H. LUTTER & E. A. GIES.

CRANK PLANER.

APPLICATION FILED FEB. 3, 1910.

982,375.

Patented Jan. 24, 1911.

2 SHEETS—SHEET 1.

Fig. 2.

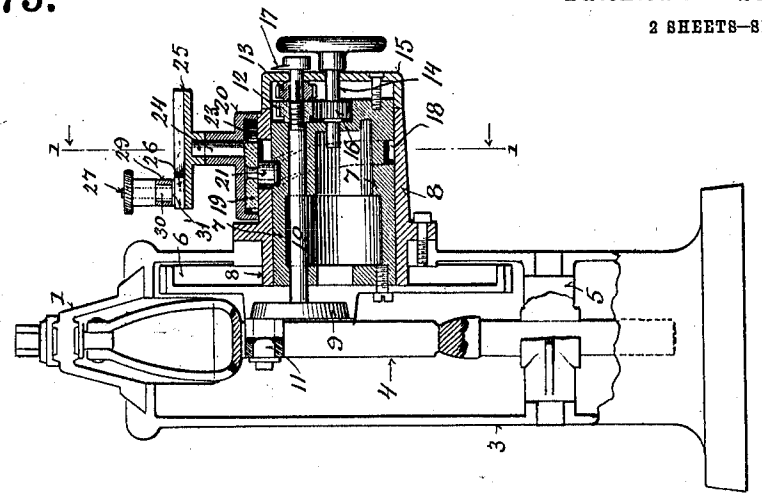
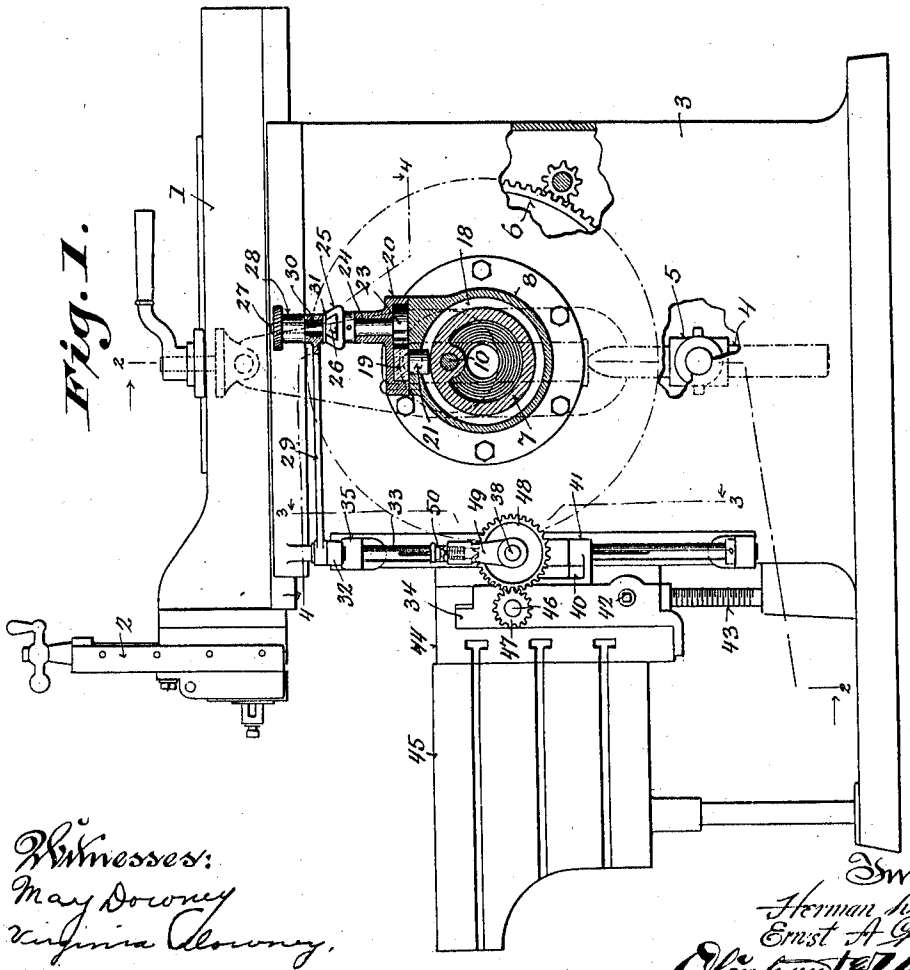


Fig. 1.



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2 SHEETS—SHEET 2.

Fig. 6.

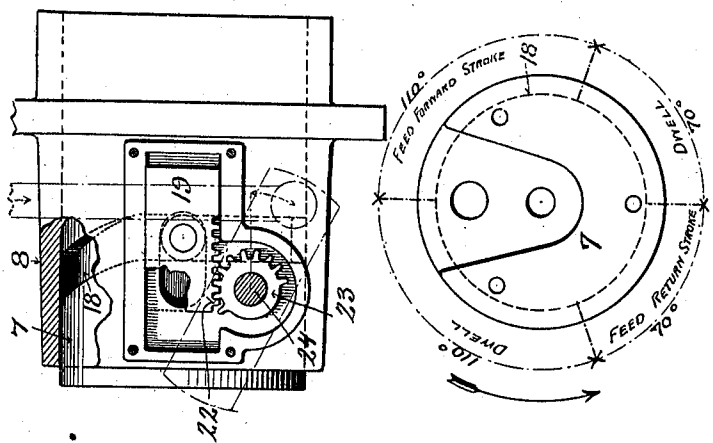


Fig. 5.

Fig. 4.

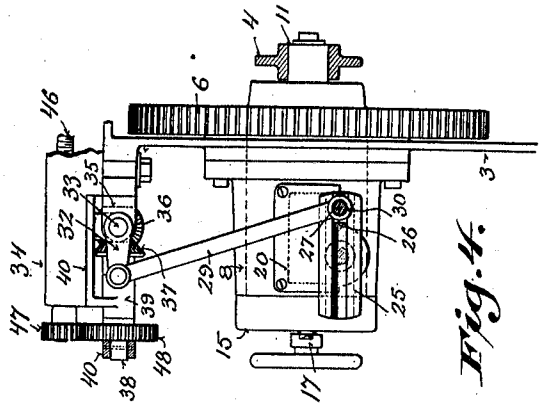


Fig. 7.

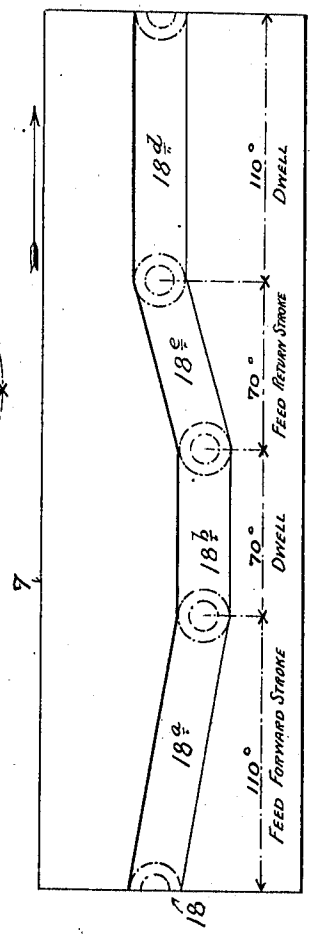
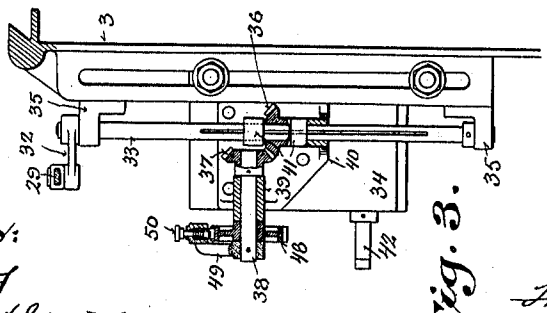


Fig. 3.



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UNITED STATES PATENT OFFICE.

HERMAN LUTTER AND ERNST A. GIES, OF MILWAUKEE, WISCONSIN, ASSIGNORS TO LUTTER & GIES CO., OF MILWAUKEE, WISCONSIN.

CRANK-PLANER.

982,375. Specification of Letters Patent. **Patented Jan. 24, 1911.**

Application filed February 3, 1910. Serial No. 541,904.

To all whom it may concern:

Be it known that we, HERMAN LUTTER and ERNST A. GIES, citizens of the United States, and residents of Milwaukee, in the county of Milwaukee and State of Wisconsin, have invented certain new and useful Improvements in Crank-Planers; and we do hereby declare that the following is a full, clear, and exact description thereof.

Our invention relates to crank-planers, its object being to provide a simple, durable and noiseless feed mechanism for the feed-table.

The construction and arrangement of the invention is such that feed of the table is effected in either direction by the mechanism, which mechanism is capable of imparting a slow feed stroke incidental to the idle or return stroke of the ram, the idle stroke of the feed mechanism being correspondingly slow, whereby a positive and smooth operation of the parts is insured and overthrow due to momentum avoided.

Our improved feed mechanism, while applicable to any form of planer or shaper, is particularly designed to be applied to crank-planers such as patented by us Nov. the 13th, 1906, and June 16th, 1908, Nos. 835543 and 890780 respectively.

Heretofore the table screw feed of machines of this type have been actuated by a series of links connecting a rock-arm of the screw-feed and an oscillatory lever, which lever is operated by a cam carried upon the face of the main gear-wheel of the machine, the gear-wheel being provided with an adjustable crank-pin adapted to impart oscillatory motion to the ram through a yoke. The cam for obtaining this motion is designed to impart a quick backward and forward movement to the lever upon the return or idle stroke of the ram and thus this quick movement imparts a sudden feed and return stroke to the rock-arm aforesaid, which, in turn, actuates the table screw whereby feed of said table is had. This sudden or jerky forward or backward movement of the rock-arm, which is accomplished on the idle stroke of the ram, is liable to cause an overthrow of the feed stroke due to momentum which momentum also results in wear of the mechanism due to the rapid slipping of the rock-arm ratchet upon the gear-wheel engaged thereby the quick action of the parts being also objectionable due to the rattle or click of the pawl upon its return stroke over said ratchet.

Our present invention is particularly designed to overcome the above objectionable features by providing a peripheral cam-groove about the face of the main gear-wheel arbor, which cam-groove is formed with gradually inclined faces upon opposite sides of said arbor, one of which faces is adapted to impart a feed stroke to the table feed mechanism upon the idle stroke of the ram, while the opposite inclined face is designed to impart a return stroke movement to said mechanism, there being an intervening dwell space in the cam-groove to permit rest after the feed and idle stroke of said table feed mechanism. By this arrangement it will be understood that we are enabled to utilize any portion of the entire return stroke of the ram to impart the feed movement while the forward or feed stroke of said ram is utilized to accomplish the idle stroke of the table feed mechanism in the same manner. This insures a very slow feed movement whereby overthrow is eliminated and the return stroke movement will thus be rendered practically noiseless. By utilizing a peripheral cam about the arbor of the gear-wheel, which arbor is comparatively small in diameter, it will also be seen that the power to actuate the table feed mechanism is reduced, whereby a gain in power in proportion to the reduction in speed is obtained.

The invention consists in certain novel features of construction and in the arrangement and combination of parts hereinafter particularly described and pointed out in the claims.

In the drawings Figure 1 represents a side elevation of a crank-planer embodying the features of our invention with parts broken away and parts in section as indicated by line 1—1 of Fig. 2; Fig. 2, a transverse sectional view of the same as indicated by line line 2—2 of Fig. 1; Fig. 3, a detail view partly in section as indicated by line 3—3 of Fig. 1, the view illustrating the gearing by means of which cross feed is imparted to the planer-table; Fig. 4, a detail sectional

plan view of the feed mechanism as indicated by line 4—4 of Fig. 1; Fig. 5, an enlarged plan view partly broken away of a detail of said mechanism, and Figs. 6 and 7, diagram views of the feed mechanism actuating cam.

Referring by characters to Figs. 1 and 2 of the drawings, 1 indicates a reciprocative ram provided with the usual tool-carrying head 2, which ram is mounted upon ways of a frame 3 in the usual manner. 4 indicates the usual vibratory yoke formed at its lower end with a longitudinal stem, which stem is supported in a rocker-head 5 that is trunnioned in the side walls of the frame as best shown in Fig. 2. A gear-wheel 6 provided on one side with a hollow arbor 7 is located within the frame, the arbor being journaled in a housing 8, which housing is secured to and extends from one side of the frame as shown. On the opposite side of the gear-wheel adjacent to the yoke 4, said wheel is formed with a circular eccentric seat, into which seat is fitted a friction disk 9. This disk is provided with a centrally disposed stem 10 which extends through and is adapted to turn in bearings formed thereof in the arbor 7. The opposite side of the disk 10 carries a crank-pin 11 having a shoe mounted thereon adapted to engage the slot of the yoke 2, the pin and gear-wheel 6 constituting a crank-wheel. Similar gears 12 and 13 are mounted beside each other on the stem 10. The gear 12 is threaded on said stem and adapted to bear against the outer end wall of the arbor 7 so that when it is screwed up against said wall it will draw the crank-disk 9 into its seat. The gear 13 is loosely keyed or feathered on said stem, which stem is thus allowed to move endwise, but is prevented from turning therein. A spindle 14 is supported parallel with the stem 10 and arranged to have endwise movement in the outer wall of the arbor 7, the spindle being also provided with a bearing in a cap-plate 15, which plate is secured to and revoluble with the arbor. The spindle 14 is provided with a hand-wheel exterior of the cap and a pinion 16, which pinion normally meshes with the gear 12, being adapted to also mesh with gear 13 when said spindle is drawn outwardly for this purpose. The outer end of stem 10 is provided with the usual index or pointer 17, there being a scale (not shown) indicated upon the face of the cap to facilitate the adjustment of the crank-disk and indicate the distance of the crank-pin from the center of the gear-wheel 6.

The above described mechanism forms no part of my present invention and is provided for the purpose of adjusting the crank-pin with relation to the center of the gear-wheel 6, whereby the stroke of the yoke is controlled, which yoke, through its connection with the ram, imparts reciprocative motion thereto.

The arbor 7 is provided with an annular cam-groove 18, the cam-groove, as shown by the diagram in Figs. 6 and 7, being provided with an offset forward feed section 18^a, succeeded by a dwell-section 18^b, and return feed section 18^c, followed by a dwell-section 18^d, which latter section merges into the forward feed section 18^a.

A block 19 is slottedly mounted upon the upper face of the housing 8, being guided and supported within a casing 20, which casing is secured to said housing. The block 19 carries a depending stud, upon which is mounted a roller 21, and this roller projects through an elongated slot formed in the adjacent wall of the housing and engages the annular cam-groove 18 of the arbor. One edge of the block 19 is provided with rack-teeth 22, which rack-teeth mesh with a mutilated gear-wheel 23 that is also located within the casing 20. This gear-wheel 23 is provided with an arbor 24 that extends up through a sleeve of the casing for the purpose of receiving a horizontally disposed T-lever 25, which lever is secured thereto. The T-lever is formed with a dovetailed slotted channel, into which is seated a dovetailed block 26 having a threaded stem 27 for the reception of a thumb-nut 28. This stem is designed to receive one end of a link 29, the said end being fitted over a sleeve 30 surrounding the stem and having a flange extension 31, which extension overlaps the upper faces of the T-shaped lever. The sleeve and link end aforesaid are interposed between the T-shaped lever and thumb-nut 28, by which construction it will be seen that when said nut is run down upon the stem its engagement with the thimble will then cause the dovetailed block 26 to be securely clamped by frictional engagement within the dovetailed groove of said T-shaped lever. Thus the dovetailed block 26 and its spindle can readily be adjusted longitudinally within the groove of the lever, whereby the fulcrum-point of the link with relation to the arbor 24 can be varied to increase or diminish the stroke of the link, or, if desired, the dovetailed block may be shifted to the opposite side of the arbor 24 in order to effect a reversal of the link stroke. The opposite end of the link 29 is connected to an arm 32 and is secured to the upper end of a vertically disposed rock-shaft 33, the rock-shaft being disposed rearward of the planer cross-head 34, and mounted in suitable bearings 35 that extend from the frame 3.

As best shown in Fig. 3, a beveled-pinion 36 is in spline connection with the rock-shaft and being meshed with a similar beveled-pinion 37, which latter pinion is secured to one end of a horizontally disposed shaft 38. The shaft 38 is journaled in a

bearing 39 of a bracket 40, which bracket is secured to the rear face of the cross-head 34. This bracket is also provided with bearings 41 that engage the rock-shaft 33 above and below its beveled-pinion, whereby the same is longitudinally adjusted upon the shaft 33 with the cross-head 34. Vertical adjustment of the cross-head is obtained in the usual manner through the crank-shaft 42, which crank-shaft is in beveled-gear connection with the threaded spindle 43, that is stepped into a bearing formed in the machine frame. The beveled-gear connection between the crank-shaft and threaded spindle 43 in this instance is not shown as it forms no part of our invention, this mechanism, together with the apron 44 and table 45, being similar to that shown and described in our patents hereinbefore referred to. The cross-head 34 is provided lengthwise thereof with the usual feed screw 46, the end of which screw carries a pinion 47 that meshes with a gear-wheel 48, the gear-wheel being loosely mounted upon the shaft 38 before mentioned. Motion is imparted to this gear-wheel by a rock-arm 49 fast on the shaft 38, the rock-arm being provided with a suitable spring-controlled dog 50, which dog is adapted to engage the teeth of said gear-wheel, it being understood that this dog is capable of being reversed in the manner usual with this type of feed mechanism, whereby the feed movement to the gear-wheel can be imparted thereto either upon the forward or backward stroke of the rock-arm. The above provision is made for the purpose of feeding the table in either direction relative to the cutting stroke of the ram-tool.

In the operation of our device, the working faces of the cam-groove in the arbor are so timed with relation to the gear-wheel 6 that upon a forward or cutting stroke of the ram the rock-arm of the table feed mechanism is acted upon to effect a return or idle stroke, by means of the oscillatory motion of the T-shaped lever 25, motion being imparted thereto by its gear connection with the block 19. After this idle stroke of the rock-arm, the cam permits the same to rest for a considerable period, during which the gear-wheel 6 completes a half revolution and the ram finishes its forward stroke. Upon the return stroke of the ram, the rock-arm 49 is actuated by the cam-groove to effect a feed stroke, and thereafter a dwell, in a similar manner to that just described in connection with the return stroke of said table feed mechanism. Thus it will be seen that the feed and return stroke of the rock-arm 49 is reduced to a slow movement having comparatively long dwells intervening between each stroke and the mechanism thus arranged will render overthrow impossible, whereby the feed table movement is evenly and positively insured and the mechanism rendered comparatively noiseless.

We claim:

1. In a crank-planer having a frame, a table supported thereon, a feed mechanism for the table, a reciprocative ram, a yoke in connection with the ram, a crank-wheel in operative connection with the yoke, an arbor extending from the crank-wheel and a bearing for the arbor carried by the frame; the combination of a peripheral cam in connection with the arbor, a bearing for said arbor extending from the frame, a toothed block carried by the bearing, a stud in connection with the block engageable with the cam, a pinion in meshed engagement with the block teeth, and a lever carried by the pinion in link connection with the table feed mechanism.

2. In a crank-planer having a frame, a table supported thereon, a feed mechanism for the table, a reciprocative ram, a yoke in connection with the ram, a crank-wheel in operative connection with the yoke, and an arbor extending from the crank-wheel; the combination of a peripheral cam in connection with the arbor, having inclined working faces approximately upon opposite sides of said arbor, a housed bearing for the arbor having a slotted aperture, the housed bearing being extended from the frame, a slidable toothed block carried by the bearing, a stud extending from the block through the housing slot for engagement with the cam, a pinion in meshed engagement with the block teeth, a lever carried by the stud, and a link in adjustable connection with the lever, the opposite end of the link being connected to the table feed mechanism.

3. In a crank-planer having a frame, a table supported thereon, a feed screw for the table, an oscillatory shaft disposed parallel with the feed screw, toothed gears carried by said feed screw and shaft in meshed engagement with each other, the shaft gear being loosely mounted thereon, a rock-arm secured to said shaft, a spring-controlled dog carried by the rock-arm for engagement with the gear-wheel, a vertically disposed shaft carried by the frame, beveled gears connecting the first named shaft and vertically disposed shaft, an arm secured to said vertically disposed shaft, a reciprocative ram, a yoke in connection with the ram, a crank-wheel in operative connection with the yoke, an arbor extending from the crank-wheel, and a bearing for the arbor carried by the frame; the combination of a peripheral cam in connection with the arbor, having inclined working faces approximately upon opposite sides of said arbor, a slidable toothed block carried by the bearing, a stud in connection with the block engageable with the cam, a pinion in meshing engage-

ment with the block teeth, a lever carried by the pinion and a link in adjustable connection with the lever, the opposite end of the link being secured to the arm of the vertically disposed shaft aforesaid.

In testimony that we claim the foregoing we have hereunto set our hands at Milwaukee in the county of Milwaukee and State of Wisconsin in the presence of two witnesses.

HERMAN LUTTER.
ERNST A. GIES.

Witnesses:
EDW. C. BAUMANN,
M. P. DAVERN.