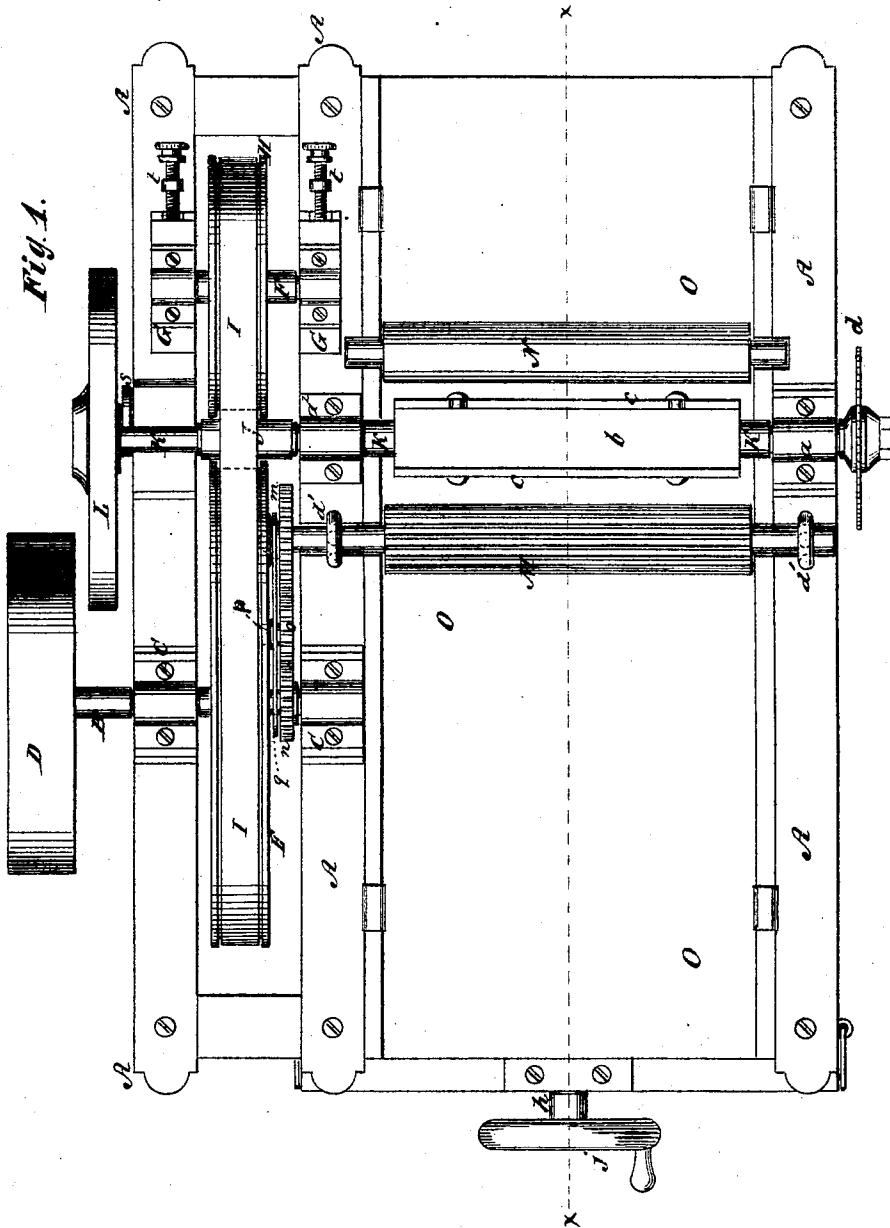


J. RANKIN.
Planing-Machines.

No. 145,012.

Patented Nov. 25, 1873.



Witnesses:

E. Wolff
J. Helbel

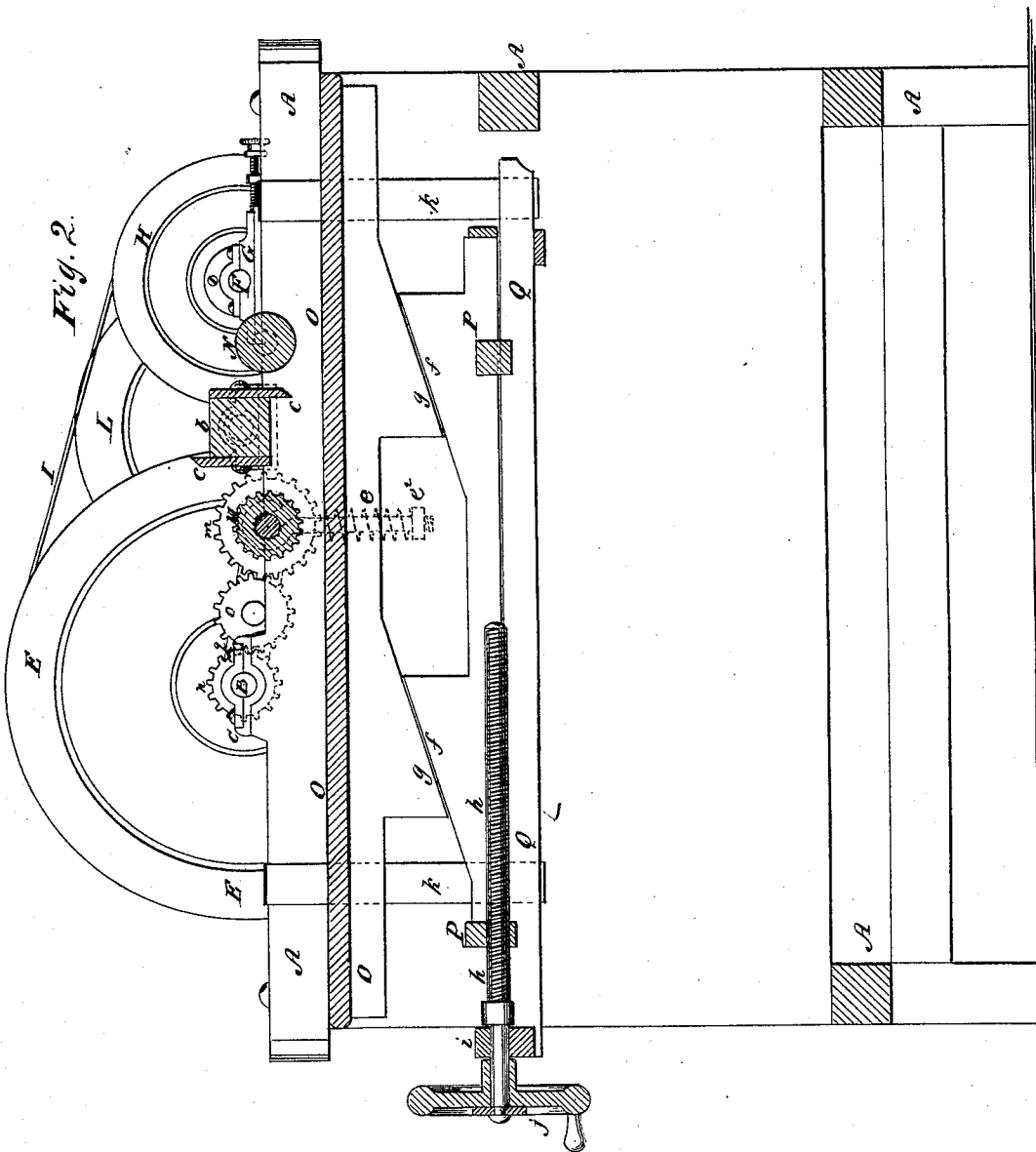
Inventor:

John Rankin
By his attorney
J. M. Intire

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Fig. 3.

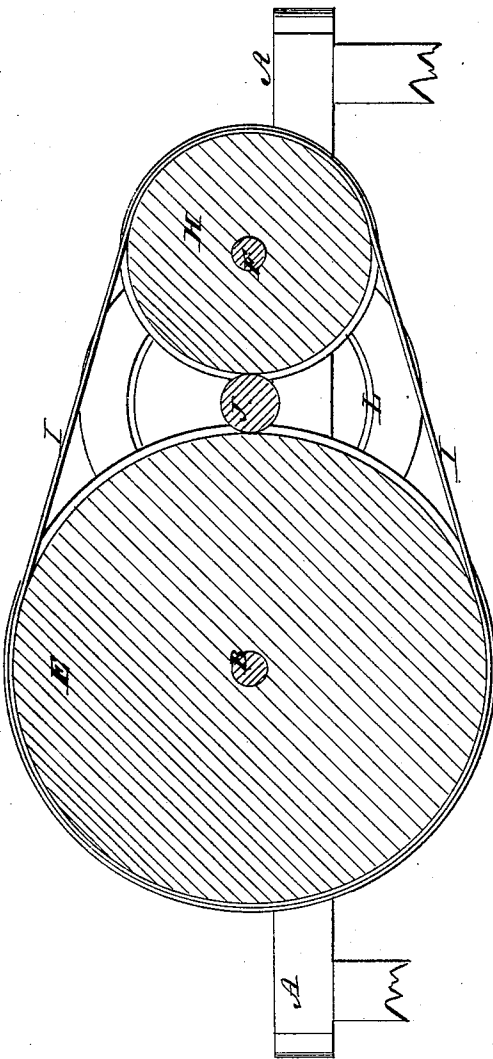


Fig. 5.

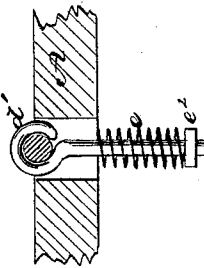
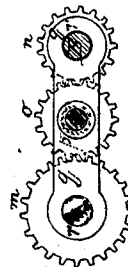


Fig. 4.



Witnesses:
E. Wolff }
J. Helbel }

Inventor:
John Rankin.
By his attorney
J. Wm. Intire

UNITED STATES PATENT OFFICE.

JOHN RANKIN, OF BINGHAMTON, NEW YORK.

IMPROVEMENT IN PLANING-MACHINES.

Specification forming part of Letters Patent No. **145,012**, dated November 25, 1873; application filed December 3, 1872.

To all whom it may concern:

Be it known that I, JOHN RANKIN, of Binghamton, in the State of New York, have invented an Improvement in Planing-Machines; and I do hereby declare that the following is a full and exact description thereof, reference being had to the accompanying drawings making part of this application.

Previous to my invention a great variety of planing-machines have been devised and used, most of which are best adapted to the purpose of large mills and establishments where water or steam power is used.

My invention relates most particularly to that kind of machine which is intended for use where horse-power is employed, and where economy of power, compactness, simplicity, and adaptation of the machine to various kinds of work are the important requisites; and has for its main objects to provide a planing-machine which, while it is exceedingly simple, compact, and durable, shall embody all the elements of efficiency, and be adapted to the uses of the farmer and small operator; and to these ends my invention consists in the hereinafter-described improvements of construction and combination of devices, whereby I am enabled to accomplish the requisites alluded to.

To enable those skilled in the art to make and use my invention, I will proceed to describe the construction and operation of my improved machine, referring by letters to the accompanying drawings, in which—

Figure 1 is a top or plan view of my improved machine. Fig. 2 is a vertical longitudinal section at the line *x x*, Fig. 1; and Figs. 3, 4, and 5, detail views.

In the several figures the same part will be found designated by the same letter of reference.

A represents the frame-work of the machine or main frame, (which I have constructed with a view to its use; also, for other purposes, as made the subject of other Letters Patent,) in which are mounted and properly supported all the working parts. B is the main driving-shaft, which is mounted to rotate freely in suitable journal-boxes CC, bolted to the main frame, as shown, and provided with a pulley, D, to which the main motor is belted, and another larger pulley, E, which acts as a driver, as will

be presently explained. F is a counter-shaft, mounted, as shown, in suitable boxes G G, and carrying a pulley and friction-wheel, H, which is banded to the pulley E by a flat belt, I. Between the two wheels E and H is located the friction-wheel J of the cutter-shaft K. (See Figs. 1 and 3.) This shaft is mounted in boxes at *a a'*, and is provided, at one end, with a fly-wheel or balance-wheel, L, and has secured to its cutter-stock *b* the usual adjustable cutters or knives *c*, by the rapid rotation of which in contact with the surface of the board the latter is planed or smoothed off. At one end of the shaft K is mounted a circular saw, *d*, which may be conveniently used for sawing the stuff which is planed; but this arrangement is made the subject of another patent to me, and need not be further described here. M is the usual feed-roll, and N the weighted roll, beneath which the lumber or board passes as it leaves the cutter-shaft. The journals of roll N simply rest in suitable bearings in the main frame A, as illustrated; but those of feed-roll M are held down by rods *d' d'*, (see Fig. 5,) which are formed at their upper ends with eyes, and are provided, below the main frame, with springs *e*, by means of which the proper tension is created to hold the feed-roll M down on the board with the requisite pressure to insure its flattening onto the surface of the carriage or bed O, and proper presentation to the cutters *c c*. The bed O, on which the stuff rests and travels, is mounted, as seen, in the main frame A, and rests on an adjusting-carriage, P, which in turn is supported on the ways Q. This carriage and the bed O are each provided, where they come together, with inclines *f* and *g*, in such a manner that any motion longitudinally of the carriage Q will effect the elevation or depression of the bed-plate O; and said carriage is provided with a screw-shaft at *h*, which is journaled in the cross-bar *i*, and is provided at *j* with a suitable hand-wheel. By means of this arrangement the attendant can, by simply turning the wheel *j*, set the bed O at variable elevations, and different distances below the cutter-shaft, to suit the different thicknesses of boards to be planed.

I have shown the ways or carriage-supporting frame Q suspended by vertical bars or straps *k*, and the whole fixture removable, in

order to utilize the frame-work and driving machinery for other purposes, as made the subject of another application for Letters Patent; but these parts can, of course, be all permanently arranged, if desired.

On one end of the shaft of feed-roll M is securely fastened a spur-gear, *m*, while on the shaft B is fastened a pinion, *n*, and between *n* and *m*, and engaging with both, is arranged an intermediate gear, *o*, which is mounted on a stud, *p*, (see Fig. 4,) attached to the arm or plate *q*. This arm or plate *q*, which carries on its stud the gear *o*, is hung or pivoted at one end on the shaft B, and has its other end held to the end of the shaft of feed-roll M by a screw, *r*, in such a manner that, by the taking out of said screw *r*, the plate *q* may be released and the gears *m* and *o* changed to vary the feed, if required. As that end of the shaft K which carries the fly-wheel L overhangs the bearing-box *a*² some distance, it may be supported by one or two anti-friction wheels, S, hung on the frame A. It has been remarked that one of the boxes, marked *a*², of the cutter-shaft K is made to slide freely, and is retained horizontally only by the shaft itself. The boxes G G, which also slide freely, are held in one direction and fed up against wheel J by the belt I. The object and operation of the arrangement will be presently explained.

The operation of my improved planing-machine is as follows: The bed-plate O having been adjusted to the proper height or distance below the cutters to suit the thicknesses of the stuff, and motive power applied to the pulley D to impart the requisite power and motion to the main driving-shaft B, the board is placed on the bed O and its forward end shoved under the fluted feed-roll M, in the usual manner. As the shaft B rotates, its pulley E, through the medium of belt I, drives the pulley H, and these two wheels E and H drive, by frictional contact, the intermediate friction-wheel or pulley J of the cutter-shaft K at the required high velocity. The circumference of wheel E being so much greater than that of pulley J, it follows that during one revolution of the former the latter will have to rotate many times. The wheel H being belted to E, its periphery, of course, travels at the same velocity, and between the faces of E and H, driven by the friction of both, the wheel J is rapidly rotated. As the wheel J depends for the motion and power to be imparted to it upon the frictional driving-faces of E and H, it is important that it should be held in constant and uniform contact, and be free to slightly change the position of its center or axis to compensate for any inequalities or slight eccentricities of the peripheries of any of the wheels, and it is to permit this that the box *a*² is left free to move in a horizontal plane, and the boxes G are made to slide, as described, and held toward the wheel J by the belt I. It will be understood that by this arrangement the elasticity of the belt will be sufficient to permit a slight move-

ment apart of the wheels to ride over any eccentricities, while at the same time the tension of the belt will always keep the friction-surfaces up to a perfect bearing against each other.

While the cutter-shaft is driven in the manner described, the roll by which the feeding in of the board is effected is operated in the following manner: As the shaft B rotates, its pinion *n* drives the intermediate gear *o*, and this in turn drives gear *m*, by which latter the shaft of the feed-roll is rotated at the proper velocity; and as the board is fed along beneath said roll M, the latter is free to rise and fall with the unequal thicknesses of different parts of the stuff, the degree of pressure of the feed-roll on the board (to flatten it on the bed and take out the "wind") being regulated by the springs *e* on holding-rods *d'*, and the nuts *e*², for shortening the distance between the points confining the said spring.

It will be understood that, by the arrangement of driving mechanism shown and described, the motive power may be transmitted to the cutter-shaft with great economy; and it will be seen that, by driving the motion for the feed-roll directly from the slowly-moving main shaft B, I am enabled, by the simple means of the three gears *m*, *n*, and *o*, to get the required motions. The intermediate is employed to get the right direction of motion to the gear *m* of the feed-roll, and by a simple shift of gears, or change of gears, I am enabled to vary the feed, as may be desired, for different kinds of work.

It will be seen that the whole arrangement of the mechanism is such as to render the machine compact in form, strong, and durable, while at the same time it is so free of complication that any one of ordinary judgment can adjust and run it without liability of derangement or breakage of any of the parts.

By means of the friction driving mechanism, with the driven shaft (the cutter-shaft) held in balance between the wheels E and H, which are bound together by the driving-belt I, a very great saving of power over the usually employed driving mechanism is gained.

Having so fully explained the construction and operation of my improved planing-machine that any one of ordinary skill can make and use it, what I claim therein as new, and desire to secure by Letters Patent, is—

In combination with the supporting-frame and work-bed, and the cutter-shaft with its driving mechanism, the yielding feed-roll and its driving-gears, the whole arranged to operate substantially as and for the purposes described.

In testimony whereof I have hereunto set my hand and seal this 28th day of October, 1872.

JOHN RANKIN. [L. S.]

In presence of—

H. G. RODGERS,
C. W. GENNET.