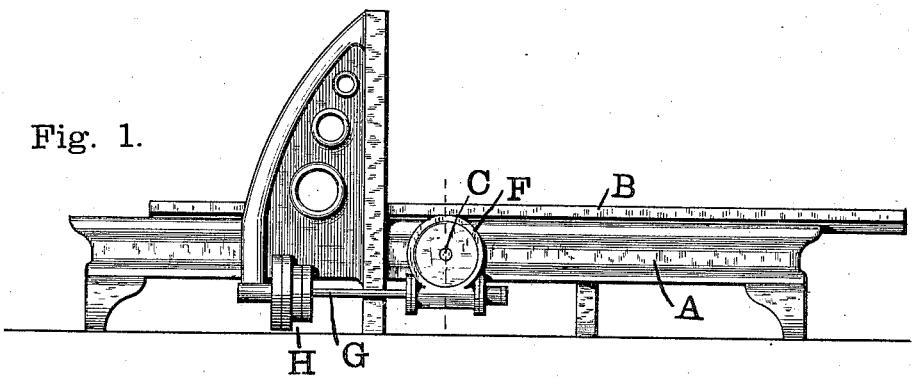
(No Model.)

J. K. CULLEN.

METAL PLANING MACHINE.

No. 344,082. Patented June 22, 1886.

Fig. 1.



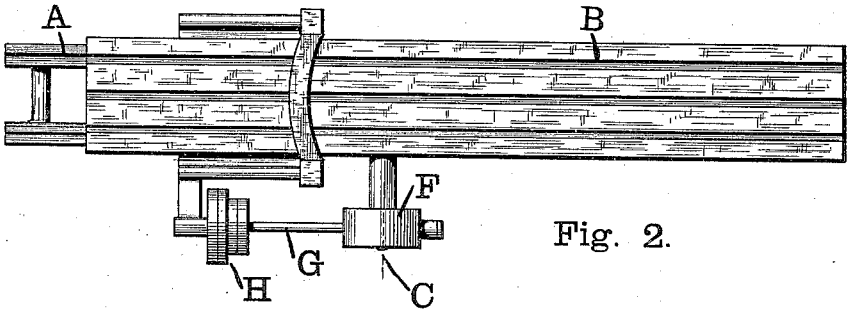


Fig. 2.

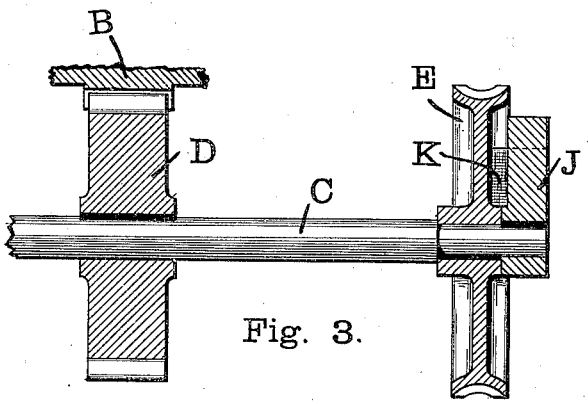


Fig. 3.

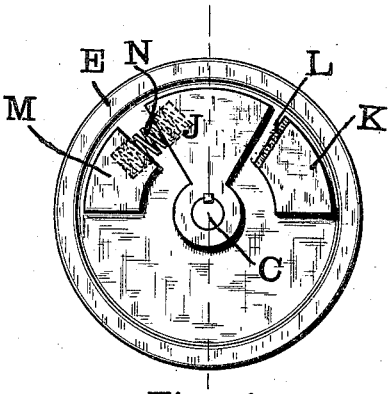


Fig. 4.

Witnesses:
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UNITED STATES PATENT OFFICE.

JAMES K. CULLEN, OF HAMILTON, OHIO, ASSIGNOR TO THE NILES TOOL WORKS, OF SAME PLACE.

METAL-PLANING MACHINE.

SPECIFICATION forming part of Letters Patent No. 344,082, dated June 22, 1886.

Application filed March 29, 1886. Serial No. 197,085. (No model.)

To all whom it may concern:

Be it known that JAMES K. CULLEN, of Hamilton, Butler county, Ohio, have invented certain new and useful Improvements in Metal-Planing Machines, of which the following is a specification.

This invention pertains to metal-planing machines, and will be readily understood from the following description, taken in connection with the accompanying drawings, in which—

Figure 1 is a side elevation of the important parts of a metal-planing machine embodying my invention; Fig. 2, a plan of the same; Fig. 3, a vertical transverse section of the planing-machine through the axis of one of the driving-shafts and Fig. 4 a face view of one of the driving-gears.

In the drawings, A indicates the usual bed of the machine; B, the reciprocating table; C, the usual cross-shaft, through which the table motion is imparted; D, a driving-gear upon this cross-shaft engaging, in the usual manner, a rack beneath the table; E, a worm-gear fitted upon but not fast to this shaft; F, a casing inclosing this worm-gear; G, the worm shaft, through which the worm-gear is actuated; H, the usual belt-pulleys upon the worm-shaft; J, a driver rigidly secured to the cross-shaft, near the worm-gear; K, a jaw formed upon or secured to the worm-gear and adapted to engage the driver, and thereby revolve the cross-shaft as the worm-gear revolves in the direction corresponding to the cutting-stroke of the table; L, a cushion of leather or other semi-elastic material interposed between this jaw and the driver, and forming a buffer between them; M, a second jaw upon the worm-gear, adapted, if unrestrained, to engage the opposite side of the driver, and to rotate the cross-shaft when the worm-gear moves in a direction corresponding to the backing motion of the table, and N a spring interposed between this second jaw and the driver, such spring being illustrated as a helical spring seated in sockets in the contiguous faces of jaw and driver, the spring forming a buffer similar in action to the cushion L, but possessing a greater degree of elasticity or capacity for compression and extension.

The belts transmit the motion to the table in the usual manner. When the worm-gear is driven in a direction corresponding with the cutting-stroke of the table, the driver, and consequently the cross-shaft, is carried around by the jaw K, the driver being entirely free of contact with the jaw M. At the end of the stroke the belt motion is suddenly reversed in the usual manner, and the worm-gear immediately begins to revolve in the opposite direction, a direction corresponding to the return-stroke of the table, but at a much higher speed than before. In case the jaw M were in direct contact with the driver it is evident that the table would at once begin its return motion, or that the strains incident to the arresting of its momentum would be at once imposed upon the belt. To arrest the motion of the table in one direction, and to at once inaugurate a rapid motion in the other direction is incompatible with smooth reversing, and with durability of belts. In the present device, when the worm-wheel begins the backing motion it does not impose a sudden check upon the forward motion of the table. On the contrary, the worm-gear, revolving in its backing direction, applies its arresting power to the driver gradually through the medium of the spring N, and the elasticity of the spring, continuing to be called upon, finally effects the arrest of the forward motion and a gentle inauguration of the backing motion of the table, after which the backing motion takes place at full speed, the spring being at first under severe compression, the compression lessening when the table-motion reaches the full backing speed. At the end of the backing stroke the worm-gear reverses its direction of motion, and the jaw K engages the driver and impels the table upon its cutting-stroke, the worm-gear and driver moving at differential speeds while the jaw K is approaching the driver. The cushion L serves to deaden the noise of impactive contact between its jaw and the driver, and also performs an office similar to the spring N, except that its action is restricted by reason of its semi-elasticity. The cushion L, I prefer to form of leather secured either to the face of its jaw or to the face of the driver; but I have in practice employed a comparatively rigid spiral

spring for the purpose, the spring being similar in construction to but of greater stiffness than the spring N.

I illustrate the driver as being secured to the cross-shaft in a position to be engaged by the gear which drives that shaft; but it is obvious that the gear which drives the shaft—that is, the worm-gear in this case—may be fast upon the shaft, the driving-gear D being loose upon the shaft and fitted to be actuated by the driver, and it is obvious that the features may be interposed at most any appropriate point in the driving system of a planing-machine where there are several cross-shafts geared together as is the common practice.

I claim as my invention—

1. In a metal-planing machine, the combination, with the mechanism by which the belt or belts transmit the reciprocating motion to the planer-table, of a gear in such mechanism loose upon its shaft and provided with jaws, a driver rigidly secured to such shaft and fitted to be engaged alternately by said jaws, and a buffer interposed between said driver and one of said jaws, substantially as and for the purpose set forth.

2. In a metal-planing machine, the combination, with the mechanism by which the belt or belts transmit the reciprocating motion to the planer-table, of a gear in such mechanism loose upon its shaft and provided with jaws, a driver secured to such shaft and adapted to be engaged alternately by said jaws, and buffers interposed between both of said jaws and their respective drivers, substantially as and for the purpose set forth.

3. In a metal-planing machine, the combination, with the mechanism by which the belt or belts impart reciprocating motion to the planer-table, of a gear in said mechanism loose upon its shaft and provided with jaws, a driver secured to said shaft and adapted to be engaged alternately by said jaws, and buffers of dissimilar elasticity interposed between said jaws and said driver, substantially as and for the purpose set forth.

4. In a metal-planing machine, the combination, with the mechanism by which the belt or belts impart the reciprocating motion to the planer-table, of a gear loose upon its shaft and provided with jaws, a driver rigidly secured to said shaft and adapted to be engaged alternately by said jaws, a spring disposed in sockets in the contiguous faces of one of said jaws and the driver, and a cushion of semi-elastic material, as leather, disposed between the contiguous faces of the other jaw and said driver, substantially as and for the purpose set forth.

JAMES K. CULLEN.

Witnesses:
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W. A. SEWARD.