(No Model.) 2 Sheets—Sheet 1.

C. A. LOUD.

SHUTTLE DRIVING MECHANISM FOR LOOMS.

No. 437,215. Patented Sept. 30, 1890.

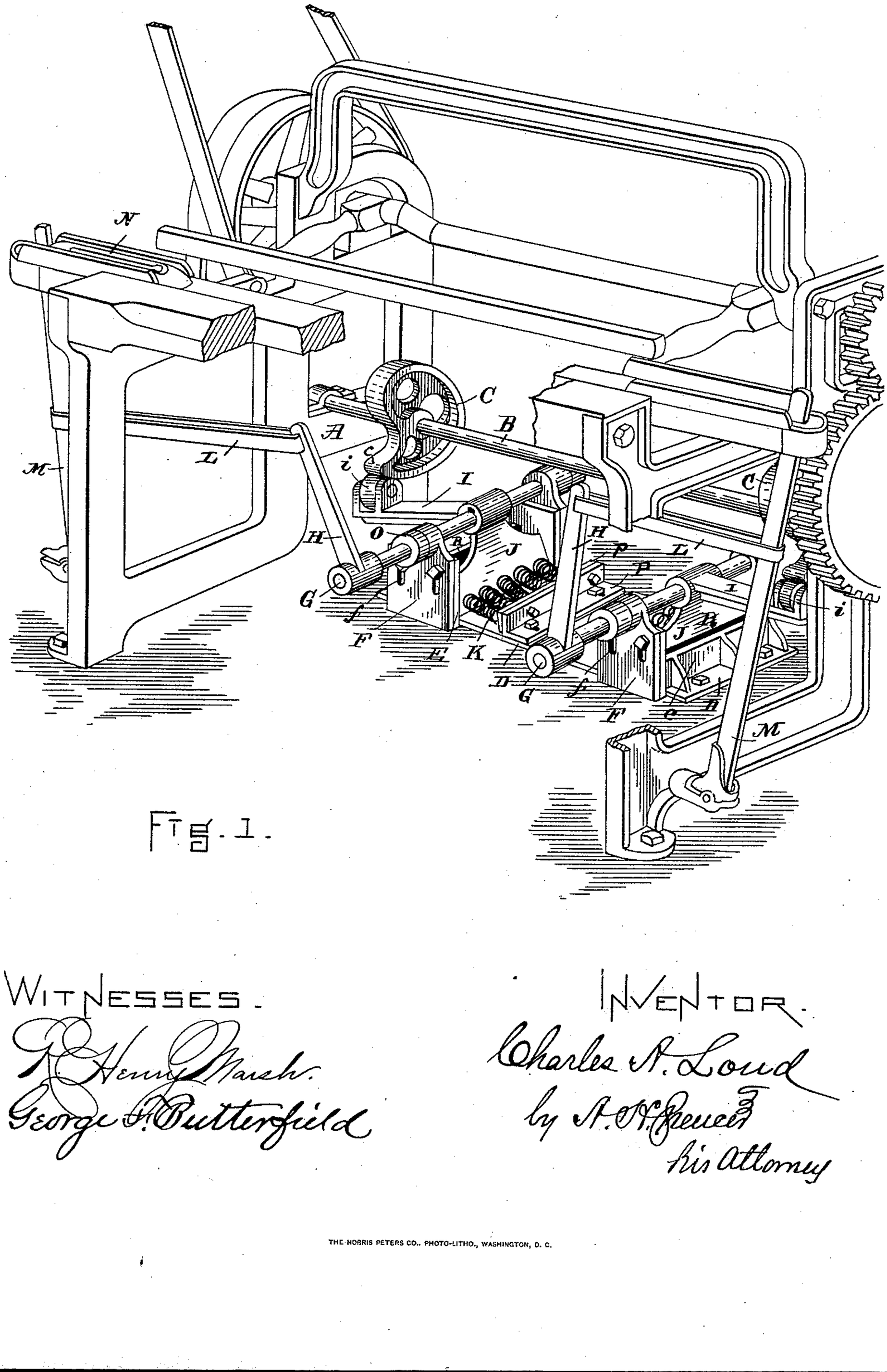

FIG. 1.

WITNESSES.

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George H. Butterfield

INVENTOR.

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his Attorney

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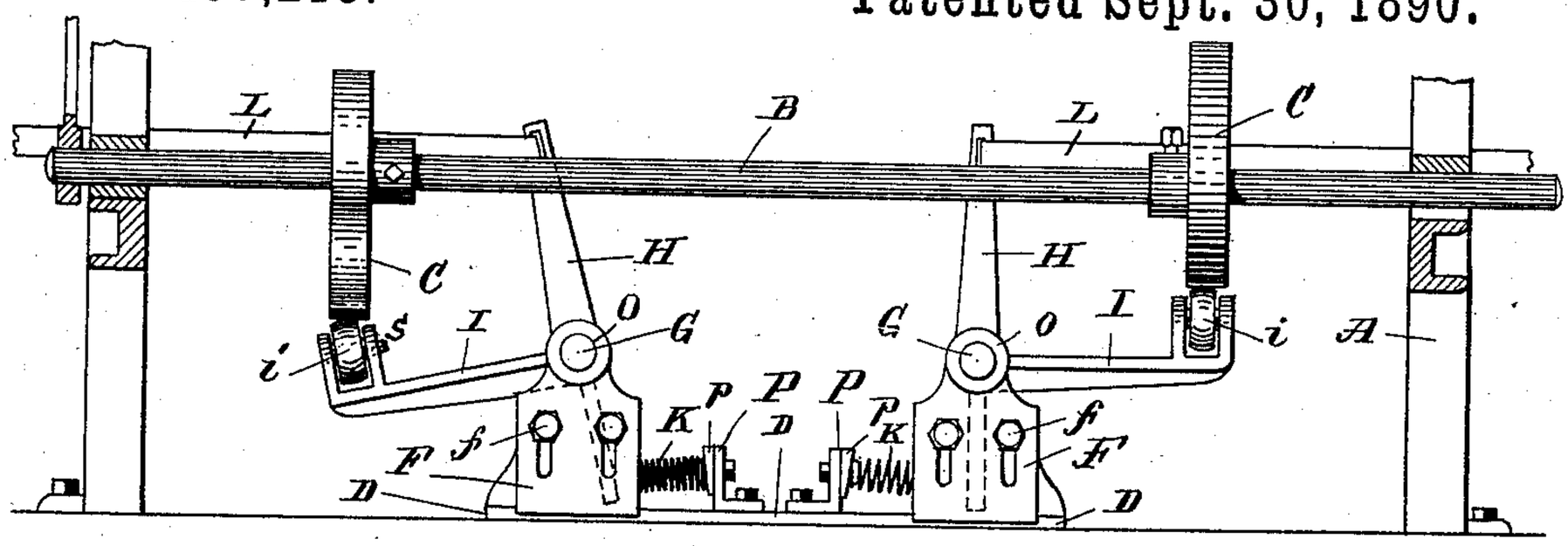

Fig. 2.

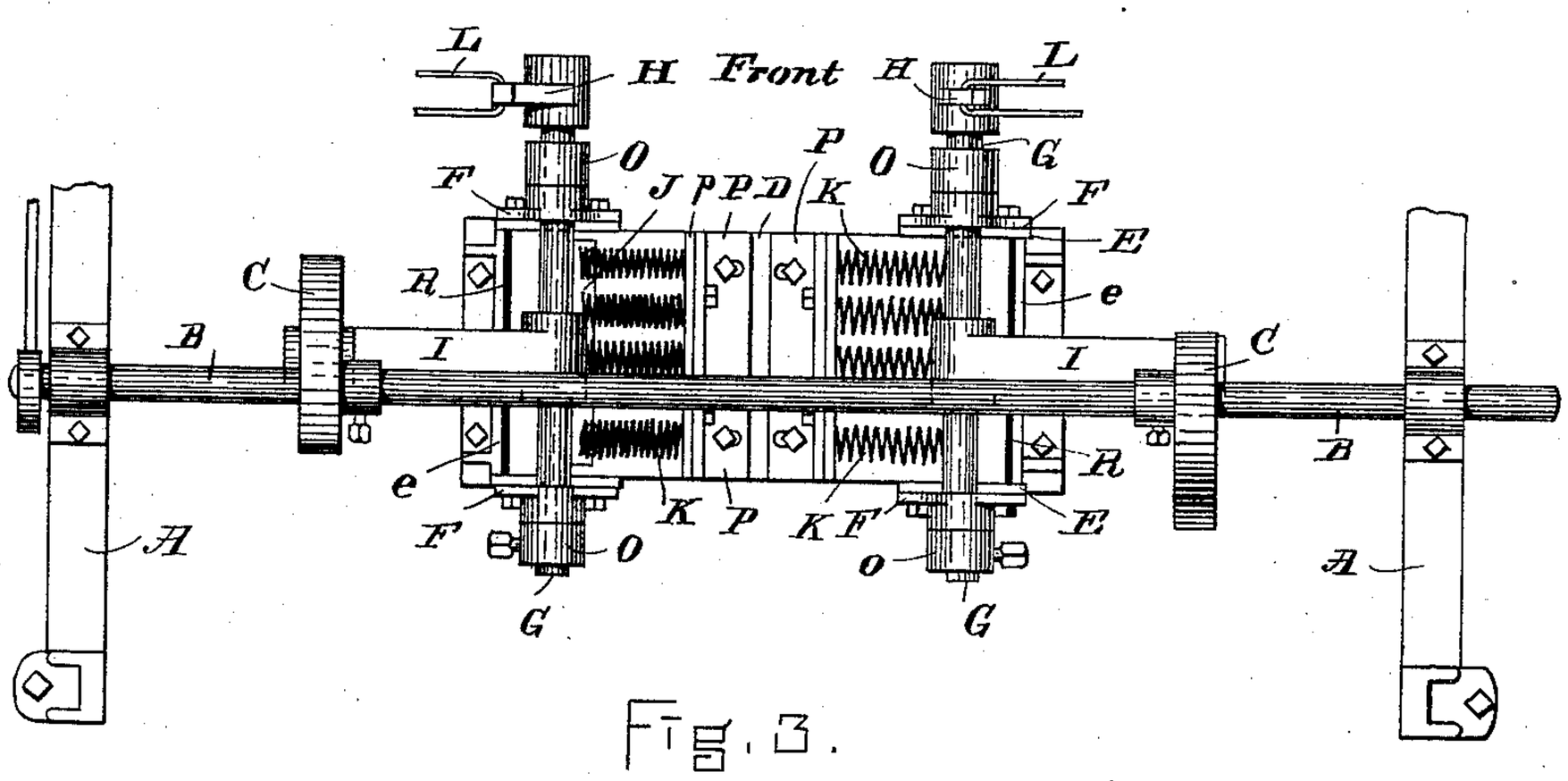

Fig. 3.

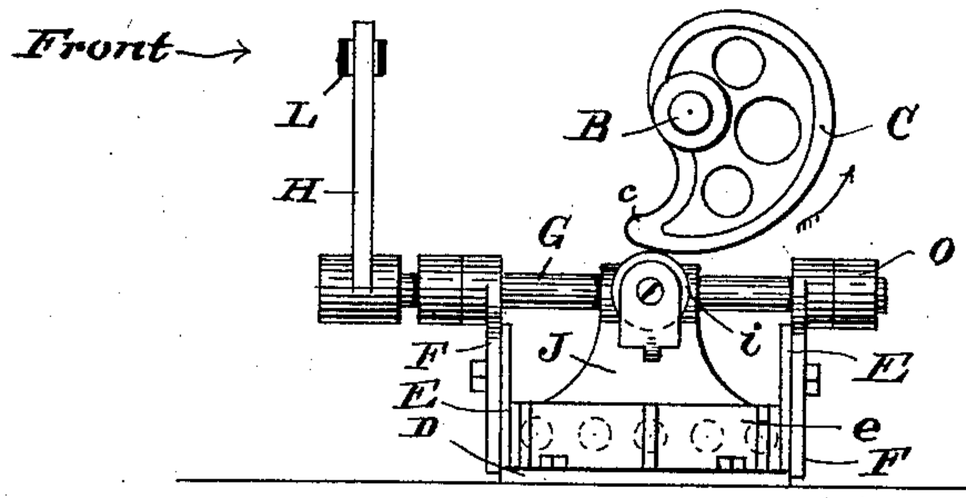

Fig. 4.

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UNITED STATES PATENT OFFICE.

CHARLES A. LOUD, OF WINCHENDON, MASSACHUSETTS.

SHUTTLE-DRIVING MECHANISM FOR LOOMS.

SPECIFICATION forming part of Letters Patent No. 437,215, dated September 30, 1890.

Application filed January 3, 1890. Serial No. 335,767. (No model.)

To all whom it may concern:

Be it known that I, CHARLES A. LOUD, of Winchendon, in the county of Worcester and State of Massachusetts, have invented certain new and useful Improvements in Shuttle-Driving Mechanism for Looms, of which the following, taken in connection with the accompanying drawings, is a specification.

My invention is designed to furnish novel means for actuating the shuttle of a power-loom, such means being independent of the loom-frame and applicable, therefore, to various kinds of frames, the device having certain adjustments adapting it to be used with any of them.

My improvements are embodied in a suitable base adapted to rest on the floor beneath the loom, and having at each end a horizontal rock-shaft, an upright arm therefrom connected by a strap to the vibrating picker-stick, which throws the shuttle; another arm at about a right angle to the first, furnished at its free end with a small wheel or roller to bear against the edge of a cam on the rotating shaft of the loom, and a spring or springs adapted to be compressed between an abutment on the base and a wing mounted on said rock-shaft. These devices act alternately at opposite ends to drive the shuttle back and forth, and are supplemented by the adjustments and attachments herein shown and described. The actuating-cams are of peculiar shape and will be fitted upon the main shaft of the loom, commonly by being slipped on endwise from each end. They will be set to conform to the relative position of the arms they are to actuate, and the position and tension of the springs will be adjusted as explained. The height of the rock-shafts from the base may be also adjusted readily. Suitable buffers check the backward movement of the arms under recoil of the springs. The arm, which bears by its terminal roller upon the periphery of the cam, stands parallel to and somewhat in front of the cam-shaft.

In the drawings, Figure 1 is a perspective view of a loom-frame with parts broken away to more clearly show the construction and connection of my shuttle-operating devices, such devices being shown on a somewhat larger scale than the loom. Fig. 2 is a rear elevation, Fig. 3 a top plan, and Fig. 4 an end view, of said devices, showing the cams on their shaft.

A represents the frame, B the main shaft, and C C the rotating cams fixed thereon at such distance apart and in such opposite relation radially to each other as the length of the base and time of actuation of the shuttle may require.

D is the base-plate, preferably formed as a single flat-bottomed iron casting, to rest upon the floor, to which it may be secured by bolts or screws. By preference I cast in one with this base-plate the vertical flanges E at and parallel with each edge and near each end thereof to constitute bearings or to act as supports for the adjustable bearings, and also the transverse vertical flanges *e* extending across near the ends of the base as stops for the buffers.

F F are slotted vertically-adjustable plates secured to the flanges E by bolts *f* through their slots and having at their upper ends bearings for the transverse rock-shaft G, which may thus be set at various heights from the floor, as required. In supplying an order where the height is definitely known, this adjustment is unnecessary and the bearings are permanent on the flanges E or equivalent uprights. The base itself may be raised when required by introducing a plate or bars beneath it.

The rock-shaft G carries two arms H and I, projecting from it at about a right angle to each other, as shown, and also a broad wing J or an equivalent series of short arms extending about diametrically opposite to the arm H, to bear against and compress the series of short stiff springs K. The arm I and wing J are shown in Fig. 1 as integral, as I prefer to make them, and I am accustomed to secure them to the rock-shaft by a groove and key, while the arm H has through its hub a set-screw (shown in Fig. 3) bearing firmly against the rock-shaft, but permitting radial and longitudinal adjustment, as required.

The arm H extends upwardly, and at its upper end is slotted to receive the strap L, running about horizontally to the middle of the picker-stick M, which is pivoted at the foot and in practice has the usual rocker-spring and a vibrating stroke to drive the shuttle N across in its race and to retire for

another stroke, while like devices at the other end of the race drive the shuttle back again.

The arm I is furnished at its extremity with an anti-friction roller *i*, mounted for rotation on a short shaft between two lateral lugs or projections. This roller travels upon the periphery of the rotating cam C, being pressed firmly into contact with it by the springs K, which are compressed when the larger part of the cam bears against the roller, and immediately and forcibly expand when the smaller part presents itself. The rotation of the cam, therefore, gradually forces down the free end of the arm I against the resistance of the springs to compression, the arm H and the connected strap L and lever M taking position to drive the shuttle the instant the cam releases the arm I and permits the expansion of the springs to give a quick partial rotation to the rock-shaft. Collars O on this shaft prevent its longitudinal movement. I interpose a suitable buffer R between the transverse flange *e* and the outer face of the wing J, to prevent their forcible contact, and keep the roller *i* from striking the smallest part of the cam when the springs expand.

The springs bear at their opposite ends against a transverse abutment P, which is preferably made adjustable, as shown, to vary the tension of the springs. Said abutment is an angle-bar slotted to receive the bolts by which it is adjusted and secured to the bed-plate, and its upright face is furnished with a vertically-adjustable plate *p*, having short studs entering the barrel of the springs to keep them in position upon it. Like studs are formed on the face of the wing J for the same purpose. The vertical adjustment of the abutment-plate *p* is designed to provide for cases where the rock-shaft bearings are raised by the vertical movement of the plates F F, already referred to. When the bearings are permanent, the vertical adjustment of the abutment is not required and the plate *p* is omitted.

The shape of the cam C is best shown in Figs. 1 and 4. Its smallest part, for about one hundred and twenty degrees, is a mere hub, which the roller *i* on the arm I does not strike at all, being so near to the shaft B. The rise on the cam from its smallest to its greatest diameter occurs during the next third of its rotation, while its remaining third, or thereabout, has its periphery in a true arc of a circle described from the axis of rotation. On this arc-shaped portion the roller *i* travels easily, holding the arm H in its extreme position and the picker-stick drawn back by its rocker-spring in readiness to receive the shuttle on arrival at that end of its race and to drive it back again when the point *c* of the cam releases the arm and roller I *i*.

For the purpose of easing the movement of the cam during the compression of the springs and subsequently, and to lessen the lateral pressure on the arm I, tending to move it bodily in the direction of the length of the rock-shaft, I prefer to place said arm with its roller *i* not directly beneath the main shaft B, but in practice about an inch and a half in front thereof, as in Figs. 3 and 4. This arrangement is peculiar to my invention. By it the spring-pressure exerted through the arm I and its roller *i* upon the arc-shaped portion of the periphery of the cam C tends to accelerate rather than retard rotation, since such pressure is not radial upon the cam, but upwardly, aside from the center, upon the retreating periphery of the cam.

The roller *i*, by preference, runs freely on an axis having a longitudinal groove containing lubricating material or fiber saturated with a suitable lubricant. One end of the axial bolt is screw-threaded to screw into the corresponding lug of the arm-head, and a check-nut S on the tip of the bolt holds it securely, the opposite end being slotted to receive a screw-driver.

While I have represented my apparatus, aside from the cams, as distinct from the loom-frame, as I prefer to make it, it is of course obvious that the base D might be secured to the frame-bars instead of to the floor. I therefore do not limit my improvements exclusively to devices independent of the frame.

I claim as my invention—

1. The base D, provided with suitable bearings, the rock-shaft G, oscillated in such bearings, and the arms H I and wing J, projecting therefrom, as described, in combination with the cam C, bearing peripherally against the roller *i*, of the arm I, and with the springs K, acting against the wing J, for the purpose set forth.

2. The independent base-plate D, adapted to rest upon and be secured to the floor, the upright flanges or bearing-supports E thereon, and the oscillating rock-shaft G, supported by said flanges distinct from the loom-frame, in combination with the arm H, and means for adjusting it radially upon said shaft and with the arm I and wing J, and the cam C and springs K serving to oscillate it, substantially as set forth.

3. The base-plate D, having vertical flanges E, the adjustable bearing-plates F, attached to said flanges, and the rock-shaft G, mounted thereon with its projections H I J, in combination with the peripheral cam C on the main shaft, the springs K, abutment P, and means for adjusting such abutment on the base-plate, substantially as set forth.

4. The base-plate provided at each end with bearings and with the rock-shafts G G, mounted thereon independent of the loom-frame, in combination with the arm I, carrying roller *i*, and wing J, secured to each shaft G between said bearings, and the arm H, fixed thereon outside of the bearings, and with the springs K, abutting on said wing and base-plate, and the cams C C on the rotating loom-shaft B, substantially as set forth.

5. The combination of cam-shaft B, cams C thereon, transverse rock-shafts G, and springs

K, with the arms I on said rock-shafts arranged parallel to shaft B and pressing by their terminal rollers upon the periphery of said cams, but not radially thereon, substantially as and for the purpose set forth.

In testimony whereof I have signed my name to this specification, in the presence of two subscribing witnesses, on this 27th day of December, A. D. 1889.

CHARLES A. LOUD.

Witnesses:
A. H. SPENCER,
JAMES P. PRINCE.