No. 649,085. Patented May 8, 1900.

J. R. THOMAS.

PLANING MACHINE.

(Application filed Apr. 24, 1899.)

(No Model.) 3 Sheets—Sheet 1.

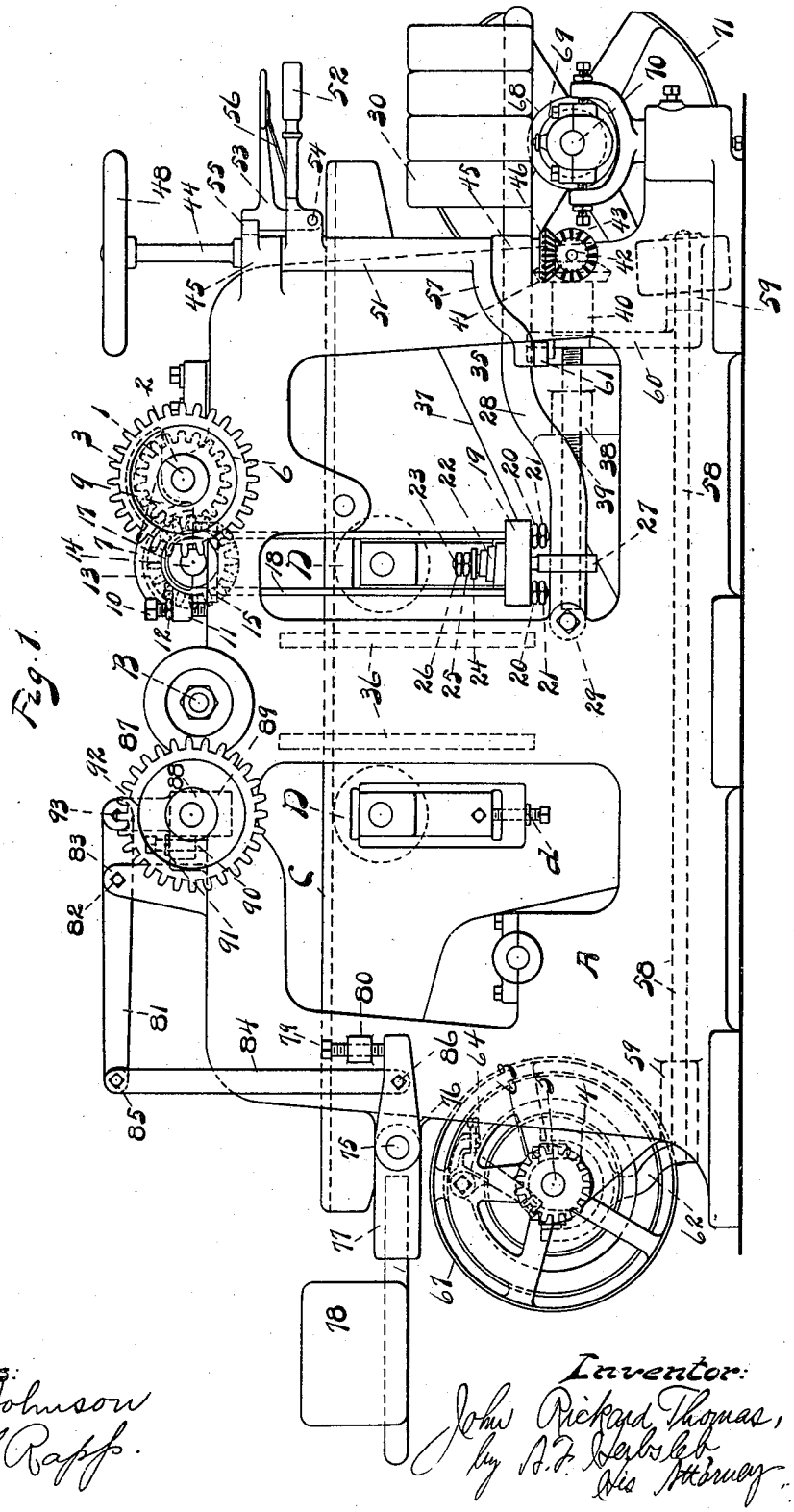


Fig. 1.

Witnesses:
Parke S. Johnson
Emil Rapp.

Inventor:
John Rickard Thomas,
by A. F. Herbst
His Attorney.

No. 649,085. Patented May 8, 1900.

J. R. THOMAS.

PLANING MACHINE.

(Application filed Apr. 24, 1899.)

(No Model.) 3 Sheets—Sheet 2.

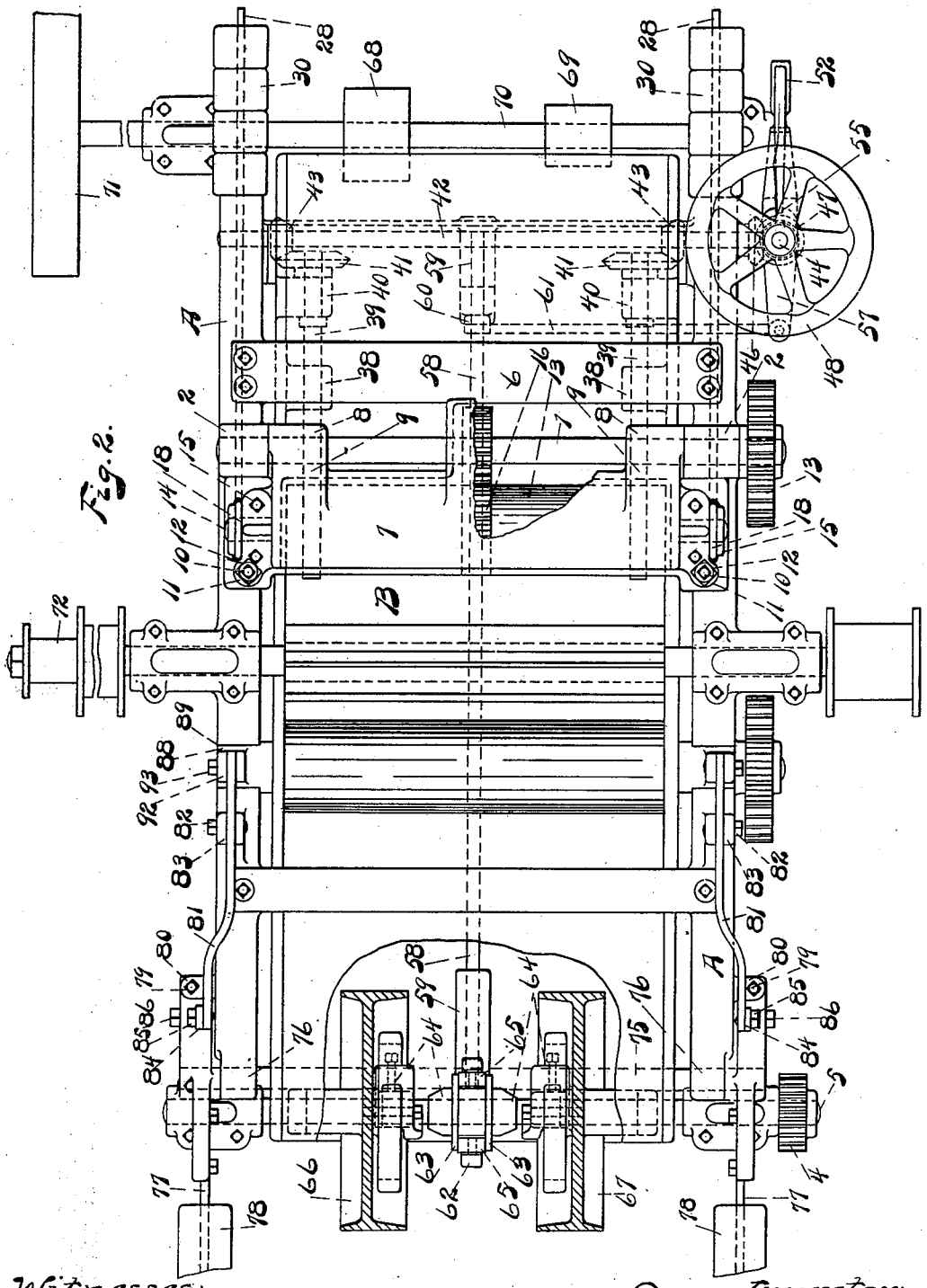


Fig. 2.

Witnesses:
Parke S. Johnson
Emil Rapp

Inventor:
John Rickards Thomas,
by S. T. Wakefield,
His Attorney

No. 649,085. Patented May 8, 1900.

J. R. THOMAS.

PLANING MACHINE.

(No Model.) (Application filed Apr. 24, 1899.) 3 Sheets—Sheet 3.

Fig. 4.

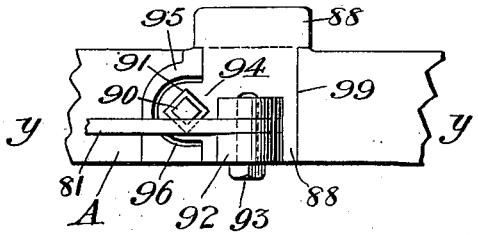


Fig. 3.

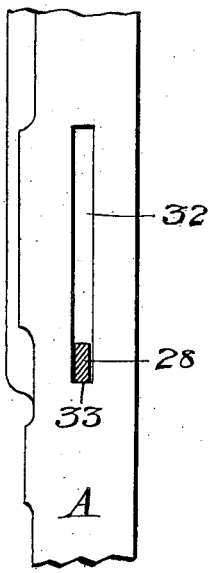
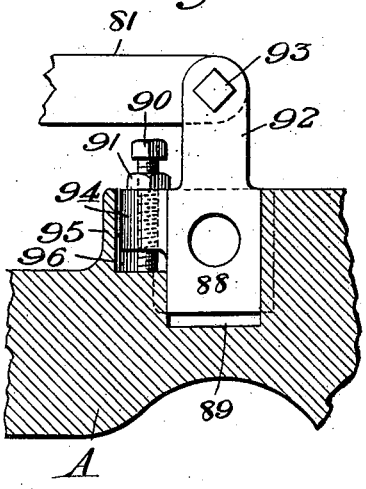


Fig. 5.



Witnesses:
John C. Rogers
Florence Brandes

Inventor:
John Rickard Thomas
by D. F. Herbert
His Attorney

UNITED STATES PATENT OFFICE.

JOHN RICKARD THOMAS, OF CINCINNATI, OHIO, ASSIGNOR TO THE J. A. FAY & EGAN COMPANY, OF SAME PLACE.

PLANING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 649,085, dated May 8, 1900.

Application filed April 24, 1899. Serial No. 714,274. (No model.)

To all whom it may concern:

Be it known that I, JOHN RICKARD THOMAS, a citizen of the United States, residing at Cincinnati, in the county of Hamilton and State of Ohio, have invented a certain new and useful Improvement in Planing-Machines, of which the following is a specification.

My invention relates to that class of planing-machines in which the upper cylinder-bearings are stationarily mounted in the frame, with the upper feed-rolls in substantially the horizontal plane of the cylinder, with the upper feed-rolls adjustable with relation to the frame and the cylinder independent of the table and having a plane-table extending from end to end longitudinally of the frame, with the lower feed-rolls mounted in the table, with the table raising and lowering for different thicknesses of stock, with the lower line of feed-rolls in parallel vertical lines on long inclines which are placed under the table and operated by a long wedge giving the table rigidity, and which are especially adapted for furniture, piano, and cabinet work, and similar work in which fine smoothing planing is desirable, and has for its object the providing of a machine which will give to the stock an especially smooth surface and allow a skimming cut to be taken from the stock, the feeding agencies being so constructed as to allow them to accommodate themselves automatically to the various conditions prevailing in work of this class.

My invention consists in providing a machine of the character described with a feeding agency which may be held to its work by means of a spring-cushion in conjunction with a weighting device in such manner that the spring-cushion only may exert its pressure on the stock while a light or skimming cut is being taken, during which the weight remains seated, the spring-cushion automatically increasing its resisting force as the amount of cut taken by the cutter-cylinder is increased until the tension of the spring-cushion raises the weight on account of the increase in cut, when the weight also exerts its pressure on the stock through the spring-cushion actively interposed between it and the feeding-roll bearing.

My invention consists, further, in providing a feed-out roll for the machine having a parallel lift, so that the upper surface of the plane stock passing through the machine beyond the cutter-cylinder may receive the full impact of the feeding-out roll across its entire width, in the peculiar system of levers and pressure devices I employ for the feeding-out roll, and in the parts and the arrangement and combinations of parts hereinafter more fully described and claimed.

I do not in this application claim, broadly, the means for hanging and driving the infeeding roll, reference being hereby made to a separate application for patent on feeding devices for planing-machines executed by me of even date herewith covering these subject-matters of invention.

I do not in this application claim the adjusting-shaft mechanism for the bed of the machine and the speed-controlling mechanism herein shown and described, but embody that subject-matter in a divisional application more fully showing, describing, and claiming the same, and reference is hereby made to said divisional application, being Serial No. 727,924, filed August 21, 1899.

In the drawings, Figure 1 represents a side elevation of my improved device. Fig. 2 represents a plan view of the same with the roll-housing partly broken away to show the roll and manner of gearing the same, also showing a part of the rear end of the bed broken away and the feed-pulleys at that end in horizontal section, to more clearly illustrate the feeding devices. Fig. 3 is an end elevation of a part of the frame, showing the lever in cross-section and the stop therefor. Fig. 4 is a plan view of a detail, showing the bearing for the feeding-out roll and contiguous parts; and Fig. 5 is a side elevation of the same, with the frame shown in longitudinal section on the line *y y* of Fig. 4.

A represents the frame of the machine, in which one or more cylinders B may be suitably journaled.

C is the bed of the machine, in which rolls D may be mounted adjustable, as by means of set-screws *d*. The bed C is a plane bed or table extending from end to end longitudinally of the machine. An actuating-shaft 1 is journaled in bearings 2 in the frame of the

machine, receiving motion through a gear 3, communicating by a system of gearing with a gear 4 on a shaft 5, which receives motion in the manner to be hereinafter explained. The actuating-shaft carries a gear 6 intermediate of its ends, preferably at its middle. It also has journaled thereto a roll-housing 7, which swings thereon in bearings 8. These bearings are preferably located in extensions 9 of the housing. The housing also has set-screws 10, taking through lugs 11 on the housing against the frame of the machine, held in place by jam-nuts 12 for the purpose of giving adjustment to the housing, and a roll 13 is mounted therein. The roll 13 is mounted on a shaft 14, journaled in bearings 15. Intermediate of its ends and preferably at its middle it has a gear 16, meshing with the gear 6 in line therewith on the actuating-shaft. The bearings 15 have a groove 17 to receive a strap 18, depending therefrom and connecting with a saddle 19, which may be adjustable thereon by means of set-nuts 20 and jam-nuts 21. The stirrup carries a spring 22, preferably of leaf-volute form. A rod 23 preferably passes through the saddle and the spring and may carry a washer 24, a set-nut 25, and a jam-nut 26 for its adjustment. The lower end of the rod is preferably stirrup-formed, as at 27, and connects with a pressure-lever 28, preferably near its fulcrum, the lever being pivoted on a pivot 29 and carrying suitable weights 30. The lever may pass through a slot 32 in the frame of the machine and normally rest on the bottom thereof, the bottom of the slot thereby forming a stop 33 for the lever. In my improved construction after the rolls have been properly adjusted and the table properly set the stock is fed into the machine, and in operation the spring interposed between the roll and the pressure-lever acts as a cushion upon the stock, but slight pressure being exerted upon the stock when a skimming cut is being taken and automatically increases the resistance as the cut is increased until the resistance raises the pressure-lever, the spring continuing to act as a cushion between the weight and the stock and producing a device in which the force of the feed is increased as the resistance by the cutter-head is increased and giving to the board a resilient pressure in its feeding agency that accommodates itself to a nicety to the varying conditions of the cut being taken and producing a highly-finished product.

The bed C is supported on a wedge 35 and is given a vertical adjustment in vertical ways 36 in the frame of the machine by forcing the wedge in and out under the bed on ways 37. The wedge 35 is provided with lugs 38, screw-threaded to receive adjusting-screws 39, which may be journaled in lugs 40 on the frame of the machine and carry gears 41. A transverse shaft 42 is journaled in the frame of the machine and carries pinions 43, meshing with the gears 41. An adjusting-shaft 44 may be journaled in lugs 45 and operatively connected with the transverse shaft by gears 46 47. A hand-wheel 48 may be provided for the adjusting-shaft. A sleeve 51 takes over the adjusting-shaft 44 and turns on the axis of the latter. A shifting-lever 52 extends from the sleeve, having a catch 53, mounted on a pivot 54, adapted to take into a notch 55 and to be held in normal position by a spring 56. An arm 57 extends from the sleeve. A rock-shaft 58 is mounted in the machine, as in bearings 59, and has an arm 60 extending therefrom. A link 61 connects the arms 57 and 60. The rock-shaft 58 also carries an arm 62, preferably fork-shaped, which takes between collars 63 on a clutch mechanism 64, mounted slidably on the shaft 5, but rotating therewith. Antifriction-rollers 65 may be placed on the arm 62 to take between the collars and the clutch mechanism. The clutch mechanism is adapted to slide on the shaft 5 and to be brought into operative contact with a pulley 66 or a pulley 67, mounted on the shaft 5. It may also be brought out of contact with both. The pulley 66 receives motion from a pulley 68 and the pulley 67 from a pulley 69, mounted on a shaft 70, which receives its motion through a pulley 71 thereon and a pulley 72 on the cylinder-shaft. The pulleys 68 and 69 are of different diameters and transmit continuous motion to the pulleys 66 and 67, rotatably mounted on the shaft 5. When the clutch mechanism is brought into operative contact with either of the pulleys, motion is imparted through it to the shaft and thence to the feeding-rolls. When the catch 53 is in engagement with the notch 55, the clutch mechanism is out of contact with both of the pulleys, and when the lever is thrown to one side or the other of the notch a slow or a fast feed is given to the feeding-rolls, according to which of the pulleys receives operative contact. The lever for stopping, accelerating, or diminishing the feed is hung upon the same axis as the shaft for adjusting the bed, producing economy of construction, ease and readiness for operation, compactness of parts, and efficiency in product, the adjusting and the stopping and starting mechanism and the mechanism for controlling the speed of the feed being located at one point under the ready and direct control of the operator.

A rock-shaft 75 may be mounted in lugs 76 in the frame of the machine, having pressure-levers 77 secured thereto at or near either end thereof. The pressure-levers may carry weights 78. Set-screws 79, threaded in lugs 80, may take against the levers and limit their movement. Levers 81 may be mounted on pivots 82 in standards 83 on either side of the machine and be connected with the respective levers on the rock-shaft by means of links 84 and pivots 85 86. A feed-out roll 87 may be mounted in bearings 88, sliding in ways 89 in the frame of the machine. Set-screws 90, held in place by jam-nuts 91, may connect with the bearings by taking through

lugs 94 on the bearings and rest against the frame of the machine and give the bearings adjustment to and from the bed. A ridge 95 may be formed on the frame of the machine to form a pocket 96 to receive the lug 94. Lugs 92 may extend from each of the bearings and receive the levers 81 on pivots 93. The pressure-levers secured to the rock-shaft and connected to the bearings of the feeding-out roll in the manner described give to those bearings a parallel lift, causing the feeding-out roll to bear against each part of the planed surface of the stock after passing the cylinder with equal pressure and exerting power upon the entire width of the board to feed it through and prevent the crushing of the edges of comparatively-narrow strips of stock fed through toward one side on the machine which would result from the independent hanging and action of the roll-bearings.

The character of planing-machine I have described is recognized as a distinct type of planing-machines by the trade and is intended for use in the finest and smoothest character of work to give the finishing surfacing-cut to the stock, and my invention relates to this character of machine and enables me to achieve exceptionally good results and smoothness of work and to take the lightest cut with the greatest speed and to obtain the highest efficiency in smoothness of product.

I am aware that in a class of planing-machines intended for mill-planing or timber-work in which the first or cleaning cut is taken and which leaves the stock with a surface that makes it necessary to replane the stock if intended for fine work—such as furniture, piano, or cabinet work—in which the surface of the stock must be very smooth, and in which so-called "broken" or "divided" rolls are used in connection with a roll-housing, and which are provided with a stationary bed, divided upper feed-rolls mounted on a housing have been used, the divided upper feed-rolls being held down by spring-pressure for the independent limited yielding of the divided rolls on the housing, the divided rolls being mounted on a housing, with the housing itself held in place by means of a weighted lever, and so arranged that an offset from the bearings of the divided rolls strikes the housing after the limit of the independent yield of the sectional rolls on the housing has been reached, so as to raise the housing against the action of the weighted lever by means of the roll-bearing offset striking the housing, and this I do not claim.

I claim—

1. The combination, in a planing-machine of the character described, of a main frame, with an upper cutter-cylinder mounted in the frame, a plane-table extending from end to end longitudinally inside the frame, with the lower feed-rolls mounted in the table and adjustable therewith, long inclined ways on the lower end of the table, with an inclined wedge between the inclined ways on the table and the lower part of the frame, means for adjusting the wedge horizontally and longitudinally of the frame for raising and lowering the table with the feed-rolls in vertical lines, guides between the frame and the table for guiding the table with the feed-rolls in vertical lines, with a feeding-roll in substantially the horizontal plane of the cylinder, a bearing for each end thereof, a weighting device suspended from a bearing, and a spring-cushion actively interposed between the roll-bearing and the weighting device, with a stop for normally supporting the weight, constructed and arranged for first bringing the spring-cushion under tension while the weight remains at rest and then actuating the weight through the medium of the spring, substantially as described.

2. The combination, in a planing-machine of the character described, of a main frame, with an upper cutter-cylinder mounted in the frame, a plane-table inside the frame of the machine, with a pair of lower feed-rolls mounted therein, long inclined ways under the table, with an inclined wedge between the inclined ways on the table and the frame, means for adjusting the wedge horizontally and longitudinally with relation to the frame for raising and lowering the table with the feed-rolls mounted therein in vertical lines, guides between the frame and table for guiding the table with the feed-rolls therein in vertical lines, a driving-shaft on the frame above the table, bearings therefor on the frame of the machine, a roll-housing pivoted about the driving-shaft with an upper in-feeding roll mounted in the free end of the housing with a bearing at each end of the housing for the roll-shaft, a gear in the feed-roll substantially in its middle intermediate between its ends with the feeding-surface for the roll to each side thereof, a gear on the driving-shaft meshing therewith, and constructed and arranged for swinging the upper in-feeding roll with its housing as a unit about the driving-shaft in parallel lines and rotating the upper in-feeding roll with its axis in the circle in which it swings with its gear at substantially its middle, a weighted lever for the roll and a spring-cushion interposed between the weighted lever and a roll-bearing, with a stop for normally supporting the lever, constructed and arranged for first bringing the spring-cushion under tension while the weight remains at rest and then actuating the lever through the medium of the spring, substantially as described.

3. The combination, in a planing-machine of the character described, of a main frame, an upper cylinder mounted thereon, a plane-table C inside the frame with a pair of lower feed-rolls D journaled in the table and movable therewith, inclined ways 37 for the lower end of the table, a wedge 35 taking thereagainst, with means for adjusting the wedge horizontally and longitudinally of the frame for raising and lowering the table with the feed-rolls therein, guides between the frame

and the table for guiding the table with its feed-rolls vertically, with an upper feed-roll above a roll in the table, a bearing at each end of the upper feed-roll, a strap 18 suspended from each bearing of the upper feed-roll, a saddle 19, a spring 22, a lever 28 pivoted to the frame of the machine with a weight or weights at its outer end, and a rod 23 connecting the spring with the lever, with a stop on the frame of the machine for normally supporting the lever, constructed and arranged substantially as described for first bringing the spring under tension while the lever remains at rest and then raising the lever through the medium of the spring, substantially as described.

4. The combination, in a planing-machine of the character described, of a main frame, an upper cylinder mounted thereon, a plane-table C inside the frame with a pair of lower feed-rolls D journaled in the table and movable therewith, inclined ways 37 for the lower end of the table, a wedge 35 taking thereagainst, with means for adjusting the wedge horizontally and longitudinally of the frame for raising and lowering the table with the feed-rolls therein, guides between the frame and the table for guiding the table with its feed-rolls vertically, with an upper feed-roll above a roll in the table, a bearing at each end of the upper feed-roll, a strap 18 suspended from each bearing of the upper feed-roll, a saddle 19 at the lower end of the strap, a spring 22 supported by each saddle, a rod 23 for the spring with the spring between the rod and the saddle, with a lever 28 pivoted to the frame and connecting with the rod, with a weight or weights for the lever, and a stop on the frame of the machine for normally supporting the lever, constructed and arranged for first bringing the spring under tension while the lever remains at rest and then raising the lever, substantially as described.

5. The combination, in a planing-machine of the character described, of a main frame, an upper cylinder mounted thereon, a plane-table C inside the frame with a pair of lower feed-rolls D journaled in the table and movable therewith, inclined ways 37 for the lower end of the table, a wedge 35 taking thereagainst, with means for adjusting the wedge horizontally and longitudinally of the frame for raising and lowering the table with the rolls therein, guides between the frame and the table for guiding the table with its feed-rolls vertically, with an upper feed-roll above a roll in the table, a bearing at each end of the upper feed-roll, a strap 18 suspended from each bearing of the upper feed-roll, a saddle 19 at the lower end of each strap, a spring 22 supported by each saddle, a rod 23 for the spring with the spring between the rod and saddle, a stirrup 27 for the rod, with a lever 28 pivoted to the frame and connecting with the stirrup, with a weight or weights for the lever, and a stop on the frame of the machine for normally supporting the lever, constructed and arranged for first bringing the spring under tension while the lever remains at rest, and then raising the lever, substantially as described.

6. The combination, in a planing-machine of the character described, of a main frame, an upper cylinder mounted thereon, a plane-table C inside the frame with a pair of lower feed-rolls D journaled in the table and movable therewith, inclined ways 37 for the lower end of the table, a wedge 35 taking thereagainst, with means for adjusting the wedge horizontally and longitudinally of the frame for raising and lowering the table with the feed-rolls therein, guides between the frame and the table for guiding the table with its feed-rolls vertically, with an upper feed-roll above a roll in the table, a bearing at each end of the upper feed-roll, a groove 17 in each bearing of the upper feed-roll, a strap 18 suspended in each groove, a saddle 19 at the lower end of the strap, a spring 22 supported by each saddle, a rod 23 for the spring with the spring between the rod and the saddle, with a lever 28 pivoted to the frame and connecting with the rod, with a weight or weights for the lever, and a stop on the frame of the machine for normally supporting the lever, constructed and arranged for first bringing the spring under tension while the lever remains at rest, and then raising the lever, substantially as described.

7. The combination, in a planing-machine of the character described, of a main frame, an upper cylinder mounted thereon, a plane-table C inside the frame with a pair of lower feed-rolls D journaled in the table and movable therewith, inclined ways 37 for the lower end of the table, a wedge 35 taking thereagainst, with means for adjusting the wedge horizontally and longitudinally of the frame for raising and lowering the table with the feed-rolls therein, guides between the frame and the table for guiding the table with its feed-rolls vertically, with an upper feed-roll above a roll in the table, a bearing at each end of the upper feed-roll, a strap 18 suspended from each bearing of the upper feed-roll, a saddle 19 at the lower end of the strap, a spring 22 supported by each saddle, a rod 23 for the spring with the spring between the rod and the saddle, and a set-nut or similar means on the rod for solely adjusting the spring, with a lever 28 pivoted to the frame and connecting with the rod, with a weight or weights for the lever, and a stop on the frame of the machine for normally supporting the lever, constructed and arranged for first bringing the spring under tension while the lever remains at rest, and then raising the lever, substantially as described.

8. The combination, in a planing-machine of the character described, of a frame, an actuating-shaft 1 mounted therein, a housing 7, having bearings 8 at one end taking about the actuating-shaft, and a roll 13, with the bearings 15 therefor at the other end of the hous-

ing, a gear 16, in the feed-roll 13, substantially in its middle intermediate of the ends of the feed-roll with the feeding-surface for the roll to each side thereof, and a gear 6 on the actuating-shaft in the same plane therewith and meshing therewith, a strap 18 taking about each feed-roll bearing in the free end of the housing, with a saddle 19 at the lower end of each strap, a spring 22 supported by each saddle, with a lever 28 pivoted on the frame and connecting with the spring, with a weight or weights for the lever, constructed and arranged for giving the feed-roll a parallel lift about its actuating-shaft, with an adjustment for the free end of the housing for raising and lowering the feed-roll with relation to the frame about the axis of the actuating-shaft, and constructed and arranged for first bringing the spring under tension while the lever remains at rest and then raising the lever and yieldingly holding the feed-roll up to its work through the action of the spring acting as a cushion between the saddle and the weighted lever, substantially as described.

9. The combination, in a planing-machine of the character described, of a frame, an actuating-shaft 1 mounted therein, a housing 7, having bearings 8 at one end taking about the actuating-shaft, and a roll 13, with bearings 15 therefor at the other end of the housing, a gear 16 in the feed-roll 13, substantially in its middle intermediate of the ends of the feed-roll with the feeding-surfaces for the roll to each side thereof, and a gear 6 on the actuating-shaft in the same plane therewith and meshing therewith, a strap 18 taking about each feed-roll bearing in the free end of the housing, with a saddle 19 at the lower end of each strap, a spring 22 supported by each saddle, with a lever 28 pivoted on the frame and connecting with the spring, with a weight or weights for the lever, and a stop on the frame for normally supporting the lever, constructed and arranged for giving the feed-roll a parallel lift about its actuating-shaft, with an adjustment for the free end of the housing for raising and lowering the feed-roll with relation to the frame about the axis of the actuating-shaft, and constructed and arranged for first bringing the spring under tension while the lever remains at rest and then raising the lever and yieldingly holding the feed-roll up to its work through the action of the spring acting as a cushion between the saddle and the weighted lever, substantially as described.

10. The combination, in a planing-machine of the character described, of a frame, an actuating-shaft 1 mounted therein, a housing 7, having bearings 8 at one end taking about the actuating-shaft, and a roll 13, with bearings 15 therefor, at the other end of the housing, a gear 16, in the feed-roll 13, substantially in its middle intermediate of the ends of the feed-roll with the feeding-surface for the roll to each side thereof, and a gear 6 on the adjusting-shaft in the same plane therewith and meshing therewith, a strap 18 taking about each feed-roll bearing in the free end of the housing, with a saddle 19 at the lower end of each strap, a spring 22 supported by each saddle, a rod 23 for the spring with the spring between the rod and the saddle, with a lever 28 pivoted on the frame and connecting with the spring, with a weight or weights for the lever, and a stop on the frame for normally supporting the lever, constructed and arranged for giving the feed-roll a parallel lift about its actuating-shaft, with an adjustment for the free end of the housing for raising and lowering the feed-roll with relation to the frame about the axis of the actuating-shaft, and constructed and arranged for first bringing the spring under tension while the lever remains at rest and then raising the lever and yieldingly holding the feed-roll up to its work through the action of the spring acting as a cushion between the saddle and the weighted lever, substantially as described.

11. The combination, in a planing-machine of the character described, of a frame, an actuating-shaft 1 mounted therein, a housing 7, having bearings 8 at one end taking about the actuating-shaft, and a roll 13, with bearings 15 therefor at the other end of the housing, a gear 16 in the feed-roll 13, substantially in its middle intermediate of the ends of the feed-roll with the feeding-surface for the roll to each side thereof, and a gear 6 on the actuating-shaft in the same plane therewith and meshing therewith, a groove 17 in each feed-roll bearing in the free end of the housing, a strap 18 suspended in each groove with a saddle 19 at the lower end of each strap, a spring 22 supported by each saddle, a rod 23 for the spring with the spring between the rod and the saddle, with a lever 28 pivoted on the frame and connecting with the spring, with a weight or weights for the lever, and a stop on the frame for normally supporting the lever, constructed and arranged for giving the feed-roll a parallel lift about its actuating-shaft, with an adjustment for the free end of the housing for raising and lowering the feed-roll with relation to the frame about the axis of the actuating-shaft, and constructed and arranged for first bringing the spring under tension while the lever remains at rest and then raising the lever and yieldingly holding the feed-roll up to its work through the action of the spring acting as a cushion between the saddle and the weighted lever, substantially as described.

12. In a planing-machine, the combination of a frame, a rock-shaft, bearings therefor stationarily secured with relation to the frame, a feeding-out roll, a bearing at each end thereof, a lever connecting with each bearing, a pivot therefor stationarily secured with relation to the frame, a pressure-lever secured at or near each end of the rock-shaft and rocking with it on its axis, and a link connecting each pres-

sure-lever with one of the levers for the roll-bearing, constructed and arranged to give a parallel lift to the feeding-out roll, substantially as described.

13. In a planing-machine, the combination of a rock-shaft 75, pressure-levers 77 secured thereto and rocking with the rock-shaft as a trunnion, levers 81, a feed-roll, bearings for the feed-roll, pivotal connections between the bearings and the levers 81, links 84 connected respectively to the levers 81 and 77, and a stop for the pressure-levers, substantially as described.

14. In a planing-machine, the combination of a rock-shaft 75, pressure-levers 77 secured thereto and rocking with the rock-shaft as a trunnion, levers 81, a feed-roll, bearings for the feed-roll, pivotal connections between the bearings and the levers 81, links 84 connected respectively to the levers 81 and 77, and stops 79 and 90, constructed and arranged, substantially as described.

JOHN RICKARD THOMAS.

Witnesses:
PARKE S. JOHNSON,
EMIL RAPP.