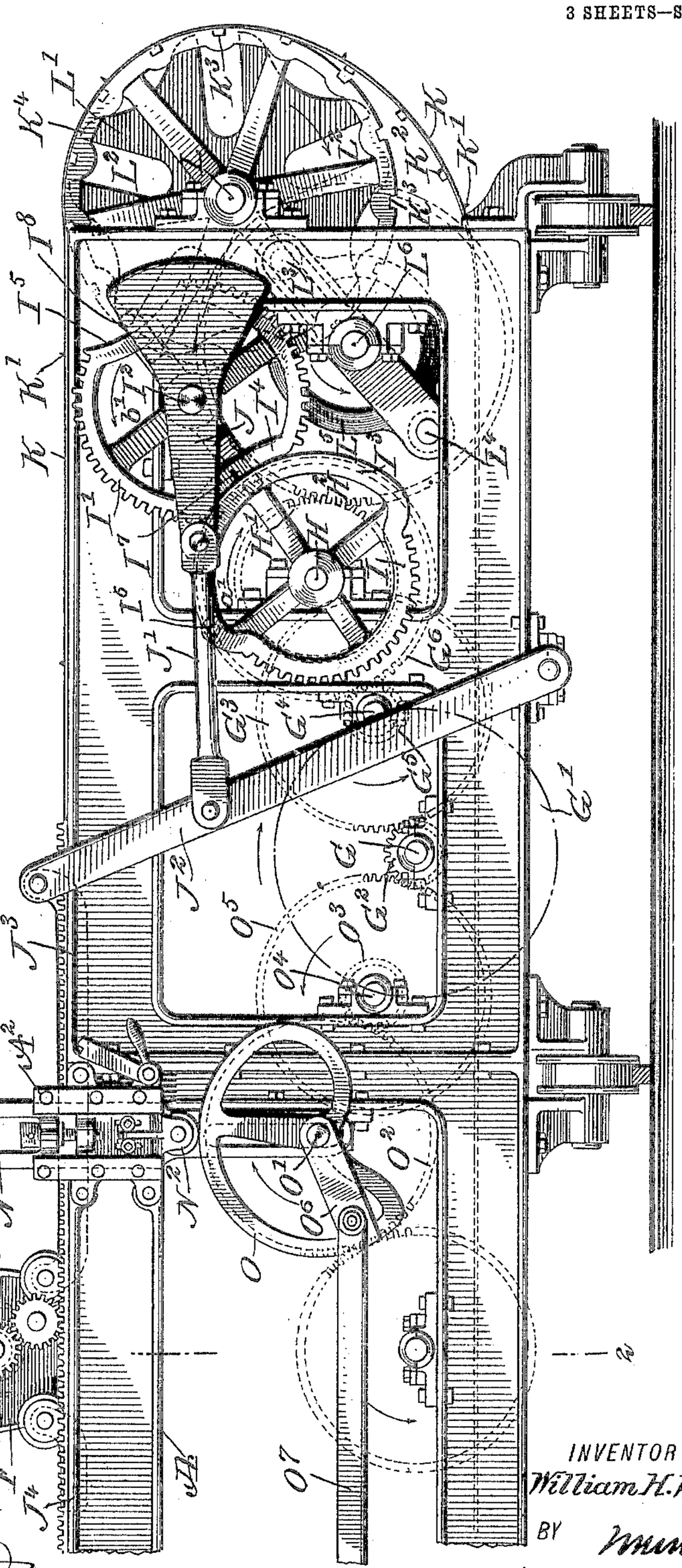

Fig. 1.

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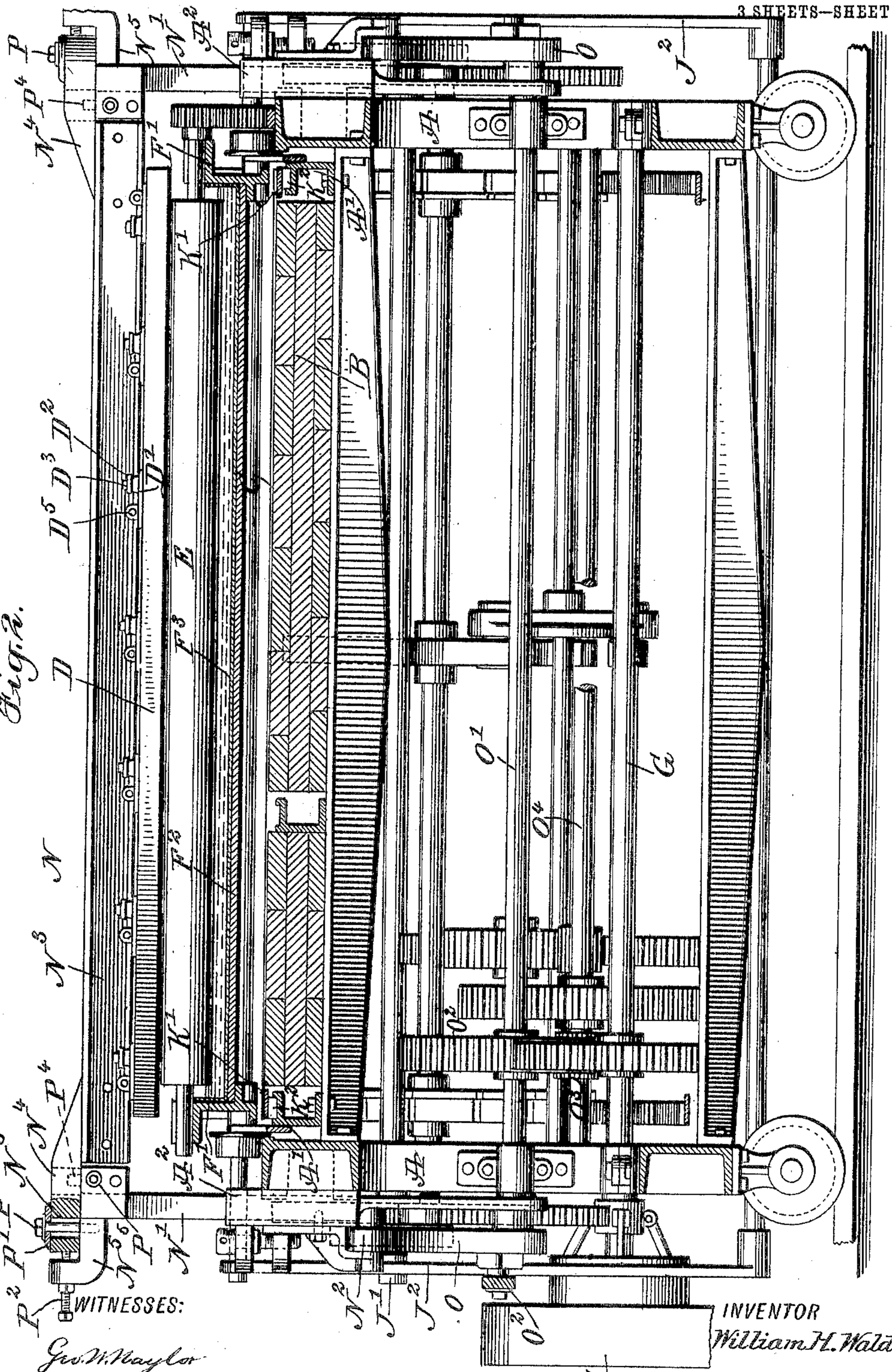
3 SHEETS—SHEET 2.

Fig. 2.



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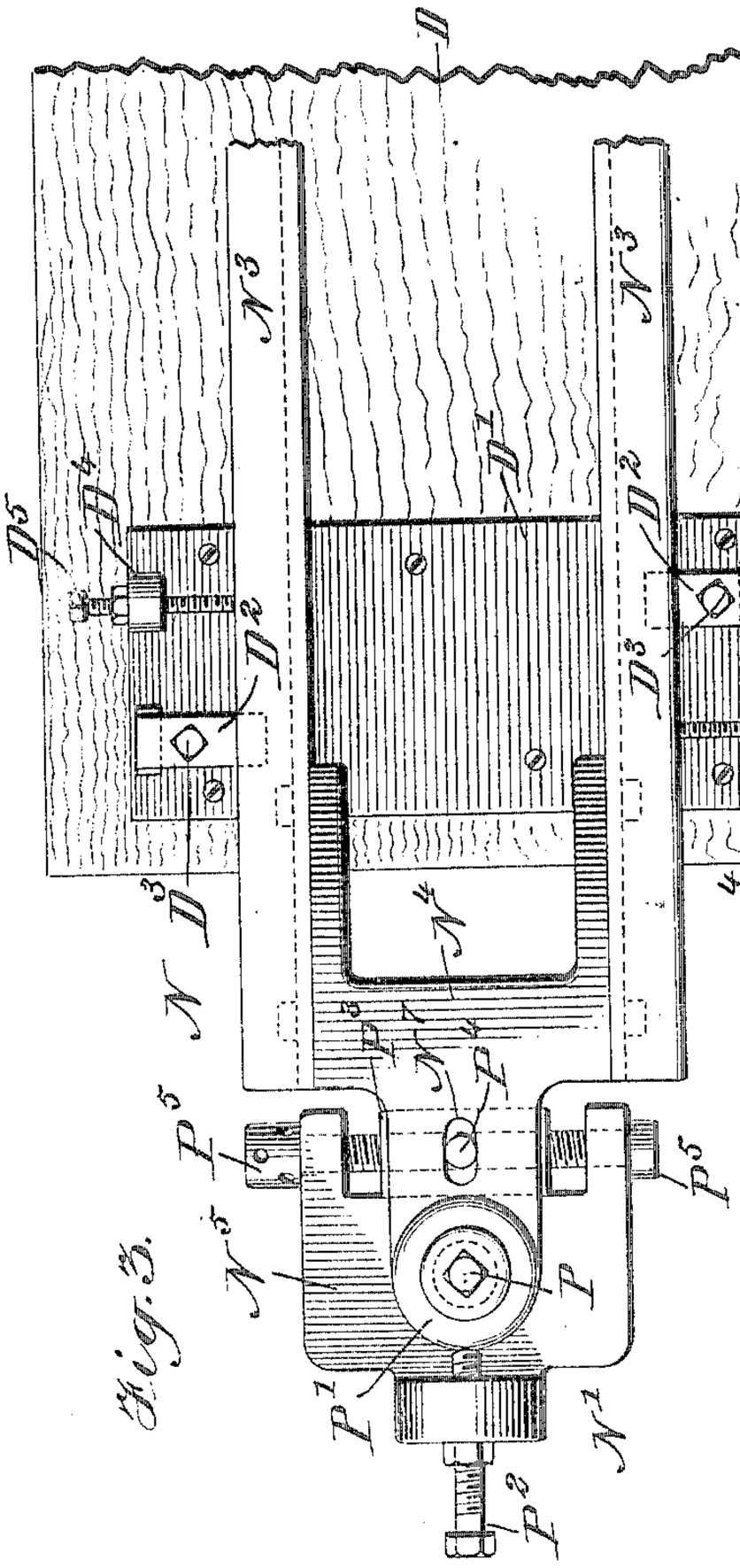

Fig. 3.

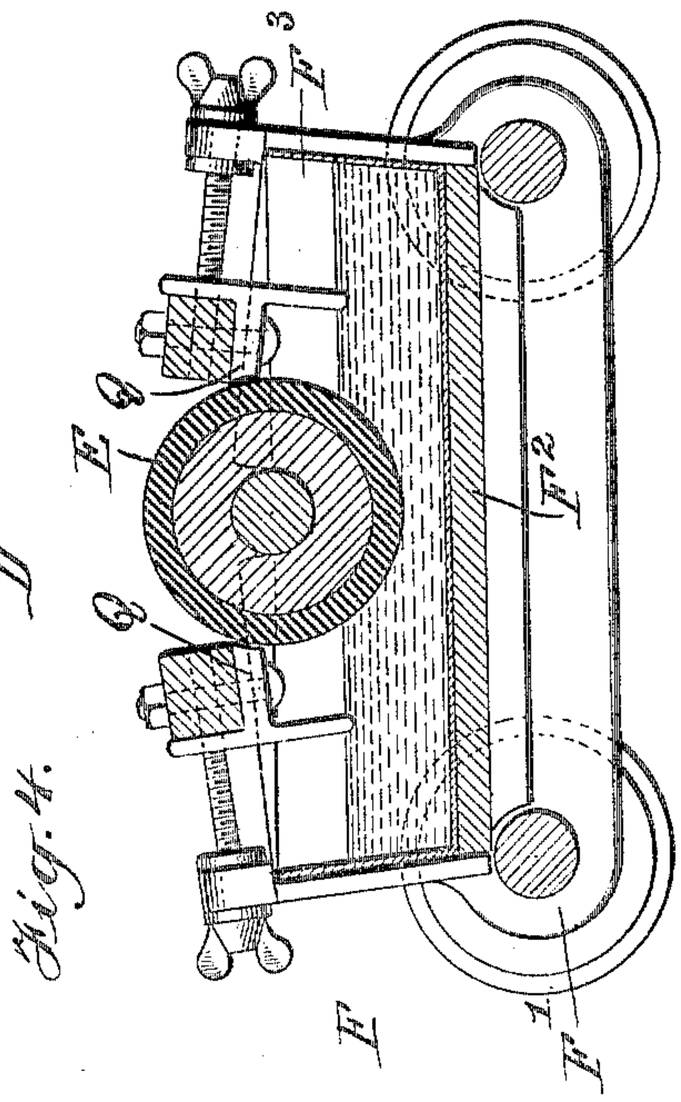

Fig. 4.

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WILLIAM HUBELI WALDRON, OF NEW BRUNSWICK, NEW JERSEY, ASSIGNOR TO JOHN WALDRON COMPANY, OF NEW BRUNSWICK, NEW JERSEY.

OIL-CLOTH-PRINTING MACHINE.

No. 804,640. Specification of Letters Patent. Patented Nov. 14, 1905.

Application filed December 8, 1904. Serial No. 236,011.

To all whom it may concern:

Be it known that I, WILLIAM HUBELI WALDRON, a citizen of the United States, and a resident of New Brunswick, in the county of Middlesex and State of New Jersey, have invented a new and Improved Oil-Cloth-Printing Machine, of which the following is a full, clear, and exact description.

The invention relates to machines for imprinting designs in various colors upon oil-cloths and other fabrics by the use of intermittently-reciprocating printing-blocks; and the object of the invention is to provide a new and improved machine for printing oil-cloth arranged to insure a positive locking of the intermittent driving mechanism for the color-trough, to cause an easy driving and locking of the said mechanism without shock or jar, to allow convenient adjustment or detachment of the printing-blocks, and to reduce the weight of the color-trough to a minimum.

The invention consists of novel features and parts and combinations of the same, as will be more fully described hereinafter and then pointed out in the claims.

A practical embodiment of the invention is represented in the accompanying drawings, forming a part of this specification, in which similar characters of reference indicate corresponding parts in all the views.

Figure 1 is a side elevation of the improvement. Fig. 2 is an enlarged cross-section of the same on the line 2 2 of Fig. 1. Fig. 3 is an enlarged plan view of part of one of the printing-blocks and its support, and Fig. 4 is an enlarged longitudinal sectional elevation of one of the color-troughs.

On the main frame A of the oil-cloth-printing machine is held a table B, over which is intermittently moved the oil-cloth or other fabric C to be printed by the use of a series of printing-blocks D, (one only being shown in the drawings,) reciprocating intermittently in a vertical direction and supplied with color by inking-rolls E, mounted to turn in color-troughs F, adapted to travel intermittently forward and backward on the frame A at the time the printing-blocks are in a raised resting position, so that the inking-rolls E ink the faces of the said blocks, the several color-troughs being linked together in the usual manner to move in unison.

The several devices of the machine so far described are those of the ordinary oil-cloth-printing machines now generally in use.

The color-troughs are usually very heavy, and it requires considerable force to properly start the troughs on their travel, and when the machine is in operation the momentum acquired by the color-troughs in their rapid forward-and-backward motion tends to carry the moving parts beyond their proper positions.

In order to insure an easy starting and accurate stopping and locking of the color-troughs and to reduce their weight, the following arrangement is had: On one end of the main frame A is journaled a transversely-extending main shaft G, provided with a suitable clutch-pulley G′, connected by belt with other machinery for imparting a continuous rotary motion to the main shaft G. On the latter is secured a pinion G^2, in mesh with an intermediate gear-wheel G^3, secured on a shaft G^4, journaled on the main frame A and carrying a pinion G^5, in mesh with a gear-wheel G^6, secured on a shaft H, journaled in suitable bearings on the main frame A and carrying on each end a mutilated gear-wheel I, adapted to mesh with a mutilated gear-wheel I′, secured on a crank-shaft I^2, journaled in suitable bearings on the main frame A. On each end of the crank-shaft I^2 is secured a counterbalanced crank-arm J, connected by a link J′ with a rocking lever J^2, fulcrumed at its lower end on the main frame A and connected at its upper free end by a link J^3 with the first color-trough F, connected by a link J^4 with the next color-trough, it being understood that the several color-troughs of the series are connected with each other by links J^4, so that all the color-troughs move in unison.

The mutilated gear-wheel I is provided with a smooth segmental rim portion I^3, adapted to fit alternately onto smooth concave rim portions I^4 and I^5, formed on the mutilated gear-wheel I′ between the two sets of teeth thereof, as plainly illustrated in Fig. 1. Now when the segmental rim portion I^3 is in mesh with the concave rim portion I^4 or I^5 then the mutilated gear-wheel I′ is held against rotation—that is, the said portions I^3 and I^4 form a Geneva stop to allow rotation of the mutilated gear-wheel I and its

portion I^3 without revolving the mutilated gear-wheel I′ until the teeth of the mutilated gear-wheel I move in mesh with the corresponding set of teeth on the mutilated gear-wheel I′. In order to turn the mutilated gear-wheel I′ sufficiently to bring this corresponding set of teeth in mesh with the mutilated gear-wheel I, a friction-roller I^6 is journaled on the mutilated gear-wheel I, and this friction-roller is adapted to engage a projection or tooth I^7 or I^8, held on the smooth rim portion I^4 or I^5 of the mutilated gear-wheel I′.

When the machine is in operation, the rotary motion of the shaft G is transmitted to the shaft H by the gearing described, and the rotary motion of the shaft H causes the mutilated gear-wheel I to rotate in the direction of the arrow *a′*, (see Fig. 1,) so that the friction-roller I^6 finally moves in contact with the lug I^7, thus turning the mutilated gear-wheel I′ a sufficient distance to bring the teeth of the mutilated gear-wheel I′ in mesh with the teeth of the revolving mutilated gear-wheel I. When this takes place, a rotary motion is given to the mutilated gear-wheel I′ and its shaft I^2 in the direction of the arrow *b′*, so that the crank-arms J impart a rocking motion to the levers J^2 to move the color-troughs F from the left to the right under the corresponding printing-blocks D, so that the inking-rolls E ink the printing-faces of the said printing-blocks D. When the troughs F have passed the printing-blocks D, then the teeth of the mutilated gear-wheels I and I′ move out of mesh with each other and the smooth rim portion I^5 is moved in engagement with the smooth segmental rim portion I^3, so that the mutilated gear-wheel I′ is held against further rotation for the time being—that is, until the friction-roller I^6 comes in contact with the projection or tooth I^8 to move the mutilated gear-wheel I′ again in mesh with the mutilated gear-wheel I. When this takes place, the mutilated gear-wheel I′ is again rotated, and with it the shaft I^2, so that the crank-arms J are actuated to impart a return traveling motion to the color-troughs F by the link-and-lever connection above described, it being understood that during the time the color-troughs F were at rest in their right-hand side positions the printing-blocks D descended, made an impression, and returned to their uppermost positions previous to the return movement of the color-troughs F.

The fabric C to be printed is attached at its side edges to pins K′, projecting from endless belts or aprons K, provided at their inner sides with spaced lugs K^2, traveling in suitable longitudinally-extending guideways A′, formed on the main frame A, as plainly indicated in Fig. 2. The lugs K^2 are adapted to engage notches K^3, formed in the peripheral faces of drums K^4, secured on a shaft L, journaled in suitable bearings on the end of the main frame A, the said shaft L carrying star-wheels L′, having radial slots L^2, adapted to be engaged successively by friction-rollers L^3 and L^4, journaled on cam-wheels L^5, secured on a shaft L^6, mounted to turn in suitable bearings on the main frame A. The shaft L^6 is continually rotated from the shaft H, and for this purpose the latter is provided with a gear-wheel H′, in mesh with a gear-wheel H^2, secured on the shaft L^6. When the machine is in operation and the shaft L^6 is rotated, then the friction-rollers L^3 L^4 are alternately moved in mesh with successive radial slots L^2 to impart an intermittent rotary motion to the star-wheels L′, the shaft L, and the drums K^4, secured thereon, to impart an intermittent traveling motion to the aprons K and the fabric C temporarily attached thereto. The travel given to the fabric C corresponds to the width of a printing-block D, and the arrangement is such that the movement of the fabric C takes place at the time the printing-blocks D are moving vertically, the fabric being at rest during the time the impressions are made.

Each printing-block D is removably supported by a frame N, mounted to slide with its side arms N′ vertically in suitable guideways A^2, attached to the sides of the main frame A, and the lower ends of the side arms N′ of the frame N are provided with friction-rollers N^2, traveling on the peripheral faces of cam-wheels O, secured on a transversely-extending shaft O′, provided with a gear-wheel O^2, in mesh with a pinion O^3, secured on a shaft O^4, journaled on the main frame A and provided with a gear-wheel O^5, in mesh with the pinion G^2 on the main driving-shaft G. The first shaft O′ (shown in Fig. 1) is provided with the usual crank-arm O^6, connected by a link O^7 with a similar crank-arm on the next following shaft O′, carrying similar mechanism to the one described for raising and lowering the frame N and the printing-block D. In other words, the several raising and lowering devices for the printing-blocks D in the series are connected together, so that the several printing-blocks D are operated in unison.

In order to quickly attach or detach the printing-blocks D to or from their frames N and to adjust the said printing-blocks to bring the same in proper position to insure an accurate impression, the following device is provided, special reference being had to Fig. 3. The frame N for supporting a printing-block D consists, essentially, of transversely-extending beams N^3, preferably in the form of channel-irons, bolted or otherwise secured at their ends to arms N^4, resting on the upper surfaces of heads N^5, formed on the upper ends of the side arms N′, each arm N^4 being engaged by a vertically-disposed bolt P, extending through an enlarged opening N^6, formed in the

arm N^4 and the bolt screwing in the corresponding head N^5. By loosening the bolt P the beams N^3, with their heads N^4, can be shifted transversely, and when the desired adjustment has been reached the bolts P are screwed up to securely fasten the arms N^4 to the heads N^5 of the side arms N'. Each bolt P is provided with a suitable washer P' to cover the enlarged opening N^6 in the corresponding arm N^4. Minute transverse adjustment of the arm N^4 and beams N^3 is had when the bolt P is loosened by a suitable screw P^2, screwing in the outer end of the head N^5 against the outer end of the corresponding arm N^4. A longitudinal adjustment is given to the beams N^3 and their arms N^4 by the use of a block P^3, fitting against the inner face of the head N^5 and provided with a pin P^4, extending into an elongated slot N^7, formed in the arm N^4. Screws P^5, screwing in the head N^5, engage the ends of the block P^3 to adjust the same longitudinally, it being understood that the corresponding pin P^4, moving with its block P^3, shifts the arm N^4 in a like direction until the desired position is reached.

From the foregoing it will be seen that the supporting-beams N^3 for the printing-blocks D can be adjusted longitudinally and transversely on the head N^5 of each side arm N' to bring the block D in proper alinement relative to the fabric to be printed.

In order to attach each block D to the beams N^3, a number of plates D' are secured to the upper face of the block D, and on the side of each plate D' is held a clamping-arm D^2, engaged by a bolt D^3, screwing in the plate D', the clamping-arm abutting with its outer end on the plate D' and at its inner end on the lower flange of the corresponding beam N^3. A set-screw D^5 screws in a lug D^4 on each side of the plate D', and this set-screw abuts against the outer edge of the lower flange of the corresponding beam N^3, so that when the bolts D^3 are loosened on both sides of each plate D' then a longitudinal adjustment can be had by screwing up and unscrewing the set-screws D^5 correspondingly. After the desired adjustment is had the bolts D^3 are screwed up tightly to securely clamp the upper faces of the plates D' to the under faces of the transverse beams N^3.

In order to reduce the weight of the color-troughs F to a minimum, each of the said color-troughs is provided with wheeled side frames F', connected with each other by a connecting-plate F^2, forming a support for a box F^3, preferably made of light sheet metal and containing the desired color. It is understood that heretofore the color-box formed an integral part of the wheeled frame and had to be made very heavy, owing to the great width of the machine; but by using light wheeled frames connected with each other and a separate light color-box it is evident that the color-trough is materially reduced in weight. The printing-roll E extends into the color contained in the color-box F^3, and the side frames F' of the color-trough support the usual adjustable doctors Q.

The gearing for rotating the inking-roll E during the forward and backward travel of the color-trough is of usual construction, so that further detail description of the same is not deemed necessary.

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

1. An oil-cloth-printing machine having a driving mechanism for the color-troughs, comprising a lever connected with the color-troughs, a crank-arm, a link connecting the crank-arm with the lever, and a driving-gear for the said device, comprising mutilated gear-wheels, of which one is driven and the other is attached to the crank-shaft of the said crank-arm, the said mutilated gear-wheels having interlocking smooth surfaces.

2. An oil-cloth-printing machine having a driving mechanism for the color-troughs, comprising a lever connected with the color-troughs, a counterbalanced crank-arm, a link conecting the crank-arm with the lever, and a driving-gear for the said device, comprising mutilated gear-wheels, of which one is driven and the other is attached to the crank-shaft of the said crank-arm, one of the said mutilated gear-wheels having a smooth segmental portion and the other mutilated gear-wheel having smooth concave rim portions adapted to be alternately engaged by the said segmental rim portion.

3. An oil-cloth-printing machine having a driving mechanism for the color-troughs, comprising a lever connected with the color-troughs, a counterbalanced crank-arm, a link connecting the crank-arm with the lever, a driving-gear for the said device, comprising mutilated gear-wheels, of which one is driven and the other is attached to the crank-shaft of the said crank-arm, the said mutilated gear-wheels having interlocking smooth surfaces, and means on the said mutilated gear-wheels for moving them from an interlocked position into mesh with each other.

4. An oil-cloth-printing machine having a driving mechanism for the color-troughs, comprising a lever and crank device connected with the color-troughs, a driving-gear for the said device, comprising mutilated gear-wheels, of which one is driven and the other is attached to the crank-shaft of the said lever and crank device, the said mutilated gear-wheels having interlocking smooth surfaces, and means for moving the said mutilated gear-wheels from an interlocked position into mesh with each other, the said means consisting of a friction-wheel

on the driven mutilated gear-wheel and a projection on each concave rim portion of the other mutilated gear-wheel.

5. In an oil-cloth-printing machine, the combination with a color-trough, of a lever pivoted at one end and having its other end connected with the color-trough, a crank-arm, a link connecting the crank-arm with the lever intermediate of its ends, a mutilated gear-wheel on the shaft of the crank-arm and having two oppositely-disposed smooth concave portions in its rim, a second mutilated gear-wheel having a smooth segmental rim portion adapted to fit alternately into the concave portions of the first-named mutilated gear-wheel, and means for operating the last-named mutilated gear-wheel.

6. In an oil-cloth-printing machine, the combination with a color-trough, of a lever pivoted at one end, a connection between the free end of the lever and the color-trough, a mutilated gear-wheel having oppositely-disposed smooth concave portions in its rim, and a projection in each of the said concave portions, a second mutilated gear-wheel having a smooth segmental rim portion adapted to fit alternately into the concave portions of the first-named mutilated gear-wheel and a friction-roller on said smooth rim portion, means for operating one of the mutilated gear-wheels, a counterbalanced crank-arm on the shaft of one of the said gear-wheels, and a link connecting the crank-arm with the said lever intermediate of its ends.

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

WILLIAM HUBELI WALDRON.

Witnesses:
E. A. WALDRON,
F. W. HEATH.