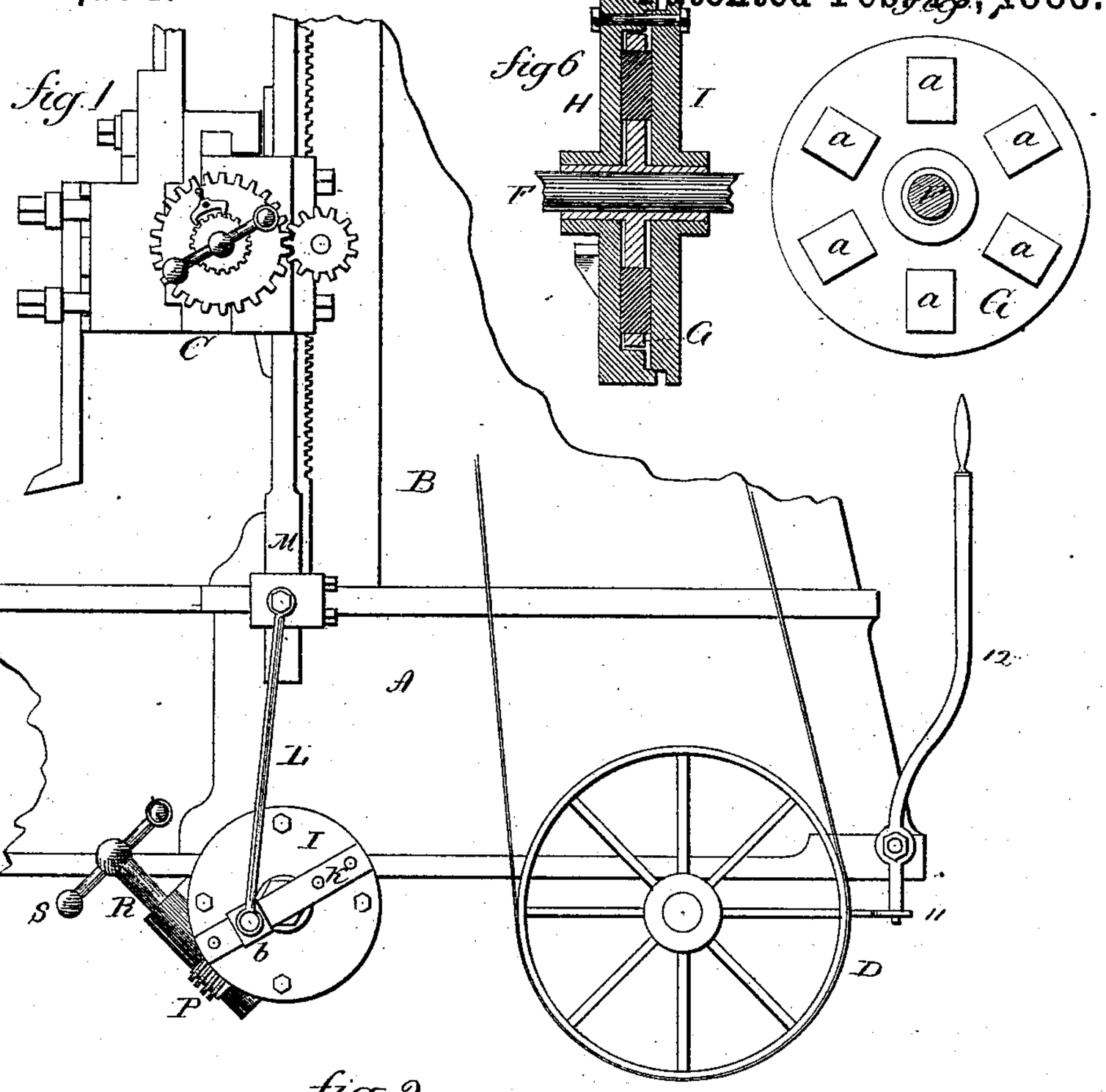
(No Model.) 2 Sheets—Sheet 1.

A. B. BEAN.

METAL PLANING MACHINE.

No. 272,192. Patented Feb. 13, 1883.



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(No Model.) 2 Sheets—Sheet 2.

A. B. BEAN.

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fig. 12

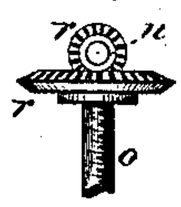


fig. 9

fig. 10

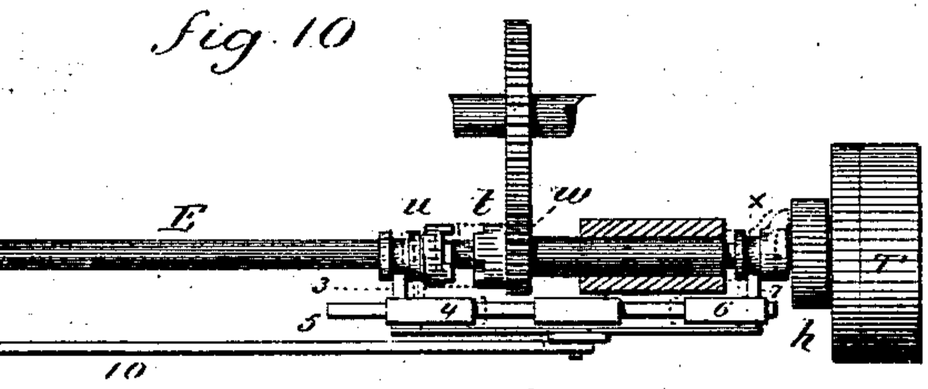
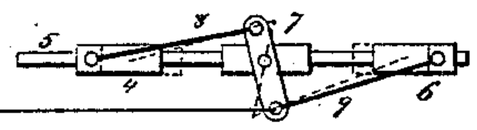


fig. 1.



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UNITED STATES PATENT OFFICE.

ALBERT B. BEAN, OF NEW HAVEN, CONNECTICUT.

METAL-PLANING MACHINE.

SPECIFICATION forming part of Letters Patent No. 272,192, dated February 13, 1883.

Application filed September 4, 1882. (No model.)

To all whom it may concern:

Be it known that I, ALBERT B. BEAN, of New Haven, in the county of New Haven and State of Connecticut, have invented a new Improvement in Metal-Planing Machines; and I do hereby declare the following, when taken in connection with accompanying drawings and the letters of reference marked thereon, to be a full, clear, and exact description of the same, and which said drawings constitute part of this specification, and represent, in—

Figure 1, the working face of the machine; Figs. 2, 3, 4, 5, 6, and 7, detached views to illustrate the first part of the invention; Fig. 8, a modification; Fig. 9, opposite side view of the machine; Figs. 10, 11, and 12, detached views to illustrate the second part of the invention.

This invention relates to an improvement in machines for planing iron, and has for its object, first, a device by which the feed of the machine may be varied or adjusted while in operation; and, second, to work the leading-screws which raise and lower the cross-head directly from the driving-shaft of the machine, thereby bringing within the machine itself the means of applying power to drive the cross-head leading-screws; and in such devices as hereinafter described, and more particularly recited in the claims, my invention consists.

A represents the bed of the machine; B, the uprights; C, the cross-head, arranged to slide thereon in the usual manner; D, the driving-pulleys on the driving-shaft E, by which, through intermediate gearing, power is communicated to the platen of the machine to move it longitudinally on the bed, and in connection with which is a reversing mechanism to reverse the power, so as to make the movement of the platen a reciprocating movement, all in the usual manner, and too well known to require particular description in this specification.

F is an intermediate shaft, to which rotation is imparted by the driving mechanism, and which reverses according to the direction the platen is to be moved. On this shaft F, and outside the bed, a disk, G, is made fast, so as to revolve with the shaft. This disk, as seen in Figs. 6 and 7, is constructed with a hub on each side, by which it is firmly secured to the shaft.

Upon the inside of the disk G is a second disk, H, arranged loosely on the hub F, without positive connection therewith, so that the hub may revolve freely independently of the disk H.

On the outside of the disk G is another disk, I. This disk I, like the disk H, is arranged upon the hub of the central disk, G, the two disks H I presenting their inner faces to the corresponding faces of the central disk, G, and the two disks H I are bolted together outside the disk G, so as to be clamped upon that central disk and produce frictional contact between the central disk and the outside disks, so that when the outside disks are free the friction of the inner disk will communicate to the outer disks a rotation corresponding to the rotation of the inner disk; but if the outer disks be held, then the inner disk will revolve with frictional contact with the outer disks.

The inner disk may present a plain metal surface to the outer disks; but I prefer to arrange in the faces of the central disk friction-blocks *a a*, more or less in number. These may be made of wood, leather, or other non-metallic material.

On the outside of the disk I is a diametrical guide, K, on which is a slide, *b*, made adjustable thereon, so that the said slide may be set to a greater or less distance from the center, and from this slide a connecting-rod, L, engages a vertical rack, M, which communicates with the pinion of the transverse leading-screw in the cross-head in the usual manner for planer-feeds, so that a partial rotation of the disk I in one direction will raise the rack and the return will draw the rack downward. The movement in one direction imparts corresponding movement to the leading-screw and transverse feed to the cross-head in the other direction, (because of the usual pawl and ratchet.) The pinion and rack impart no movement to the leading-screw. This device is well known.

The movement or rotation of the disk I is imparted by the shaft F through the disk G. When it moves in one direction it turns the disk I accordingly, and in the opposite direction reverses that movement. The movement

of the shaft F is continuous throughout the travel of the platen, whereas the feed is only required at one extreme. Hence the rotation of the disk must occur only at the extreme movement of the platen.

To prevent the rotation of the disk I beyond a certain required limit, a lug, *d*, is made fast upon the inside of the disk H, which, when rotated in one direction, will strike a corresponding shoulder, *e*, on the bed, as seen in Fig. 3. A second lug, *f*, is also attached to the inside of the disk H, to stop it in the opposite direction. Hence the movement of the disks will be limited by the two points where the said lugs *d f* strike. These might be two fixed and determined points—say like the shoulder *e*—so that the disk I, turned by frictional contact in one direction until the lug *d* shall be stopped by the shoulder *e*, will remain stationary until the movement of the platen is reversed, which will correspondingly reverse the direction of the shaft F and the disk G. Then the disk I will be turned in the opposite direction until the lug *f* brings up against its stop. There it will be held until the reverse action at the next extreme movement of the platen. The rotation of the disk is communicated to the vertical rack M, and thence to the feeding-screw, in the usual manner.

A positive, fixed, and inadjustable feed cannot be practically used. The amount of feed is usually adjusted by the distance of the slide *b* from the center of motion; but such adjustment cannot be made when the machine is at work. It frequently occurs that a gradual variation in the feed is required during the work, which in the usual construction would necessitate stopping the machine at each extreme movement; or whenever the extent of feed is required to be varied the machine must be stopped for so doing. To avoid this stopping of the machine and permit the adjustment of the feed at any time and while the machine is running, I hang a toothed segment, N, loosely upon the shaft F, and to the bed of the machine or in some rigid position I arrange a worm-gear, P, on a shaft, R, the said worm-gear working into the toothed segment N, as seen in Fig. 2, so that by turning the shaft R the segment will be correspondingly turned on its center. On this segment I form a shoulder, *g*, in the path of the lug *f*, so that when the disk I is turned in one direction the lug *f* will bring up against the shoulder *g* and arrest the rotation of the disk I at that point. The shoulder *e*, where the lug *d* brings up in one direction, being fixed, the extent of movement of the disk is between that fixed shoulder *e* and the shoulder *g* on the segment N. Hence if the segment be turned in one direction it will shorten the distance between it and the shoulder *e*, and correspondingly shorten the extent of rotation for the disk; but if the segment be turned in the opposite direction it will correspondingly increase the extent of movement of the disk I.

The shaft R has a hand-wheel or other suitable device, S, applied to it, by which it may be conveniently turned by the operator. When the machine is in operation the workman may at any time turn the shaft R, and thereby turn the segment N, to bring the shoulder *g* nearer to or farther from the opposite stop, *e*, according as his work may require a less or greater amount of feed. In practice I arrange the slide *b* so as to give about a medium amount of feed, and then as the machine is working vary that by turning the segment as may be required to increase or decrease the extent of feed. By this arrangement the feed for the machine is entirely under the control of the workman, and without stopping the machine he may vary that feed to any desirable extent, either greater or less.

The connecting-rod L may be fixed upon a crank-pin on the disk I without the interposition of the slide *b* and its guide K; but I prefer to employ the slide with the diametrical guide on the disk.

The frictional device for communicating rotation to the disk may be employed without the adjustable stop or shoulder *g*—that is to say, that shoulder or stop may be stationary, like the shoulder *e*, and the adjustment be given by moving the slide *b;* or the stop may be operated by other mechanism than through the segment M—as, for illustration, see Fig. 8. The segment-shaped slide may be arranged to move in a path of which the shaft F is the center, so that its end will act as the shoulder *g*, and this slide, moved by hand, may be set with suitable set-screws to hold it at the desired position.

Instead of employing the worm P to operate the segment, it may be otherwise turned—as, for instance, by a lever in convenient position for the operator to move.

Instead of constructing the disk H with two lugs, *d f*, it will be understood that a single lug may answer the purpose, opposite faces striking corresponding stops.

It frequently occurs in the use of this class of machines that the cross-head is required to be moved up and down to a considerable extent, and in large machines power is necessary to practically so move the head. To thus move the head vertical leading-screws are arranged, one in each upright, connected by a shaft across the top with bevel-gears working onto the corresponding bevel-gears on the upper end of the leading-screws, and on this transverse shaft a pulley is applied, to which power is communicated from the counter-shaft, and brought into action by a common belt-shipper. This necessitates shafting independent of the machine, and the machine does not carry in itself the means for applying the power to the transverse shaft for raising and lowering the cross-head. To combine such mechanism in the machine itself is the second object of my invention, and is illustrated in Figs. 9, 10, 11, and 12. Fig. 9 represents the reverse side of the machine from that seen in Fig. 1, there be-

ing a driving-pulley on each end of the main shaft E, T representing the driving-pulley on this side of the machine. Loose on this driving-shaft E is a pulley, *h*, from which a belt leads to a corresponding pulley, *i*, at the top, which imparts rotation to a pinion, *l*, working into a gear, *m*, on the transverse shaft *n*, which communicates motion to the vertical screws *o* by the usual bevel-gears *r*, as seen in Fig. 12.

On the shaft E is the loose part *t* of a clutch. It is here represented as attached to or made a part of the pinion *w*, which communicates the driving-power of the shaft to the intermediate shafts for driving the platen. *u* is the corresponding part of the clutch, which is splined to the shaft E and revolves with it.

Outside the bearing of the shaft, and near the pulley *h*, is a sliding clutch, *x*, splined to the shaft, so as to revolve with it, like the part *u* of the other clutch, and so as to be moved longitudinally on the shaft. In an annular groove in the part *u* an arm, 3, extends forward from the slide 4 on a horizontal guide, 5. On the same guide is a second slide, 6, carrying an arm, 7, which works in an annular groove in the clutch *x*. Between the two slides 4 and 6 is a vertical lever, 7, hung at its center, one end connected by a rod, 8, with the slide 4, and the other by a corresponding rod, 9, to the slide 6, and from this lever 7 a rod, 10, connects with a bell-crank lever, 11, and so that by turning the bell-crank lever in one direction it will correspondingly turn the lever 7, and in so turning the lever 7 will throw the two slides 4 and 6 away from each other, as seen in Figs. 10 and 11. This movement disconnects the clutch *u* from the pinion *w*, and carries the part *x* into connection with the pulley *h*, thus disconnecting the power from the platen and applying it to the pulley *h*, which will in its turn drive the vertical leading-screws and move the cross-head according to the direction in which the driving-shaft is turned, (up or down;) but if the lever 7 be turned in the opposite direction, then the clutches *u* and *x* are drawn toward each other; the one *u* then engages with the pinion *w* to move the platen, and the one *x* disengages from the pulley *h*. It never occurs that this up and down movement of the cross-head is required when the platen is moving, and as more revolutions of the shaft may be required to give the desired movement to the cross-head than could be permitted in one direction were the platen engaged, it is necessary that the driving mechanism for the platen shall be disengaged from the shaft when the cross-head is thus being moved up or down.

A hand-lever, 12, is arranged upon the working side of the machine (see Fig. 1) in connection with the lever 11, by which the operator may conveniently connect or disconnect the power.

An intermediate position of the two clutches *u* and *x* may leave the machine free from the effect of either clutch—that is, the shaft may continue its revolution without imparting movement to either platen or cross-head.

I claim—

1. In an iron-planer, the herein-described frictional disk for imparting feed to the tool-stock upon the cross-head, consisting of the disk G, fixed to the shaft, and constructed with recesses filled with non-metallic blocks *a a*, with the disks I H, respectively, upon opposite sides of the disk G, the said two disks I H loose upon the shaft and brought into frictional contact with the said blocks, substantially as described.

2. In an iron-planer, the combination of a disk loose on the shaft, but engaging therewith by frictional contact, the said disk provided with lugs, a shoulder against which the lug will stop when turned in one direction, a segment hung upon the shaft and carrying a stop in the path of the lug on the disk, and mechanism, substantially such as described, to impart to said segment a rotative movement, with mechanism, substantially such as described, connecting said disk with the cross-head of the machine, substantially as described.

3. In an iron-planer, the combination of a disk loose on the shaft, but engaging therewith by frictional contact, the said disk provided with lugs, a shoulder against which the lug will strike when turned in one direction, a toothed segment hung upon the shaft and carrying a stop in the path of the lug on the disk, a shaft carrying a worm, working into said segment, and by which it may be adjusted, with mechanism, substantially such as described, connecting said disk with the cross-head of the machine, substantially as described.

4. In an iron-planer, the combination of a pulley on the driving-shaft, connected to the transverse shaft driving a vertical leading-screw for the cross-head, a clutch on the driving-shaft to connect or disconnect it with said pulley, and a second clutch to connect or disconnect the shaft from the mechanism for moving the platen, and mechanism, substantially such as described, between the said two clutches to disconnect the one when the other is connected, and vice versa, substantially as described.

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Witnesses:

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