(No Model.)

G. JUENGST.

SHAPING AND PLANING MACHINE.

No. 305,520. Patented Sept. 23, 1884.

Fig. 1.

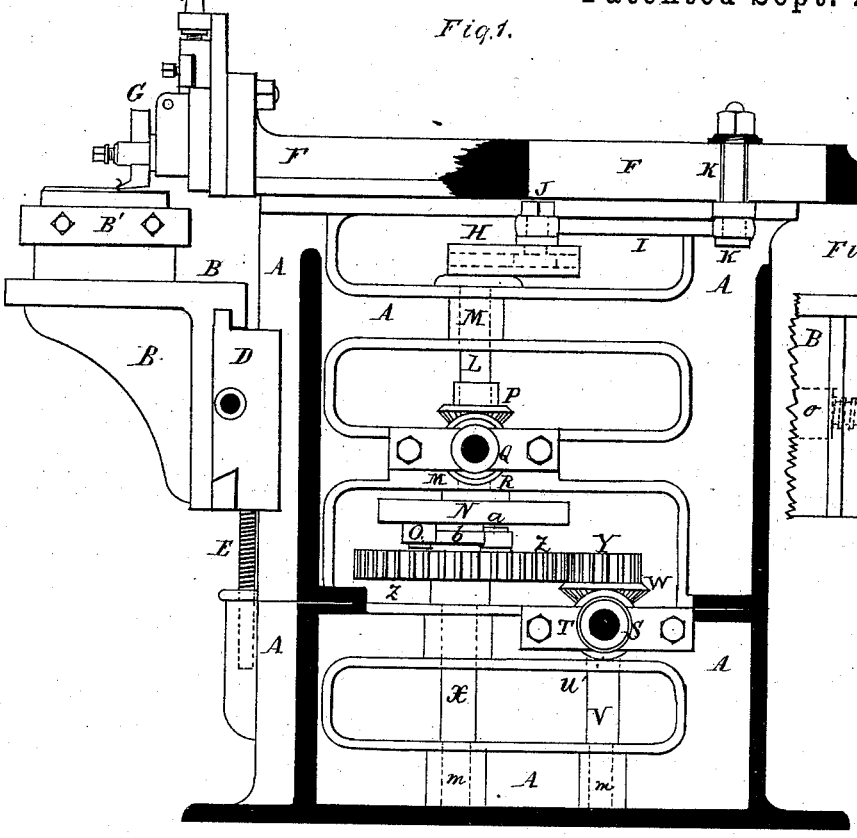


Fig. 4.

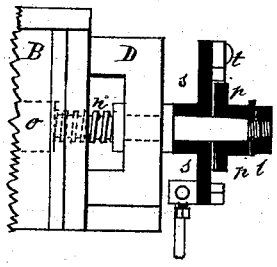


Fig. 2.

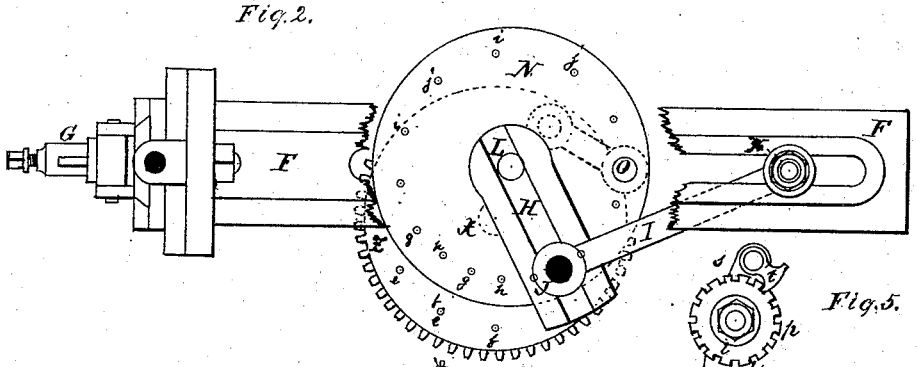


Fig. 5.

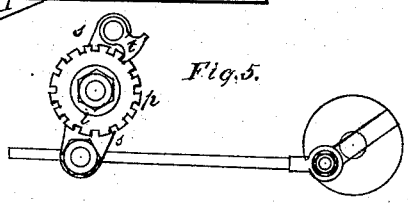
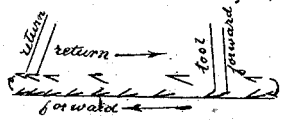
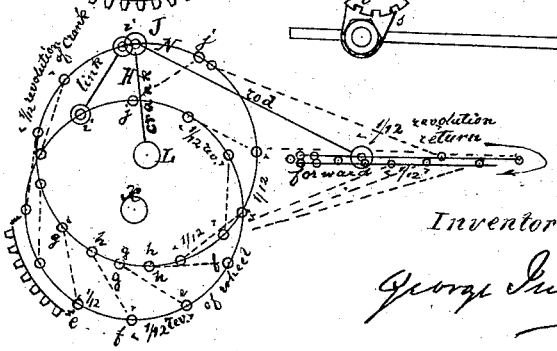


Fig. 3.





Witnesses.

Friedrich Haffner

Charles Schutte

Inventor.

George Juengst

UNITED STATES PATENT OFFICE.

GEORGE JUENGST, OF NEW YORK, N. Y.

SHAPING AND PLANING MACHINE.

SPECIFICATION forming part of Letters Patent No. 305,520, dated September 23, 1884.

Application filed October 9, 1883. (No model.)

To all whom it may concern:

Be it known that I, GEORGE JUENGST, a citizen of the United States, and a resident of the city of New York, in the county and State of New York, have invented certain new and useful Improvements in Shaping and Planing Machines, of which the following is a specification.

My invention relates to improvements in shaping and planing machines in which the tool has a horizontal reciprocating motion caused by a crank, and the work is secured upon an adjustable cross-slide forwarded to the tool by a screw-feed actuated by a pawl-and-ratchet mechanism.

The object of my improvements is, first, to secure for the tool a steady and proper slow cutting motion by means of a durable mechanism, and to secure a maximum quick return motion of the tool from the work, so that thereby a minimum time is required to perform accurate and smooth work; and the object is, secondly, to avoid the disconnection of the feed-screw with its screw-nut and avoid the frequent breakage or derangement of the feeding device by a novel friction-joint between the ratchet-wheel and the feed-screw. I attain these objects by the mechanism illustrated in the accompanying drawings, in which—

Figure 1 represents a sectional side elevation of the shaping-machine with my improvements. Fig. 2 is a top view of the tool-slide and the operating mechanism of the same. Fig. 3 is a diagram for exhibiting the motion of the tool and its slide. Fig. 4 is a detached vertical section of the pawl and ratchet of the feeding device. Fig. 5 is a front view of the same.

A represents the frame of the machine, and B the work-carriage or cross-slide carrying the chuck B′, upon which the work is secured.

D is the vertical slide, upon which the cross-slide is held adjusted and fed across.

E represents the screw for raising the slide D and the work relatively to the tool, and F represents the reciprocating tool-slide, which carries the tool-stock and tool G on its forward end.

H is the slotted crank; I, the connecting-rod; J, the crank-pin, and K the tool-slide stud for operating the reciprocating tool-slide F.

L represents the vertical crank-shaft, to which the crank H is attached at its top end. It revolves in the bearings M M, formed in the frame A, and its bottom end has secured upon it a crank-plate, N, with a crank-pin, O, and between its bearings M M the shaft L is provided, with the bevel-pinion P, secured upon it, for operating the horizontal feed-shaft Q, which has the bevel-gear R, to engage with said pinion P.

The machine is furnished with the usual horizontal driving-shaft, S, arranged in the bearing T on the side of the frame. The shaft S has on its outer end the usual cone belt-pulleys, to which the power is applied. The inner end of said shaft has upon it the bevel-pinion U, for transferring the power to the vertical counter-shaft V, which is furnished with a bevel-gear, W, to engage with said pinion U. Said shaft V transmits the power to a secondary vertical shaft, X, by means of the pinion Y, secured upon the top end of the shaft V, said pinion engaging with a horizontal spur-gear, Z, upon the top end of the shaft X. Said spur-gear Z revolves under the shaft L and its crank-plate N, and upon its top face is secured the crank-pin *a*, connected by a link, *b*, with the crank-pin O, by which means the motion is transmitted from the shaft X to the shaft L, before mentioned. The shaft L is arranged with its axis in the central vertical plane of motion of the tool-slide F. The axis of the shaft X is arranged eccentrically to that of the shaft L and in a vertical plane at a lateral distance from that of the shaft L, as shown in Figs. 2 and 3, so that the dead-center line of the crank-pin *a* lies nearly lateral to that of the crank-pin J and lateral from the shaft L, and to that side of it which is described by the crank H in forwarding the tool to the work, as shown in Figs. 2 and 3, in which the distance from *e* to *f* represents one-twelfth part of the motion of the crank-pin *a*, and in which *g h* represent the distances—corresponding—proceeded by the crank-pin J, the tool, and tool-slide during the cutting time or forward motion, and in which the distances from *i* to *j* represent the proceeding of the crank-pin J, tool, and tool-slide during each one-twelfth of the crank-pin *a* during the return motion or motion

while the tool is receding from the work, all clearly shown in Figs. 2 and 3. By this means the proper slow motion for cutting commences soon after the tool and its stock have set up solid ready for cutting. Said tool hereafter proceeds slowly until the return motion is reached. Soon after the return motion has commenced the same proceeds at a very rapid speed until having reached its termination, upon which the former-described motion takes place. Both shafts X and V have their bearings *m m m m* formed in the frame A of the machine.

By having the mechanism for producing the quick return motion constructed of compound cranks and links, which operate alternately, respectively, their dead-centers, a very rapid return motion is obtained without the destructive and unsteady power caused from momentum of the moving parts.

The vertical slide D, which carries the cross-slide B, is furnished with the horizontal feed-screw *n*, to feed the cross-slide and the work upon it to the tool. Said screw *n* has its bearings in the ends of the slide D, and has proper collars secured to it, to bear against the slide D and prevent any longitudinal motion of the screw. The cross-slide B has attached the screw-nut *o*, in which the screw *n* engages to feed said slide. Upon the outer shank or end of the screw *n*, on the side toward the feed-crank, is arranged the ratchet-wheel *p* and the vibrating pawl-lever *s*, with the pawl *t* on its upper arm and with the feed-rod stud on the lower arm. On the extremity of the screw, forward of the ratchet-wheel *p*, is fitted a proper threaded screw-nut, *l*, with a washer between it and the hub of said wheel *p*. The pawl-lever *s* is fitted, as usual, to turn loose upon the shank of the screw *n;* but the ratchet-wheel is fitted, not, as is usual, with a key to lock it upon said shank, but with a taper ground-bearing, so that it is held sufficiently tight upon said shank for operating and feeding the cross-slide; but in case said cross-slide has been allowed to feed against the end of the slide D or other solid obstruction against the cross-slide the friction of the bearing of the ratchet-wheel upon the screw *n* is insufficient to move them together, and the ratchet-wheel may turn and slip upon the screw. By this means the frequent breakage of the feeding mechanism is obviated. By means of the screw-nut *l* the friction of the bearing between the ratchet-wheel and screw is readily renewed or released and regulated to suit the requirement at any time.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. In shaping and planing machines, the combination, with the reciprocating tool-slide F, the shaft L, provided with disk N, the crank H, the connecting-rod I, and stud J, of the crank-pins O and *a*, the link *b*, the shaft X, provided with gear Z, arranged eccentrically and adapted to operate with the shaft L to secure the to-and-fro motion of the cutting-tool, as herein set forth.

2. The arrangement and combination of the tool-slide F, the shaft L, provided with disk N, the crank H, connecting-rod I, the stud J, the feed-screw *n*, the bevel-gear R, the shaft Q, and pinion P, the ratchet-wheel *p*, the pawl *t*, lever *s*, and nut *l*, with the crank-pins O and *a*, the link *b*, the shaft X, provided with gear Z, relative with the shaft L, substantially as and for the purpose herein described and shown.

In testimony that I claim the foregoing as my invention I have signed my name in presence of two witnesses.

GEORGE JUENGST.

Witnesses:

FRIEDRICH HÜFNER,

CHARLES SCHULTZE.