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Patented Jan. 29, 1901.

M. HARVEY.

DRIVING GEAR FOR PRINTING PRESSES, &c.

(Application filed Aug. 1, 1900.)

(No Model.)

Fig. 1.

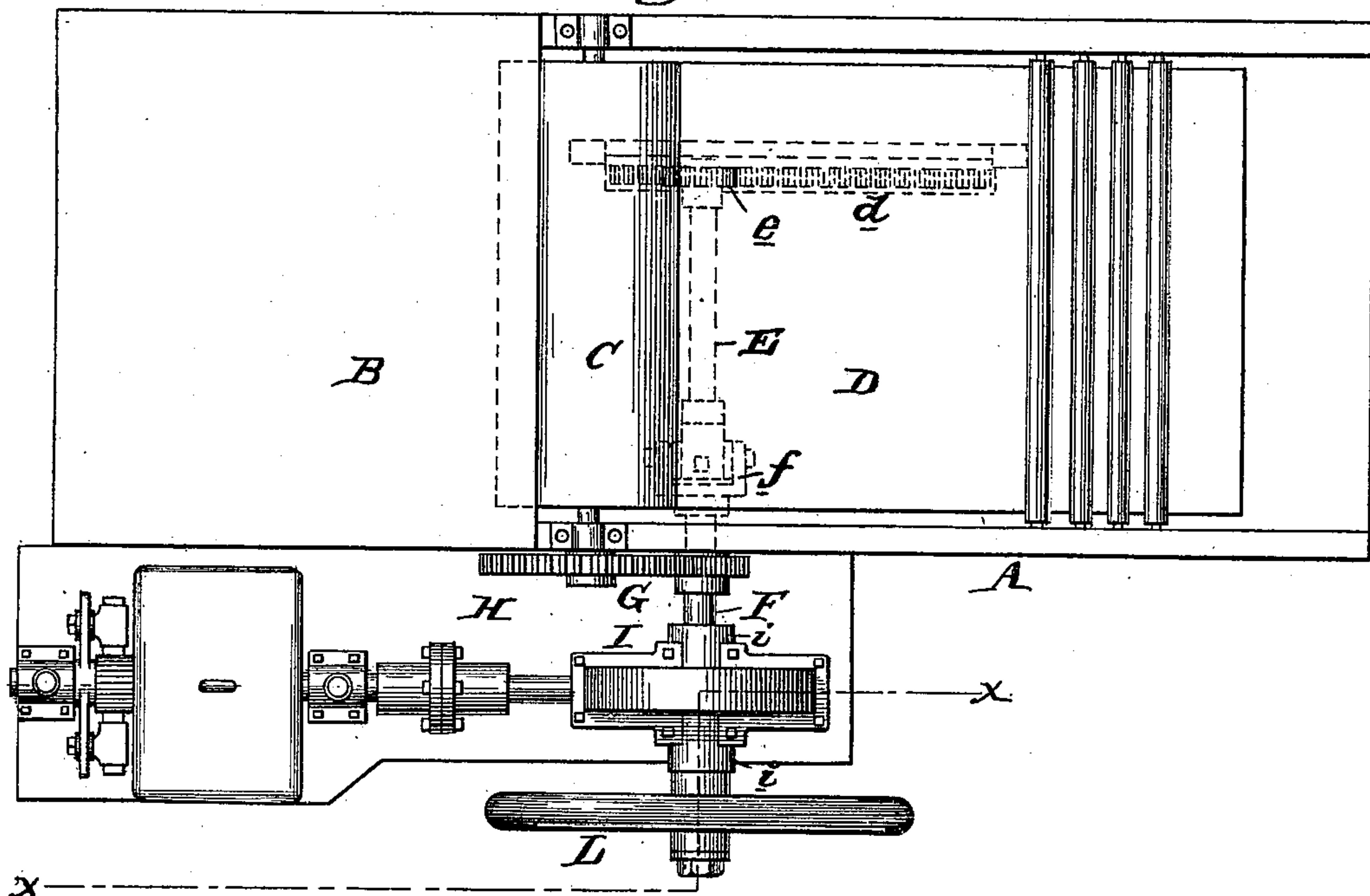
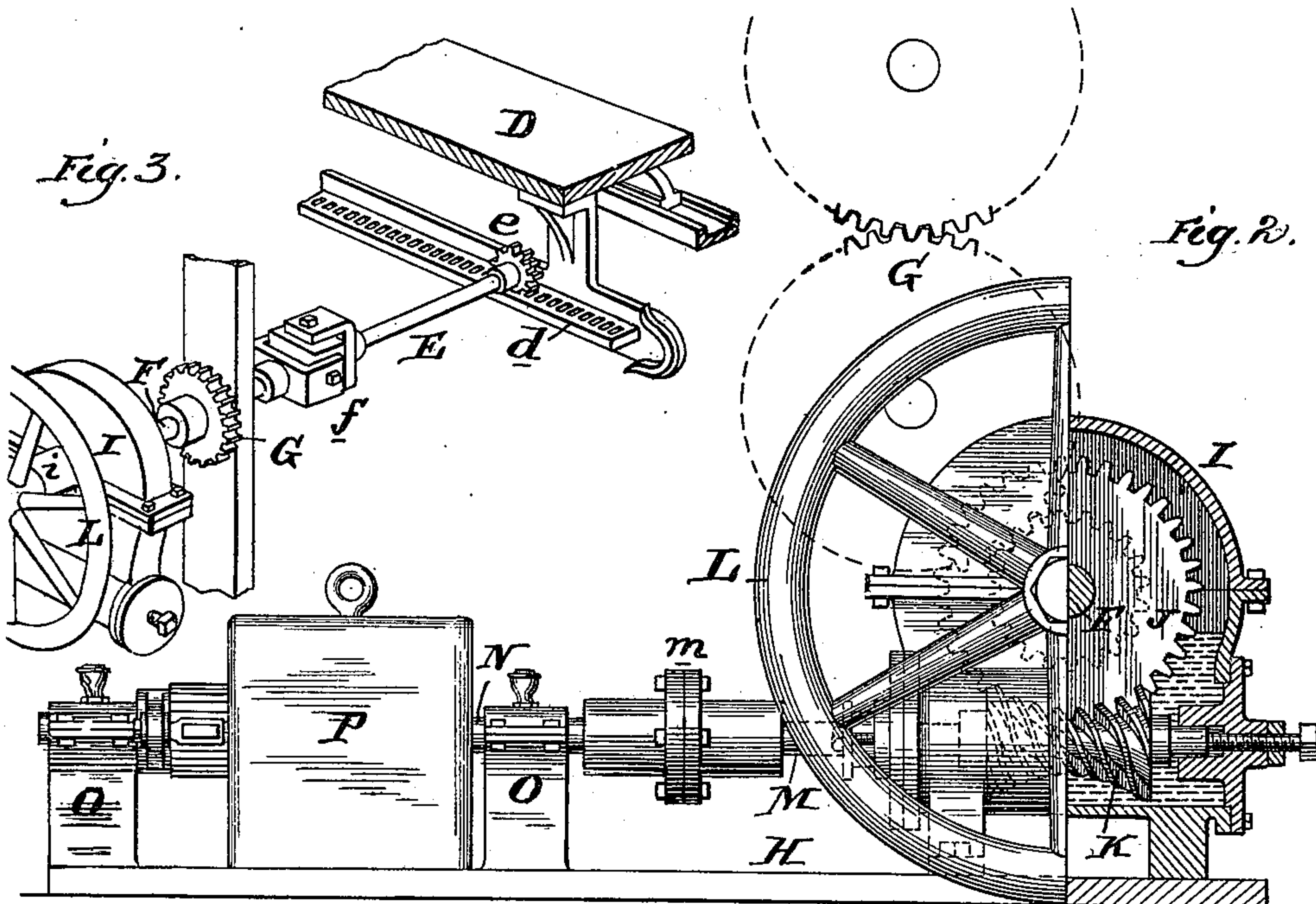


Fig. 3.



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MINOR HARVEY, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR TO THE
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DRIVING-GEAR FOR PRINTING-PRESSES, &c.

SPECIFICATION forming part of Letters Patent No. 666,848, dated January 29, 1901.

Application filed August 1, 1900. Serial No. 25,497. (No model.)

To all whom it may concern:

Be it known that I, MINOR HARVEY, of the city and county of Philadelphia, in the State of Pennsylvania, have invented an Improve-
5 ment in Driving-Gear for Printing-Presses, &c., of which the following is a specification.

My invention has reference to electrically-driven machinery for printing-presses, &c.; and it consists of certain improvements, all
10 of which are fully set forth in the following specification and shown in the accompanying drawings, which form a part thereof.

In operating printing-presses at high speed it is most important that the transmitting de-
15 vices from the power to the printing mechanism shall operate most smoothly, as this prevents undue wear to the parts, and consequently secures better impression, since there is less vibration and lost motion. In oper-
20 ating printing-presses by electric motors it has been customary to arrange a slow-speed motor with its armature-shaft parallel to the main or power shaft of the press and couple them together by a pinion-and-spur-wheel
25 construction. In this manner the motor is required to run at low speed, which makes it difficult to operate uniformly, and smooth running can hardly be relied upon and then only
30 when all parts are new and in perfect order.

The object of my invention is to overcome these objections by employment of a special form of gearing and adapting thereto a high-speed motor.

In carrying out my invention I combine
35 with the printing-press proper a bed-plate, upon which is arranged a box housing or casing through which the horizontal power-shaft of the press passes and upon which is secured a worm-wheel located within the casing. A
40 worm gears with the worm-wheel and is secured upon a motor-shaft journaled in said casing and arranged at right angles to the power-shaft of the press. The free end of this motor-shaft is secured to the armature of a
45 high-speed electric motor secured to or forming a part of the bed-plate. The worm and worm-wheel are constructed with teeth of high pitch, so as to enable the worm-wheel to drive the worm and motor-shaft when ad-
50 justing the press by hand through the employment of a large hand-wheel on the power-

shaft and also to enable the armature of the motor to be rotated at a very high speed while driving the press mechanism at a moderate speed. In the constructions employing a mo-
55 tor having its armature-shaft parallel to the power-shaft of the press and adapted to drive the same through spur-gearing the motor is of the slow-speed type, making a maximum of three hundred or four hundred revolutions
60 per minute as against fifteen hundred revolutions in the motor-shaft in my improvements. The heating and danger in the slow-speed equipment are much greater than in the high-speed equipment, it takes up more room,
65 it is located in a position especially undesirable and is in the way of the operator, and is rougher and more unsteady in its operation. Worm and worm-wheel gearing as ordinarily
70 employed in engineering locks the worm-wheel by the worm, so that the worm-wheel and its shaft cannot turn. This is objectionable in the case of a printing-press, where it frequently requires the press to be adjusted
75 by hand. For this reason I use a very fast pitch to the worm and worm-wheel, making the angle of contact such that it is greater than the angle of repose, with the result that by applying hand-power to the power-
80 shaft of the press it may be turned and the motor-shaft and the worm be rotated by the worm-wheel. Unless this is done there must be some provision for disconnecting the worm-wheel and power-shaft during hand adjust-
85 ment of the press, this necessitating clutches and operating devices. By my improvement the necessity of such clutches is overcome and the worm-wheel is secured permanently and rigidly to the power-shaft, as it should be.

My invention will be better understood by
90 reference to the drawings, in which—

Figure 1 is a plain view of a printing-press embodying my improvement. Fig. 2 is an enlarged side elevation of the power-applying
95 devices thereof with part in section, and Fig. 3 is a perspective view of a portion of the mechanism shown in Figs. 1 and 2.

A is the main frame of the printing-press. B is the feeding-table thereof. C is the im-
100 pression-cylinder, and D is the reciprocating type-form bed. The reciprocating bed D is provided with a rack *d*, with which a pinion

e meshes, said pinion running over the upper surface of the rack, then over the end, then over the under surface, then over the other end to the upper surface again, and so on, said action being to reciprocate the type-form bed D. The pinion *e* is secured to a vertically-movable shaft E, which is connected to a power-shaft F by means of a universal joint *f*. The power-shaft F is connected with the impression-cylinder C by means of spur-gearing G. This general construction of the printing-press is old and well known and will need no further detailed description.

H is a bed-plate firmly secured to the lower part of the main frame of the printing-press and below the power-shaft F. Secured to this bed-plate H is a casing I, through which the power-shaft F passes and in which it is journaled by bearings *i*. The power-shaft F extends through the said casing I, and upon its outer end is secured a large hand-wheel L, which also acts as a fly and balance wheel. Secured to the shaft F within the casing I is a worm-gear J, and this meshes with a worm K, secured to a worm-shaft M, journaled in the lower part of the casing I. The worm-wheel J and worm K have their teeth cut on such pitch that the worm-wheel may drive the worm and not become locked, as is usually the case with worm-wheel gearing. The construction is such that power applied to the hand-wheel L may be made to drive the worm K and the worm-shaft M. The worm-shaft is arranged at right angles to the power-shaft F of the press and is coupled to the armature-shaft N of an electric motor P by a suitable coupling *m*. The motor-castings constitute field-magnets, and the bearings O O of the motor-shaft may be formed integral with or firmly secured to the bed-plate H. It is evident, however, that a motor complete may be placed upon the bed-plate and firmly secured thereto in lieu of forming it integral with the bed-plate. The motor and worm shafts are in alinement and at right angles to the power-shaft F, and by these means the motor proper may be arranged very close to the bed-plate and to the rear end of the press, so as to remove it from the portions of the press which have constantly to be watched and handled by the operator. Furthermore, the power-applying gearing is protected and there is no liability to injure the operator. By arranging the worm and worm-wheel within the casing I they are held in perfect operative relation and are also enabled to run in oil.

In operating printing-presses it is constantly necessary to throw off the power and turn the press by hand to bring the type-form or the other parts into a position in which they may be handled. In the present construction the employment of clutch devices or a belt-shifter is dispensed with and the hand-wheel L may be turned by hand when no electric energy is supplied to the

electric motor, because the pitch of the worm and worm-wheel is made excessive and so that the worm-wheel may readily drive the worm, which is an essential feature of my improvement.

In cases where electric power has been applied to printing-presses the armature-shafts have been directly geared to the gearing G by means of a pinion and the motors were required to be slow-speed motors, which not only are wasteful in energy, but which are liable to vary in their speeds under the smallest variation in resistance or current-supply. They furthermore produce considerable jarring on the press, and, on the other hand, the press reacts upon the motor in such a manner as to interfere with the smooth running. These difficulties are entirely overcome with my improvement, as the worm and worm-wheel gearing is very smooth running and the motor is of the high-speed type, running approximately fifteen hundred revolutions per minute as against three hundred by the prior methods, and consequently any slight variations in the operation of the motor will not be perceptible in the printing-press. Moreover, a motor running at this speed is more easily governed, and consequently the press may be made to run uniformly at various speeds.

While I prefer the construction shown, the minor details may be varied without departing from the essential features of my invention, and it is also to be understood that the minor details of the printing-press are wholly immaterial, as my improvements may be applied to the power-shaft of any make of printing-press.

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

1. The combination of the main frame of a power-driven machine, a rotating power-shaft for operating the moving parts of said machine, a worm-wheel secured to the power-shaft, a worm meshing with the worm-wheel and secured to a shaft substantially at right angles to the power-shaft and extending rearward of the power-shaft and machine, an electric motor having its shaft in alinement with and secured to the worm-shaft and also located to the rear of the power-shaft, a bed-plate carrying the bearings of the worm-shaft the power-shaft and the motor secured to the lower part of the main frame of the power-driven machine, and a wheel secured to the power-shaft by which it may be manually rotated, and in which the worm and worm-wheel gearing have a pitch sufficiently great to enable the worm, the worm-shaft and the motor-shaft to be revolved by applying power to the said wheel.

2. The combination of the main frame of the machine, a rotating power-shaft F for operating the movable parts of the machine, a bed-plate H firmly secured to the main frame,

a casing I secured to the bed-plate and having transverse bearings *i, i* therein in which the shaft F is journaled, a worm-wheel J secured to the shaft F within the casing, a worm
5 K of large pitch also within the casing and meshing with the worm-wheel, a high-speed electric motor secured to the bed-plate and adapted to rotate the worm, and a wheel L secured to the shaft F for turning the same

and causing the worm-wheel to rotate the worm when adjusting the machine.

In testimony of which invention I have hereunto set my hand.

MINOR HARVEY.

Witnesses:

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