(No Model.)

4 Sheets—Sheet 1.

F. PHILLIPS.

PLANING MACHINE CUSHIONING DEVICE.

No. 350,554. Patented Oct. 12, 1886.

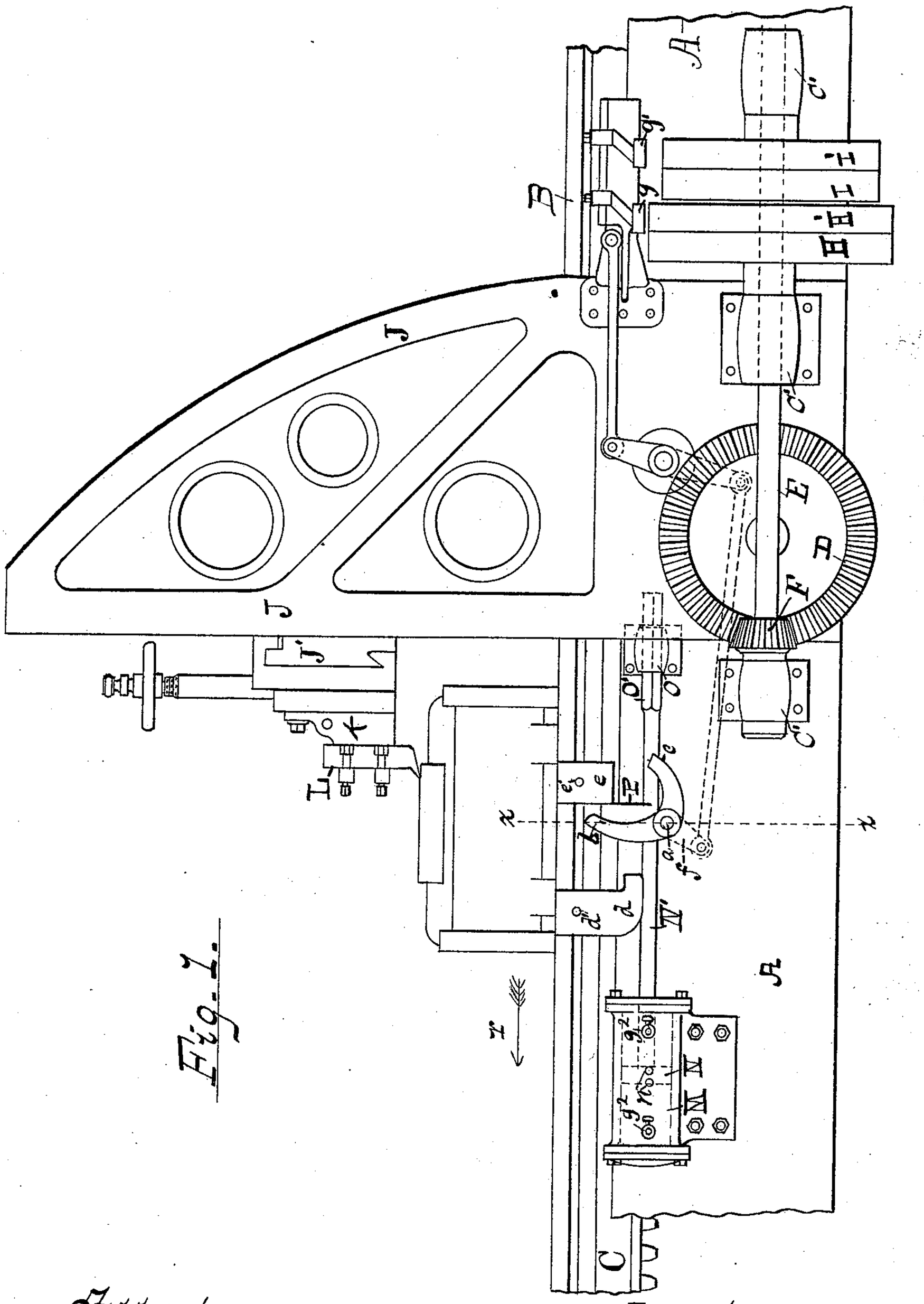

Fig. 1.

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Henry J. Theberath,

Inventor:
Franklin Phillips
per Crane & Millnatty

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Fig. 2.

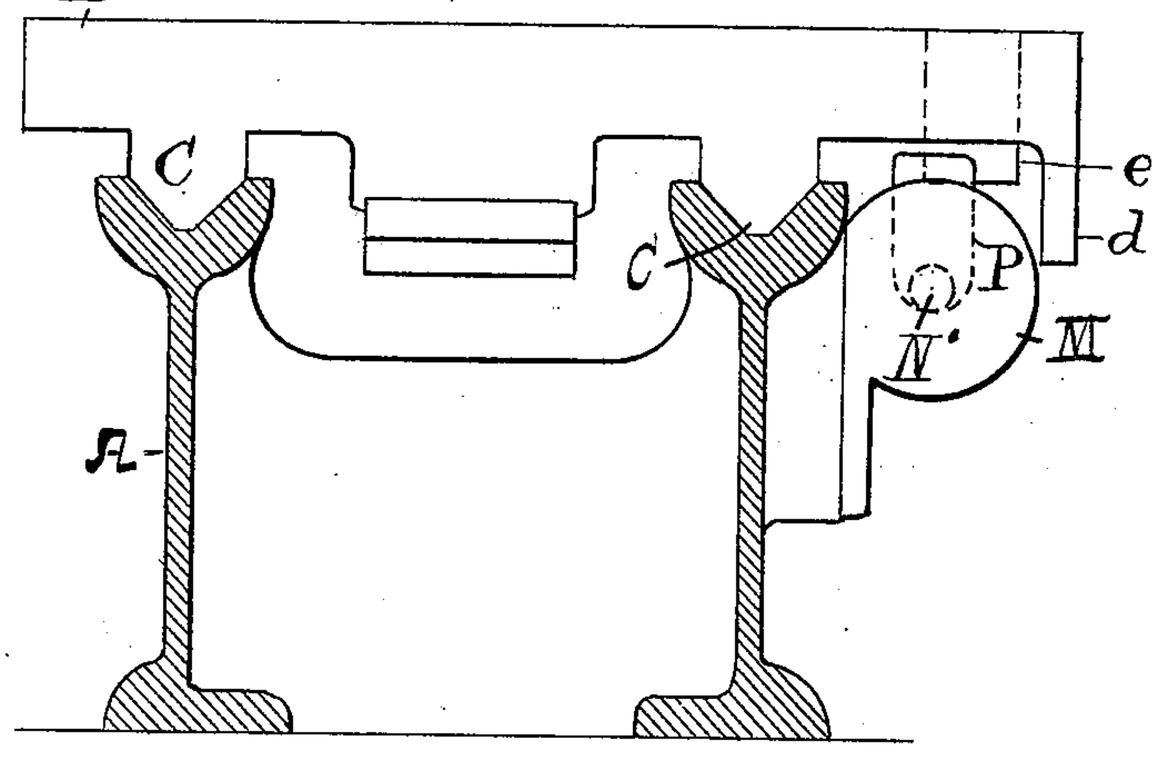
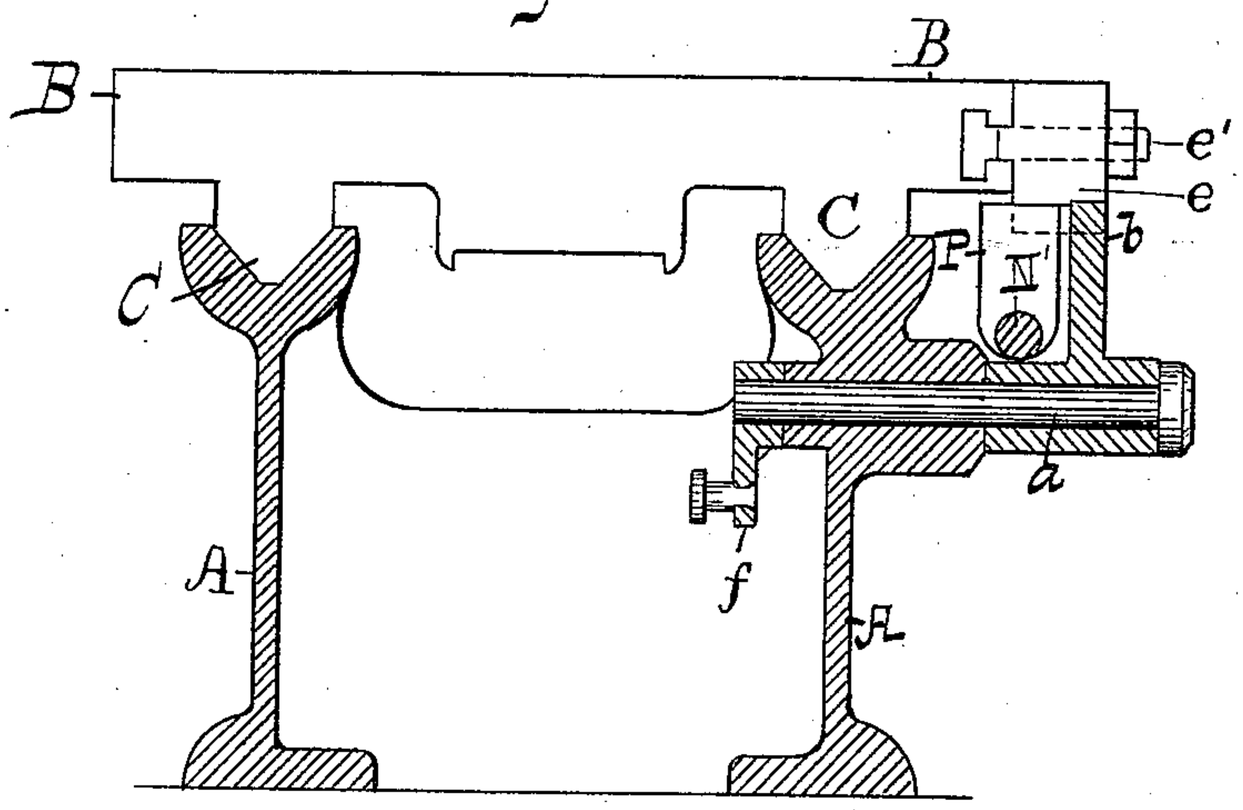


Fig. 3.



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PLANING MACHINE CUSHIONING DEVICE.

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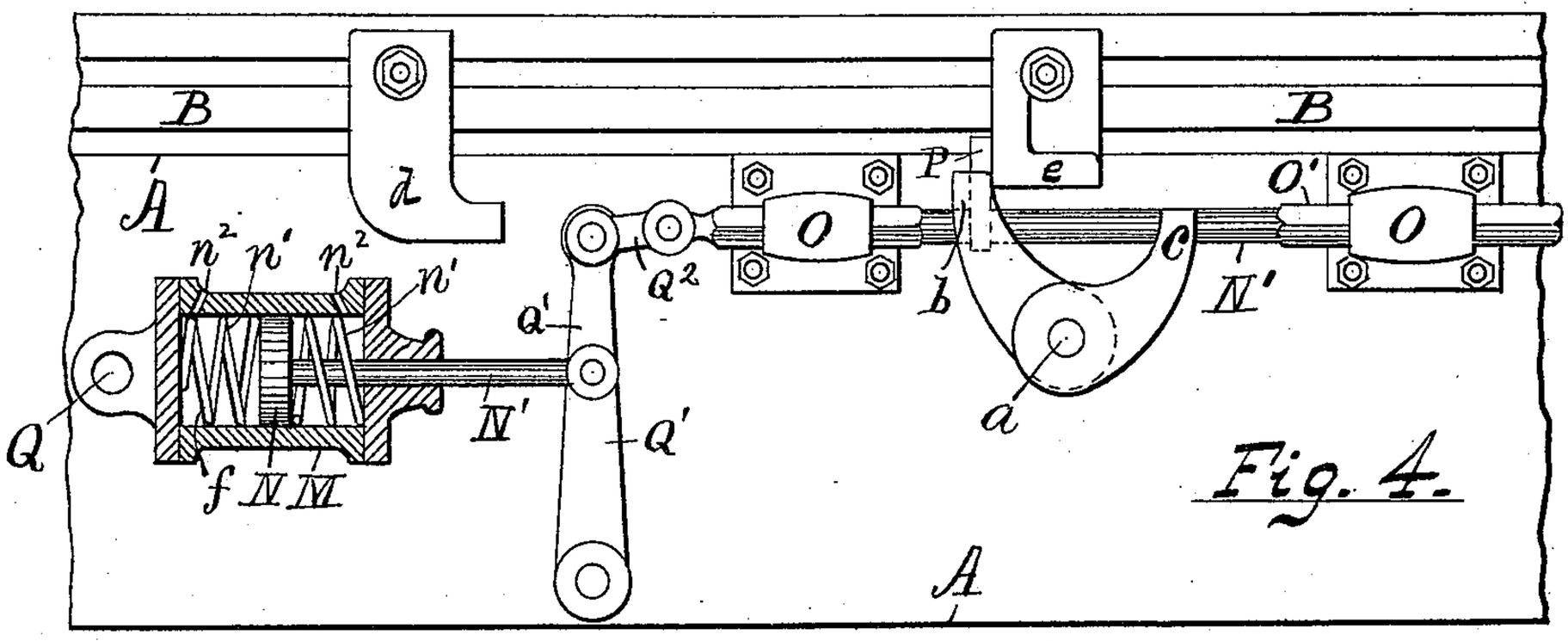

Fig. 4.

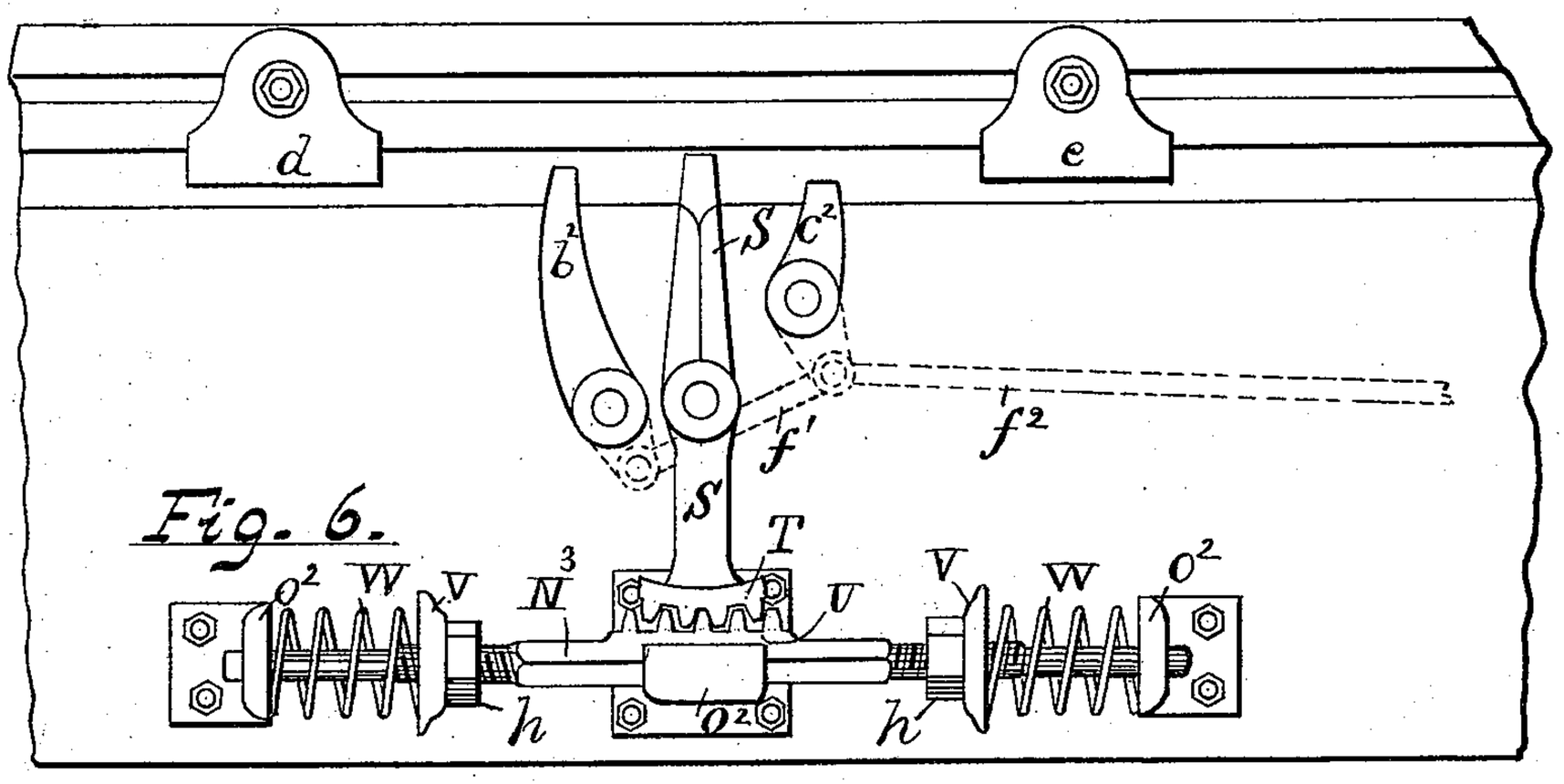

Fig. 6.

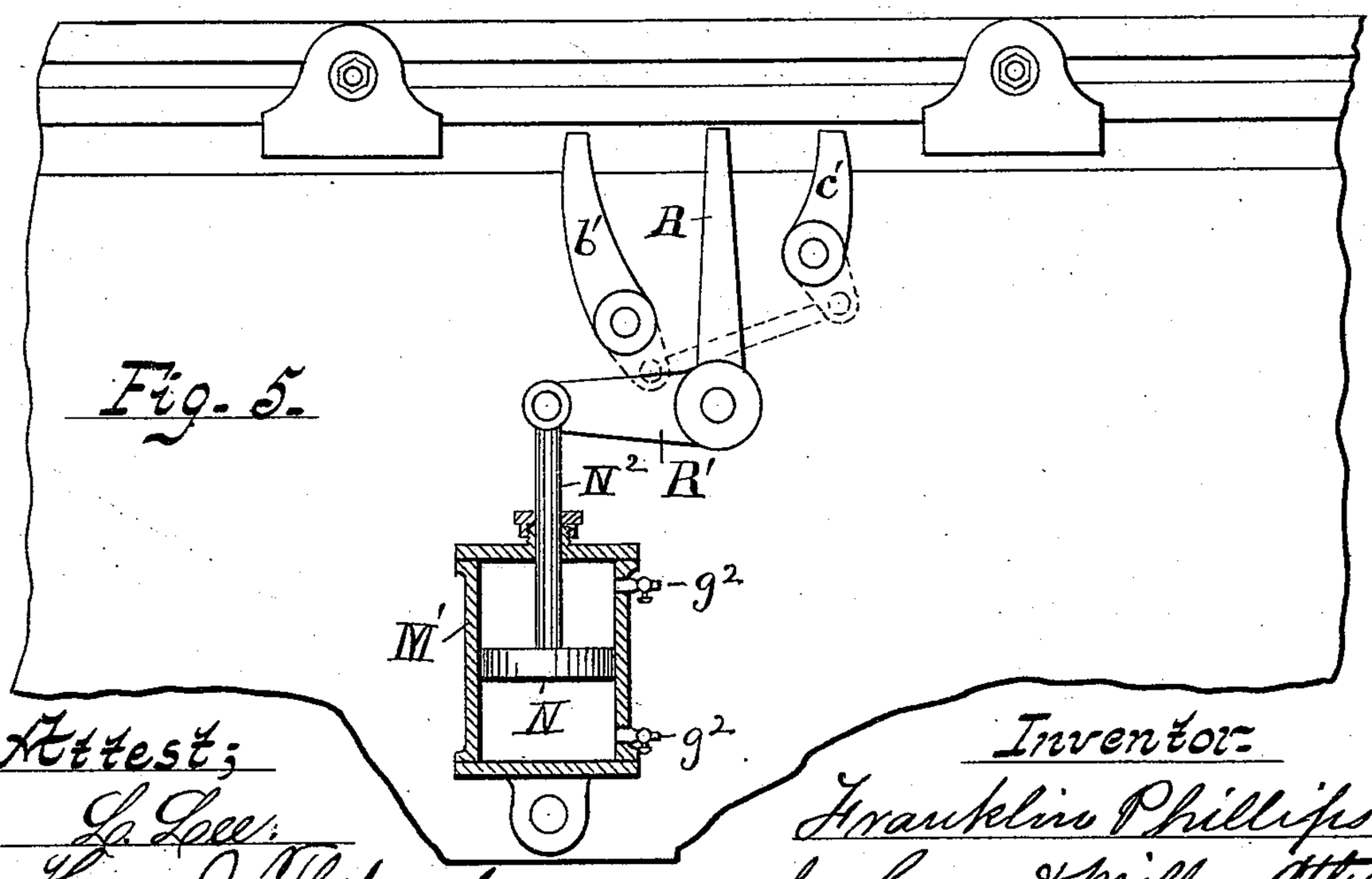

Fig. 5.

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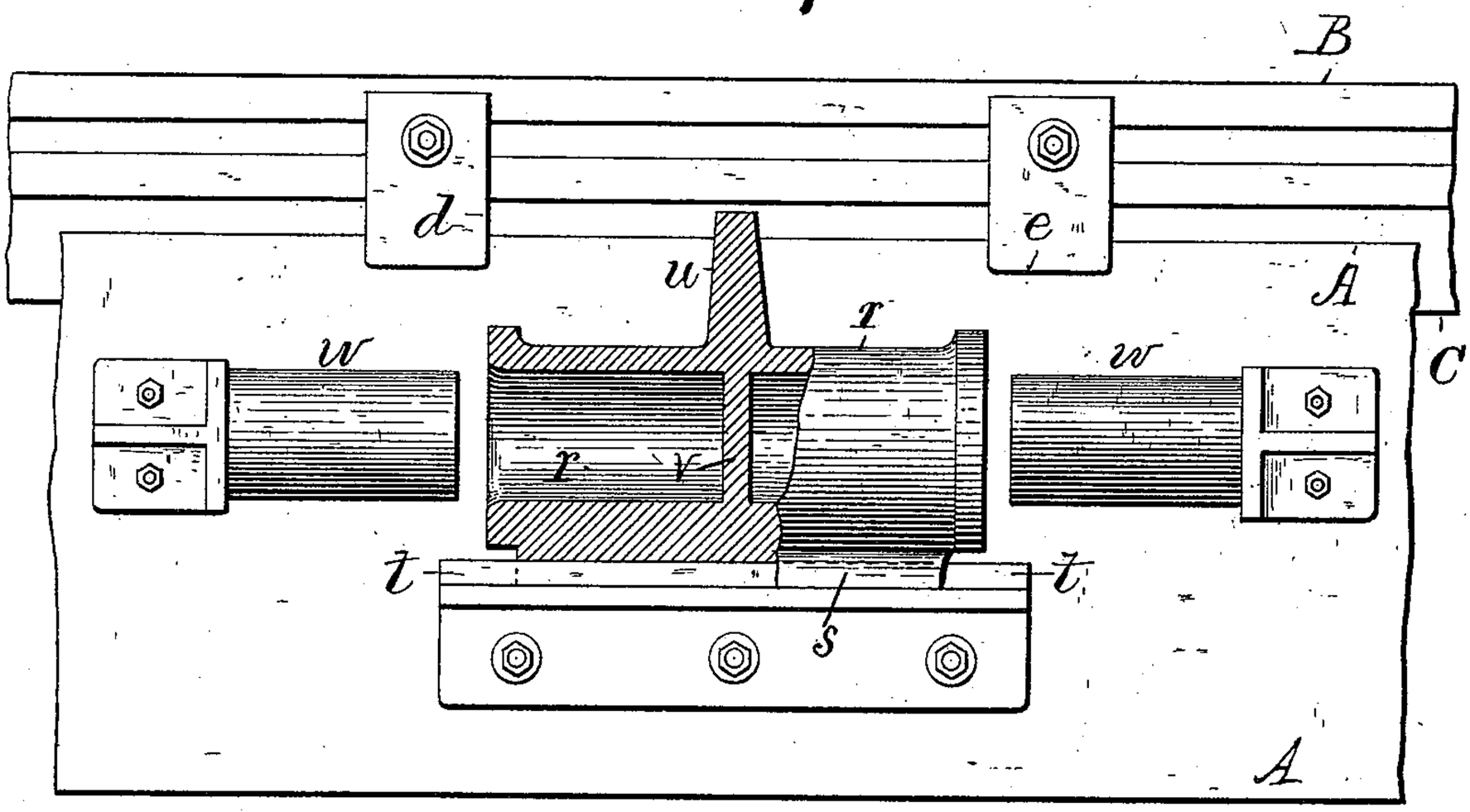
FIG. 7.



ATTEST.

J. Henry Kaiser.

Harry L. Amer.

INVENTOR.

Franklin Phillips

per Crane & Miller Attys

UNITED STATES PATENT OFFICE.

FRANKLIN PHILLIPS, OF NEWARK, NEW JERSEY, ASSIGNOR OF THREE-FOURTHS TO EDWARD L. PHILLIPS, GEORGE H. PHILLIPS, AND WILLIAM E. PHILLIPS, ALL OF SAME PLACE.

PLANING-MACHINE CUSHIONING DEVICE.

SPECIFICATION forming part of Letters Patent No. 350,554, dated October 12, 1886.

Application filed January 26, 1886. Serial No. 189,814. (No model.)

To all whom it may concern:

Be it known that I, FRANKLIN PHILLIPS, a citizen of the United States, residing in Newark, Essex county, New Jersey, have invented certain new and useful Improvements in Cushioning Devices for Iron-Planing Machines, fully described and represented in the following specification and the accompanying drawings, forming a part of the same.

This invention relates to that class of machines in which a casting of any desired form is secured upon a movable bed and traversed longitudinally beneath a cutting-tool, the rate of movement toward the tool being limited, as from twelve to twenty feet per minute, according to the hardness of the iron and the endurance of the tool which operates upon it. There is, however, no necessary limit to the speed of the table and its attached casting in the reverse direction, except the difficulty of arresting the motion of the table at the end of its stroke without injury to the reversing mechanism; and the object of the present invention is to connect a spring or air cushion adjustably to the table, so as to gradually check the motion of the latter before the reversing mechanism is fully actuated. As the reversing mechanism in such machines is usually actuated by a direct connection with the moving table, it is obvious that a diminution in the speed of the table before the reversing mechanism is operated will entirely obviate the difficulty which arises in actuating the table with a quick return motion and operating the reversing mechanism by direct connection thereto.

In the annexed drawings several constructions of equivalent character are shown for connecting the air or spring cushion adjustably with the planer-table, so that the latter may be traversed a greater or less distance beneath the tool and arrested by the cushion at the end of the required stroke.

Figure 1 is a side elevation of a planer-bed with part of the stanchions and the cross-head carrying the cutting-tool, one end of the planer-table being shown carrying a cylinder adjusted upon the same in contact with the tool. Fig. 2 is an end elevation of the same parts. Fig. 3 is a transverse section of the bed and table on line *x x* in Fig. 1. Fig. 4 is a side elevation of part of the bed and table, showing the cushion-cylinder pivoted to oscillate upon the bed and connected with the cushion-rod by a jointed arm. Fig. 5 is a similar elevation showing the cushion-cylinder actuated by a bell-crank adjusted between two separately-jointed belt-shifting toes, and Fig. 6 is a similar side elevation showing the piston-rod of the cushion-cylinder provided with rack-teeth and actuated by a toothed segment. Fig. 7 is a similar side elevation showing a cylinder mounted upon a longitudinally-movable carriage and actuated against stationary pistons by means of adjustable dogs and a lug projected from the cylinder in their path.

In Figs. 4, 5, and 7 the cushion-cylinder is represented in section to show its internal construction.

Referring to Figs. 1, 2, and 3, A is the fixed planer-bed; B, the table supported movably thereon by the V's C, in the usual manner, and D a bevel-wheel (shown upon the side of the bed in Fig. 1) for transmitting an alternating rotary motion to suitable cog-wheels meshing with the table-rack outside the bed. Such cog-wheels are not shown herein, as their operation in imparting a reciprocating motion to the bed is already well known. The bevel-wheel D is rotated by a pinion, F, and operated by suitable belts and pulleys to reverse its rotations, in the usual manner, at each stroke of the table. E is a pulley-shaft carrying a pinion, F, to drive the wheel D. C' are bearings for said shaft. H H' are belt-pulleys upon the shaft for moving the table toward the cutting-tool, and I I' are pulleys for driving the table in the opposite direction with a quick return motion. J are the stanchions supporting a cross-head, J', above the table, and K is a saddle sustaining the tool L adjustably thereon. A rock-shaft, *a*, carrying a reversing-frog provided with toes *b* and *c*, is fixed upon the side of the bed adjacent to the edge of the table, and dogs *d e* are secured adjustably to the edge of the table by bolts *d'* and *e'*, in the usual manner. The frog is provided with a crank-arm, *f*, by which it is connected with the belt-shifter guides *g g'*, the guide *g* actuating the belt upon the pulleys H H', and the

guide g' the belt upon the pulleys I I'. The dogs *e* and *d* operate alternately upon the reversing-toes *c* and *b*, the toes being so proportioned that in each case the dog rides over the end of the toe when the belt is fully shifted, as is common in belt-reversing mechanisms. M is the cushion-cylinder; N, a piston fitted therein; N', the rod for such piston, called a "cushion-rod" herein, and O a guide for such rod, which is squared at O', where it is fitted to the guide to keep the rod from turning. P is a lug formed upon the cushion-rod and projected in the path of the dogs *d* and *e*, the lug being arranged between the toes *b* and *c* and the planer-bed, so as to intercept one or both of the dogs before it comes in contact with the corresponding toe of the reversing-frog.

As shown in Fig. 1, the table is represented as moving backward, as per arrow *r*, with a quick return motion, and the dog *e* is shown in contact with the lug P and about to actuate the cushion before striking the reversing-toe *b*. The piston N is represented near the middle of the cushion-cylinder, and an air-cock, g^2, is shown applied near each end of the latter, to regulate the discharge of air therefrom when required, to moderate the resistance of the cushion, and holes *n* are formed in the cylinder near the middle of its length, to supply air to the same when the piston uncovers them to renew the resistance of the cushion. It is obvious with this construction that the cushion operates effectively through the rod O, lug P, and reversing-dog *e* to check the rapid motion of the planer-table B at or before the time that the reversing mechanism is operated, and thus not only avoids too quick an actuation of the latter and consequent injury to the reversing devices, but entirely relieves the reversing-belt or other device employed from the work of arresting the momentum of the table. It is also obvious that with an elastic cushion the force required to compress the cushion is utilized effectively in starting the planer-table in the reverse direction. It is also obvious that a cushion device connected with the planer-table through any other medium than the dog that actuates the reversing mechanism would require to be separately and accurately adjusted every time the reversing-dog was shifted; or the planer-table might be cushioned and its motion arrested before the reversing device was fully operated; or the cushion might not operate until the reversing mechanism had been already actuated at too rapid a speed by the unarrested table. The advantage is therefore very obvious of combining the agent which actuates the cushion with the same element which operates the reversing mechanism, as is effected herein in the reversing-dog *d* or *e*. It is also obvious that both the reversing-dogs may be constructed to operate in turn upon the lug P, so as to utilize the cushion at each end of the table's stroke, and that such alternate actuation of the lug in opposite directions would shift the piston N alternately toward opposite ends of the cylinder M, thus drawing in a fresh supply of air to the opposite end of the cylinder for the succeeding cushion movement; but in case such actuation of the cushion is not desired upon the forward cutting movement of the table the cushion-rod O may be returned to its initial position by a spring, *n'*, as shown in Fig. 4. Such spring may be applied to the cushion-rod or to the piston within the cylinder, and may be used exclusively to form the cushion, or, in connection with an air-piston, merely to return the piston to its operative position.

In Figs. 1 to 3, inclusive, the cushion-cylinder M is arranged nearly in a line with the upper ends of the toes *b c*, and the dog *d* is therefore offset from the edge of the table, as shown in Fig. 2, to pass by the cylinder; but in Figs. 4 to 6, inclusive, the cushion-cylinder or spring is located lower upon the side of the bed A, so as not to interfere with the ordinary arrangement of the dogs each in a line with one of the toes *b* or *c*. Thus in Fig. 4 the cushion-cylinder is shown pivoted to the bed at its rear end by a joint, Q, and the cushion-rod N^2 is connected thereto by a vibrating arm, Q', and link Q^2. Instead of an air cushion, as in Fig. 1, a spiral spring, *n'*, is inclosed within each end of the cylinder, and operates to shift the cushion-rod N' after it has been compressed by the dog *e;* and n^2 are holes for the air to escape. The dog is shown in this figure in contact with the lug P and the toe *b*, and the cushion is therefore partly compressed.

In Fig. 5 the cushion-cylinder M' is pivoted vertically to the bed A, and in place of a cushion-rod and lug, P, to intercept the moving dogs, a bell-crank is connected with the piston-rod N^2 by one arm, R', and the other arm, R, is projected in the path of the dogs between two separately-pivoted toes, b' c'. In Fig. 6 similar separate toes, b^2 c^2, are shown connected together and to the belt-guides by links f' f^2, and the cushion device is connected with the dogs *d e* by a lever, S, a segment, T, and a rack, U. The upper end of the lever projects in the path of the dogs like the lug P in Fig. 1, and its lower end is provided with the toothed segment T, to actuate a rack, U. This rack is formed on the middle of a cushion-rod, N^3, which is fitted to guides O^2, and is provided at opposite ends of the rack with collars V, to press against two spiral springs, W, which abut against the guides O^2. The springs resist the impact of the dogs operating in opposite directions, and tend to hold the lever S normally in a central position, like the spring *n'* in Fig. 4.

In Fig. 7 the adjustable dogs are arranged to move a cushion-cylinder, *r*, longitudinally with a carriage, *s*, which is held movably upon a slide, *t*, affixed to the bed. A lug, *u*, projects from the cylinder in the path of the dogs, and their impact with such lug thus shifts the entire cylinder and carriage longitudinally in a manner equivalent to the movement of the bar N' in Fig. 1. Stationary pistons *w* are affixed to the bed in a line with the bore

of said cylinder, and the latter is formed with a central partition, *v*, to confine the air therein, so that when the cylinder is moved toward either piston the air in the cylinder operates as a cushion to arrest the movement of the cylinder, and, indirectly, of the table B. It will be seen that this construction is an inversion of that containing a stationary cylinder and movable piston, as shown in Fig. 1.

Air-vents may be provided in the cylinder, but are not herein shown, as they are common in such constructions and form no part of my present invention.

I have shown in another copending application, No. 189,815, a sliding carriage actuated by a rotating toothed disk or wheel, but have not claimed therein the combination of such sliding carriage and reversing-dogs, as the bars N′ and N², shown in Figs. 1 and 6 herein, as well as the carriage *s*, shown in Fig. 7, are an entire equivalent for such carriage.

With any of the constructions shown the motion and speed of the planer-table are arrested as desired, the constructions all serving to operate at both ends of the stroke and in connection with either of the reversing-dogs. A single cushion device is thus made to operate in opposite directions at both ends of the table's stroke, and the extent of the latter can also be varied in the usual manner without deranging the adjustment of the cushion, which, when once effected by the builder, is adapted to any stroke of the planer-table. Means for varying the resistance of the spring-cushion may, however, be provided to compensate for wear, as in the screw-thread formed upon the rod N³ within the collars V in Fig. 6. The collars are thus adapted to press more or less upon the springs W, and are held in their desired adjustment by jam-nuts *h*.

From the above description it will be seen that my invention does not consist in applying a spring-buffer at each end of a reversing-table, as that has been done before when a uniform stroke of the table was desired.

My invention differs from such construction in having a cushion device actuated by an adjustable shifting device, as dog *d* or *e*, and in thereby securing an automatic actuation of the cushion at the end of the stroke, whatever its extent may be.

Having shown several means for practicing my invention, I do not limit myself to the precise construction shown herein, but claim my improvement as follows:

1. The combination, with a reciprocating planer-table and two dogs secured adjustably thereto and operated to actuate the reversing mechanism, of a cushion device actuated by one of said dogs, and thereby operated before the end of the stroke, be the same longer or shorter, substantially as shown and described.

2. The combination, with a moving table and stationary bed, of a sliding carriage movable upon the bed, adjustable dogs upon the table to shift the carriage, and a cushion mechanism applied to the carriage and operated by the longitudinal movement of the latter, substantially as described.

3. The combination, with a planer-table, of dogs *d* and *e*, attached to the table, toes actuated by the dogs to reverse the table-driving mechanism at opposite ends of the stroke, and a cushion device actuated by one or both of the dogs in advance of the reversing mechanism, as and for the purpose set forth.

4. The combination, with a planer-table, of dogs *d* and *e*, attached to the table, toes actuated by the dogs to reverse the table-driving mechanism at opposite ends of the stroke, and a cushion device having a lug or arm projected in the path of the dog at one side of the reversing-toe, substantially as shown and described.

5. The combination, with a planer-table, of dogs *d* and *e*, attached to the table, toes actuated by the dogs to reverse the table-driving mechanism at opposite ends of the stroke, and a cushion device actuated by one or both of the dogs in advance of the reversing mechanism, and means for adjusting the resistance of the cushion when actuated by the dog, substantially as shown and described.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

FRANKLIN PHILLIPS.

Witnesses:
JAMES A. THOMSON,
THOS. S. CRANE.