(No Model.)

4 Sheets—Sheet 1.

H. FRASER.

PLANER.

No. 543,475. Patented July 30, 1895.

Fig. 1

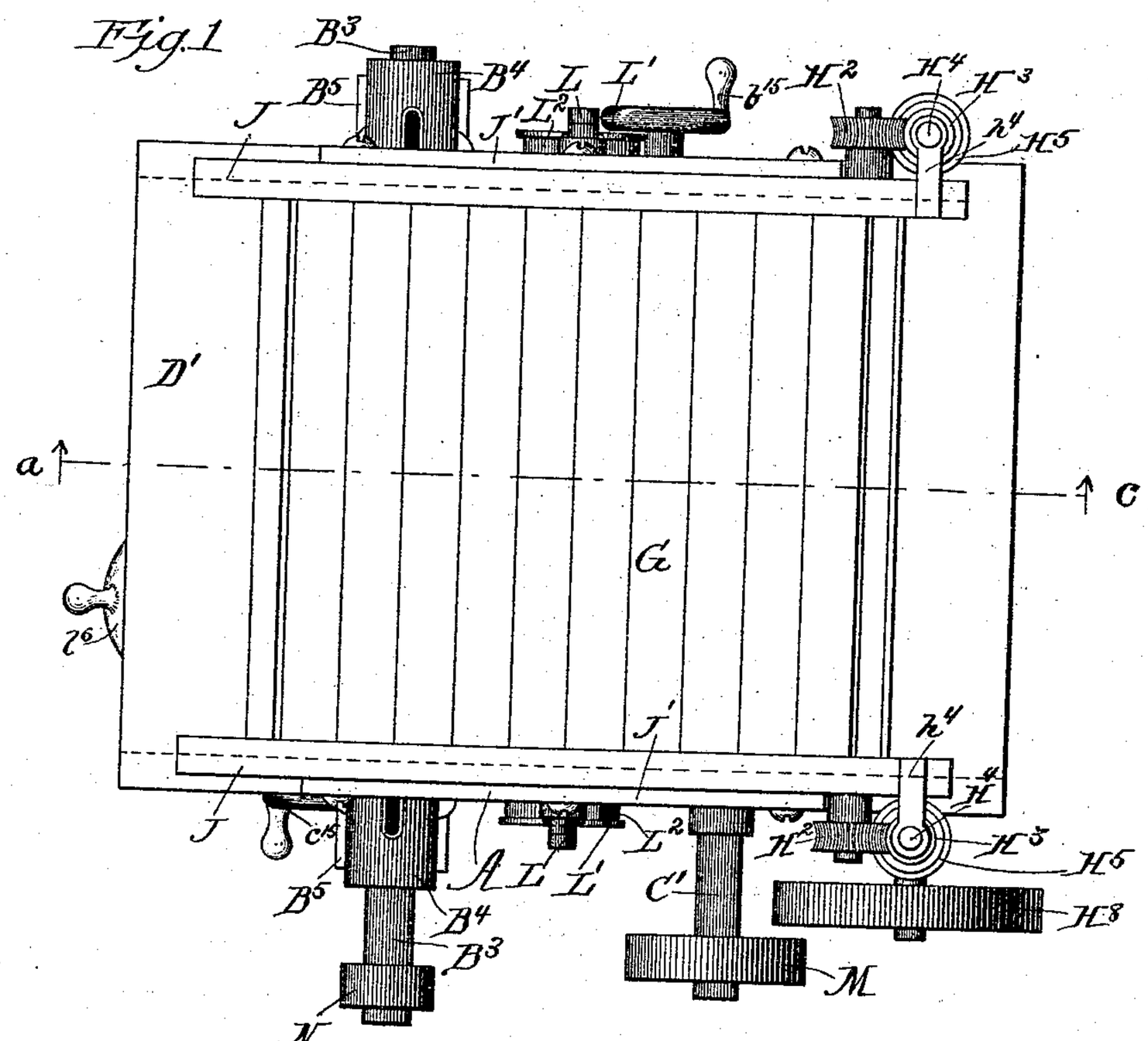
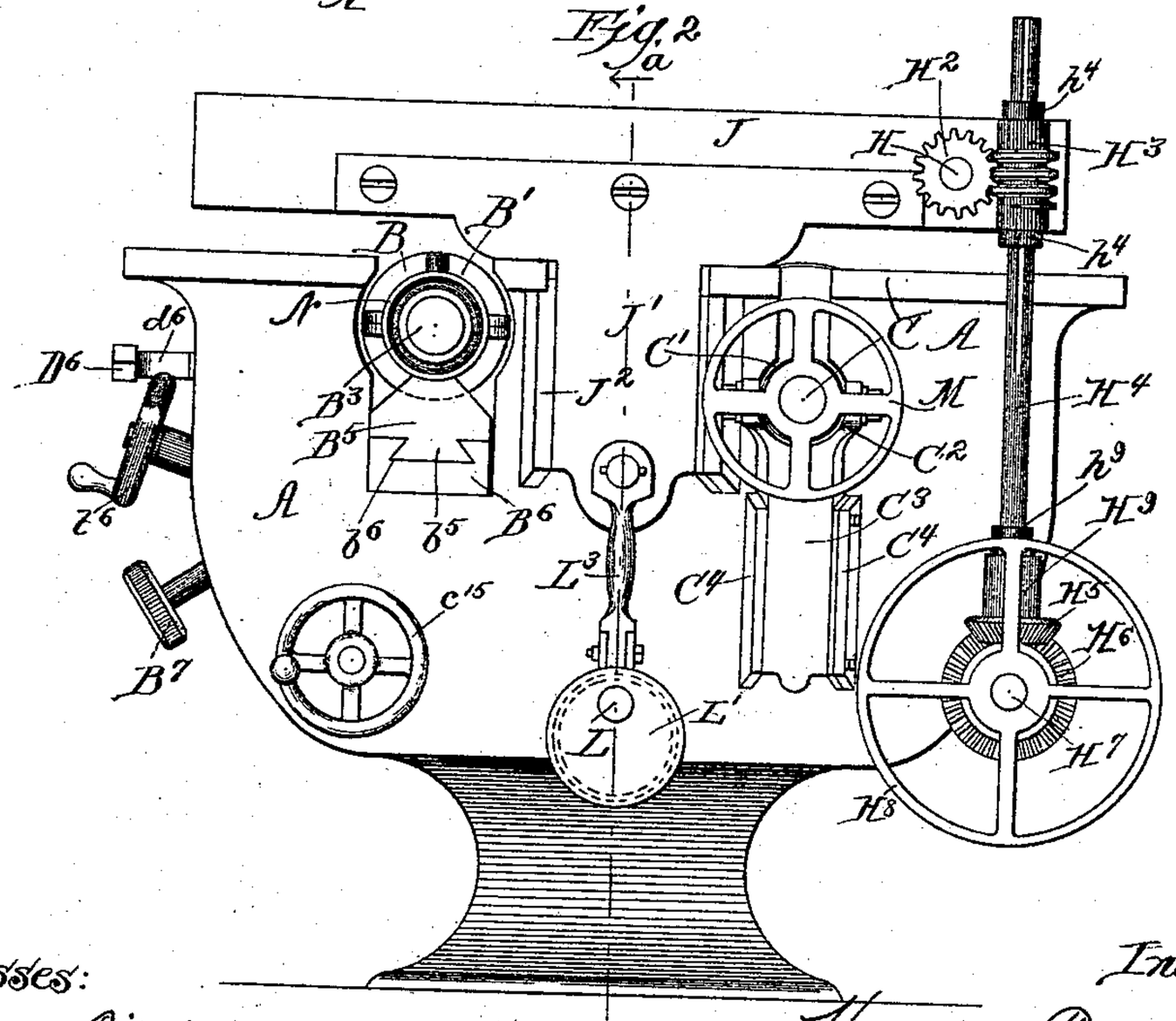


Fig. 2



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(No Model.)

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PLANER.

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Fig. 3

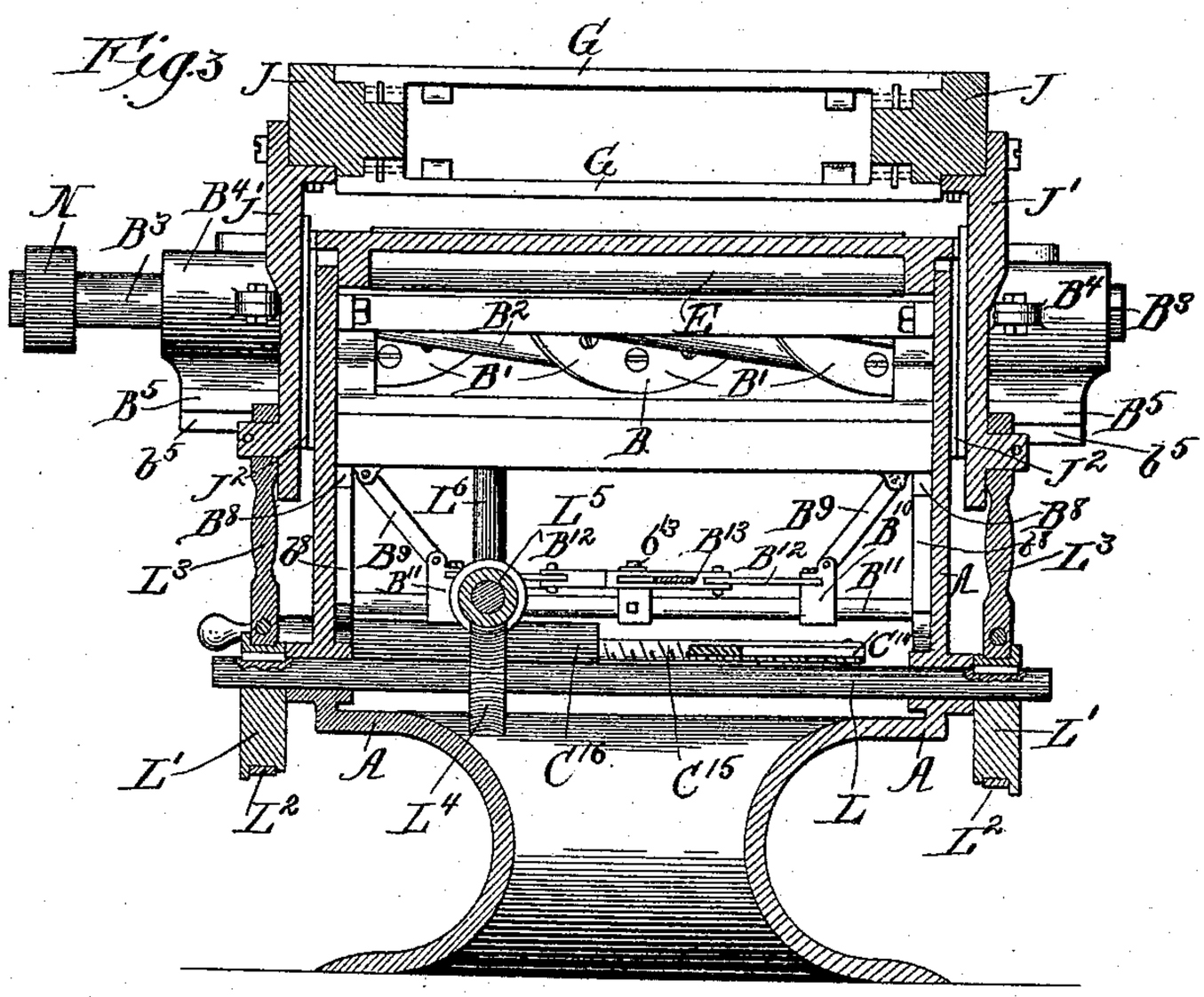
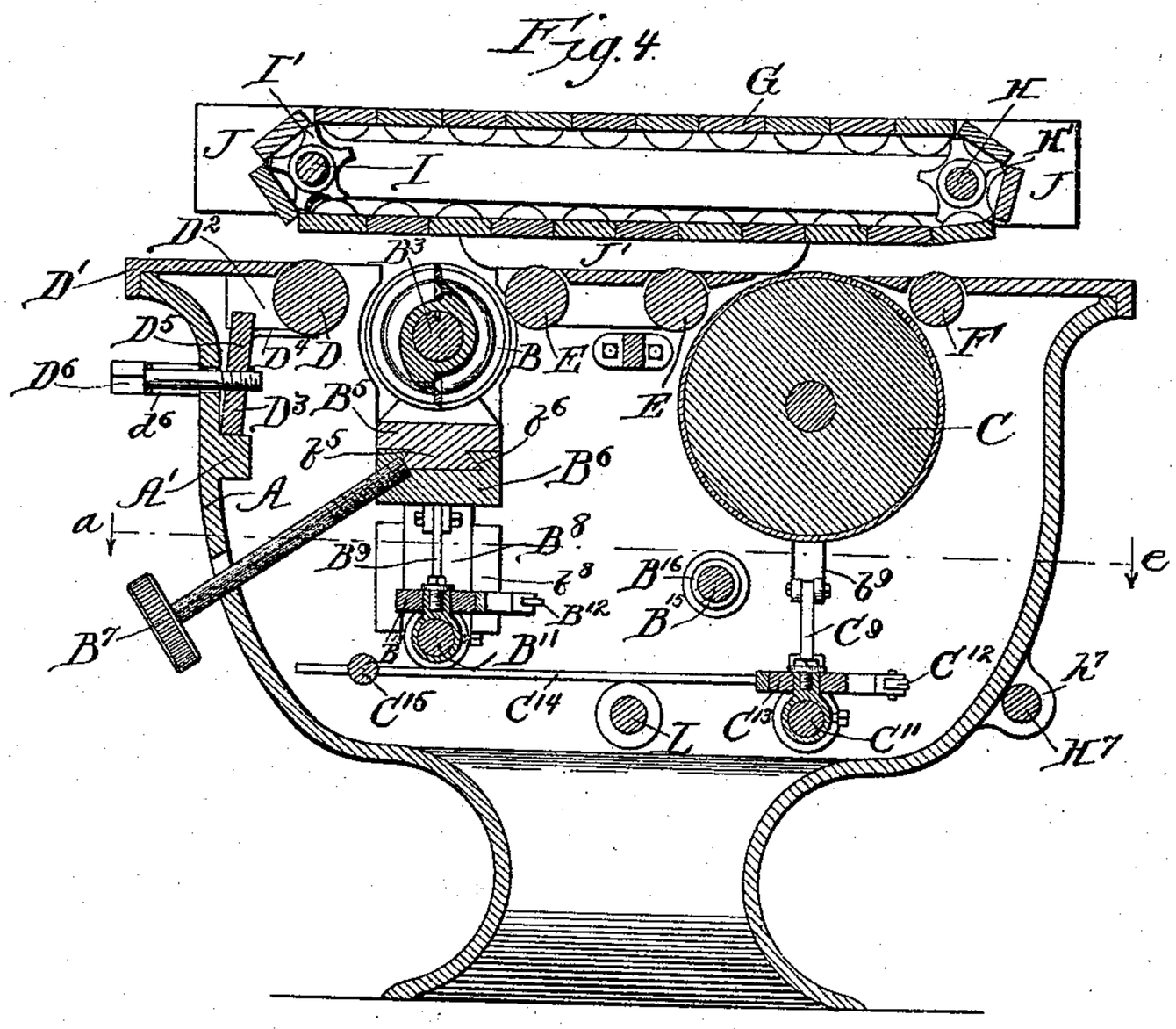


Fig. 4



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(No Model.) 4 Sheets—Sheet 3.

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Fig. 5

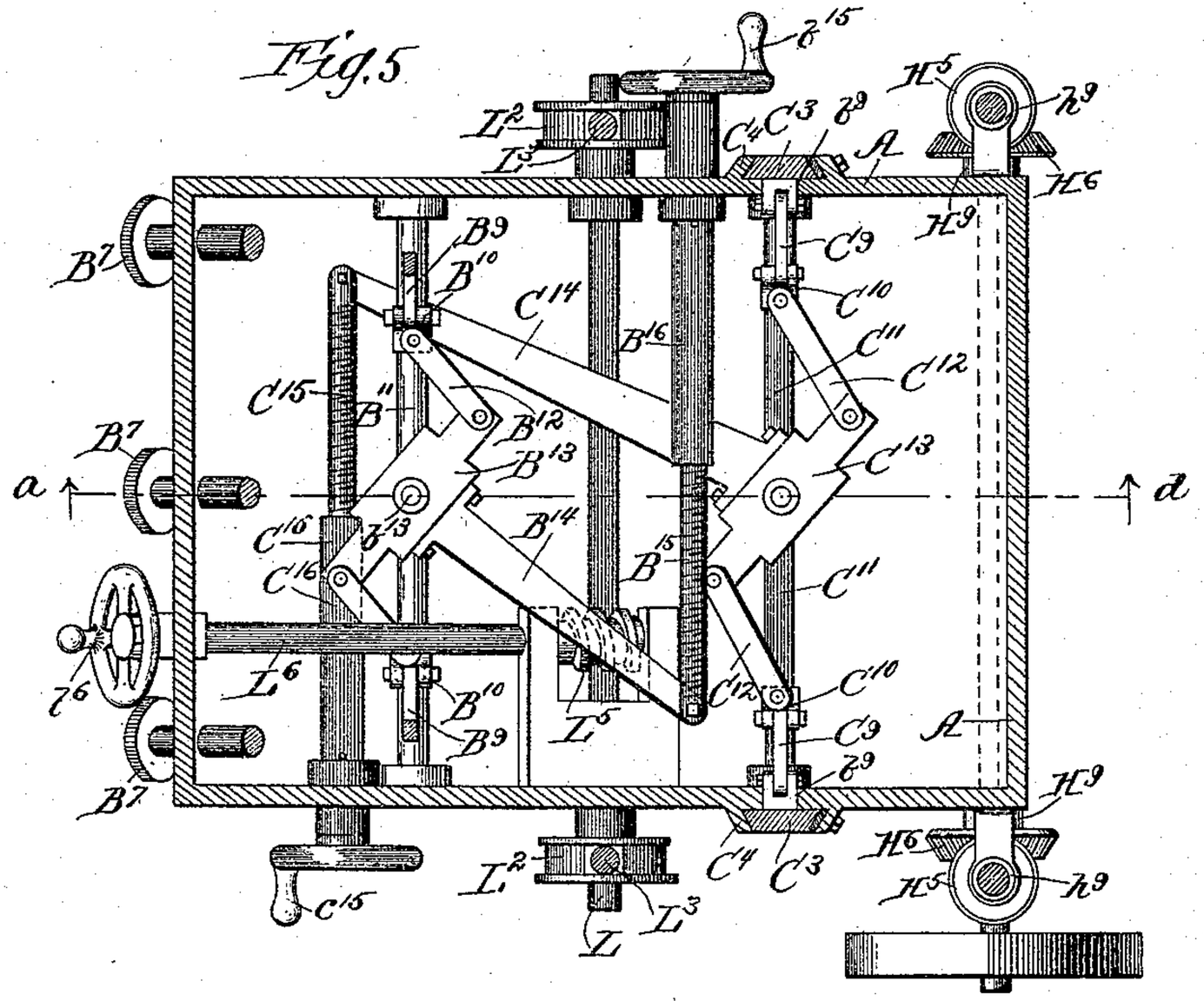


Fig. 6

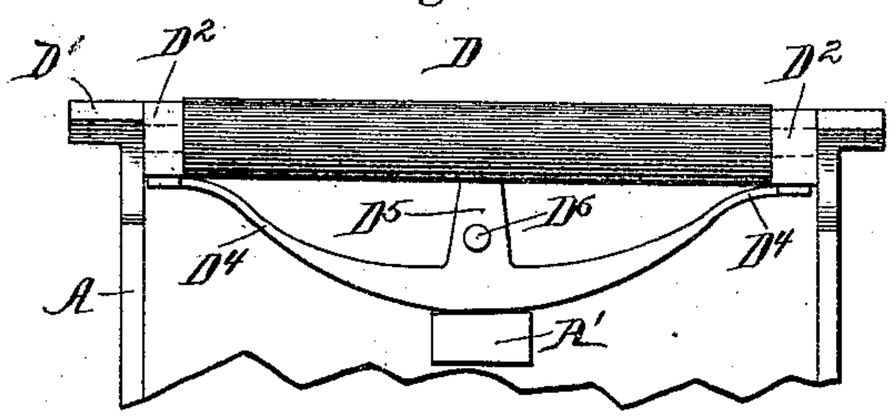
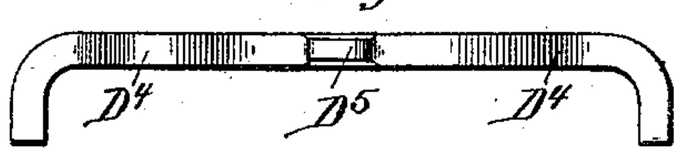


Fig. 7.



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(No Model.) 4 Sheets—Sheet 4.

H. FRASER.

PLANER.

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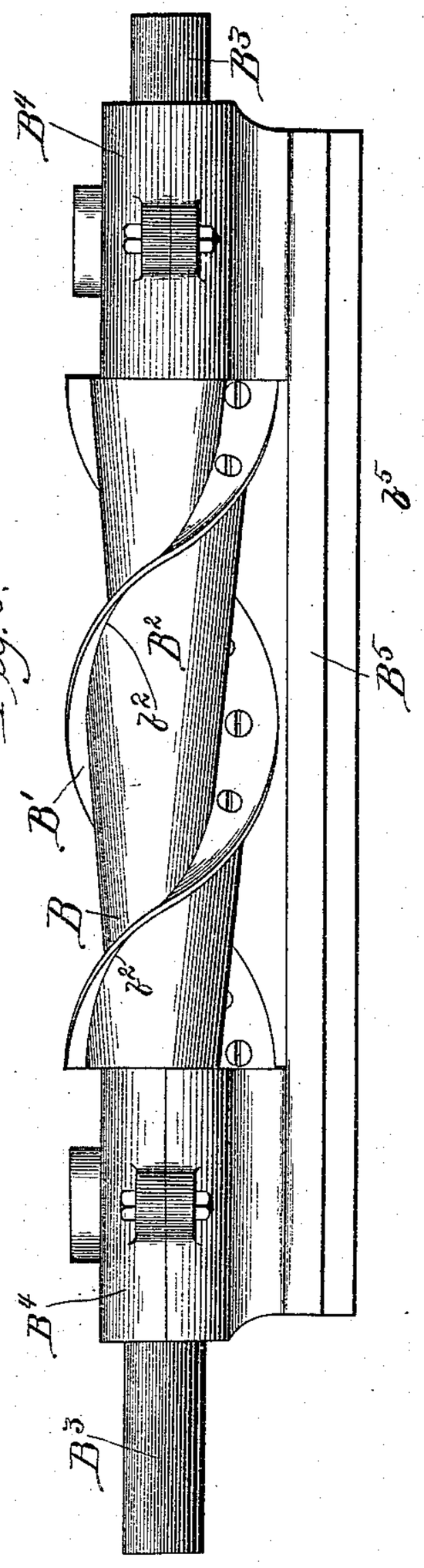

Fig. 8.

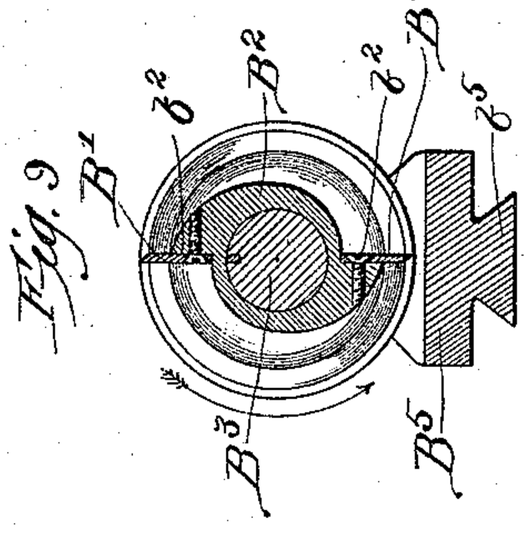

Fig. 9

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UNITED STATES PATENT OFFICE.

HARVEY FRASER, OF BELOIT, WISCONSIN.

PLANER.

SPECIFICATION forming part of Letters Patent No. 543,475, dated July 30, 1895.

Application filed May 29, 1893. Serial No. 475,917. (No model.)

To all whom it may concern:

Be it known that I, HARVEY FRASER, a citizen of the United States, residing at Beloit, in the county of Rock and State of Wisconsin, have invented certain new and useful Improvements in Planers; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to letters of reference marked thereon, which form a part of this specification.

My improvement relates to a construction which will permit the ready removal of the working cylinder or cylinders of a planer, to mechanism for effecting a vertical adjustment of the working cylinders, to mechanism for effecting a vertical adjustment of the idle feed-rollers located at the side of the passage for the lumber at which the working cylinders are located, to an endless-feed mechanism located at the path of the lumber opposite the working cylinders, to mechanism for varying the distance between said feed mechanism and the working cylinders, to the peculiar construction of one of the working cylinders hereinafter described, and to certain features of detail.

The term "working cylinder" is herein applied to any form of cylinder with which the lumber to be planed, dressed, or polished is brought into contact and acted upon by cutting or abrading. Said cylinders may be provided upon the periphery with sandpaper or similar material, or with cutting-edges.

In the accompanying drawings, Figure 1 is a plan. Fig. 2 is an elevation of the right-hand side of the machine, the left portion of the machine shown in Fig. 1 being regarded as the front of the machine. Fig. 3 is a vertical section in line *a b* of Fig. 2. Fig. 4 is a vertical section in line *a c* of Fig. 1 and *a d* of Fig. 5. Fig. 5 is a horizontal section in line *a e* of Fig. 4. Figs. 6 and 7 are details of means for adjusting one of the idle feed-rollers. Figs. 8 and 9 are details of one of the rotary working cylinders.

A is the frame or case of the machine. This is hollow, and the upper portion is preferably rectangular in cross-section, as indicated in Figs. 1 and 5. The operative parts of the machine are supported by said case. B is a rotary working cylinder having cutting-edges. C is a rotary working cylinder having its periphery covered with sand or similar material.

The cylinder B is provided with spiral knives B′. Said knives may be applied to the cylinder in any suitable manner. The drawings show them secured to the radial faces b^2 of a hub B^2 surrounding the shaft B^3 of said cylinder, and keyed to the latter. The shaft B^3 is supported in bearings B^4, and said bearings rest upon and are made rigid with the plate B^5, which is of sufficient length to extend from one of said bearings to the other. The lower portion of said plate is provided with a dovetail tongue b^5.

B^6 is a horizontal table having a dovetail groove b^6 adapted to receive the dovetail tongue b^5 of the plate B^5.

The sides of the case A are open in line with the cylinder B, and the shaft B^3 and bearings B^4 extend through said openings in order that the spiral knives may extend from one of the side walls of said case to the other. The dovetail tongue b^5 and the dovetail groove b^6 are fitted to each other accurately, and yet so loosely as to allow the plate B^5 to be withdrawn endwise from the table B^6. This affords a ready means for removing the cylinder B for sharpening and dressing or replacing the knives. When said cylinder and the plate B^5 are in place in the machine, said plate is bound to the table B^6 by means of set-screws B^7 extending through the plate B^6 and bearing against the tongue b^5. In order that said set-screws B^7 may be the more readily accessible, they are extended outward through the wall of the case A, as shown in the drawings. At each end said table B^6 has a vertical depending leg B^8 in contact with the adjacent wall of the case A and extending between guide-blocks b^8, attached to the wall of the case A. This construction permits a vertical movement of the table b^6. Raising said table will of course raise the plate B^5 and cylinder B. Any suitable means may be used for varying the elevation of said table B^6. The mechanism shown in the drawings and described next below constitute one means for accomplishing such elevation.

B^{11} (see particularly Figs. 3 and 5) is a stationary shaft located beneath and parallel to the table B^6. Upon said shaft are located two sliding blocks B^{10}, each being a little nearer the middle of the machine than the adjacent end of said table. From each said block a link B^9 extends upward and obliquely outward from the middle of the machine and is hinged by its lower end to said block and by its upper end to said table. It will be understood that moving said blocks toward each other will allow the upper ends of said links to descend, so that the table B^6 is also allowed to descend or is drawn downward, and that forcing said blocks from each other simultaneously will cause said links to approach more nearly the vertical position, whereby the upper ends of said links are elevated and the table B^6 forced upward, the two ends thereof rising equally. The movement of said blocks may be effected in different ways. The drawings show for this purpose a cross-head B^{13}, pivoted between the blocks B^{10} upon an axis b^{13} perpendicular to the shaft B^{11} and links B^{12}, hinged to the ends of said cross-head and said blocks B^{10}. A rigid arm B^{14} extends laterally from said cross-head and has the end which is opposite said cross-head hinged to a screw-shaft B^{15}. Said screw-shaft is seated in a threaded sleeve B^{16}, which extends outward through the case A of the machine. Said screw-shaft extends through said sleeve and is provided with a crank b^{15}. By turning said screw-shaft, so as to extend it farther into the machine, the cross-head B^{13} is turned to a greater angle to the shaft B^{11}, and the links B^{12} are thereby drawn toward the middle of the machine, the blocks B^{10} being similarly drawn by said links. By turning the screw-shaft outward the cross-head B^{13} is turned more nearly parallel to the shaft B^{11}, and the links B^{12} and blocks B^{10} are drawn outward. I have found that this mechanism imparts to the table B^6 and cylinder B a finely-graduated parallel motion in the vertical direction.

The cylinder C may also be supported upon a plate similar to the plate B^5, and the latter may be supported upon a table similar to the table B^6, but the drawings do not show such construction. They show the journals C′ of said cylinder resting in bearings C^2, said bearings being each in the upper end of the vertical plate C^3, resting between vertical guide-plates C^4, supported by the walls of the case A. Said plates C^3 are shown located on the outer side of the walls of the case A; but they may obviously be located inside, as are the legs B^8 of the table B^6.

As the plates C^3 may slide in a vertical direction between the guide-plates C^4, it follows that the cylinder C may be raised and lowered. Such movement is effected by means of a train of mechanism similar to that described for effecting the vertical adjustment of the cylinder B. Links C^9, corresponding to the links B^9, are applied to the plates C^4 through openings b^9 in the wall of the case A. The letters ranging from C^{10} to C^{16}, inclusive, indicate the parts of this train of mechanism which correspond to the parts designated by the letter B with the same exponents.

D is an idle-roller extending horizontally across the machine at the front of and parallel to the cylinder B.

D′ is a plate or frame resting upon the front portion of the top of the case A, and at the rear each end of said frame there is a bearing D^2, in which said roller D is journaled. A yoke D^3 is located beneath and in front of said roller and rests at its middle upon a shoulder A′ on the wall of the case A. At each side said yoke has an arm D^4, extended forward beneath the rear portion of the frame D′. At its middle said yoke has an upward and rearward directed arm D^5. A screw-bolt D^6 extends loosely through the case A and is threaded into the arm D^5. By turning said screw-bolt forward the latter draws the arm D^4 toward the front of the machine and rocks the entire yoke D^3 forward with the shoulder A′ as a pivot. In this change of position the arms D^4 of the yoke are raised more or less, while the rear portion of the frame D′ with which they are in contact is raised correspondingly. Turning the screw backward will obviously release said yoke and allow said frame to descend. A spring d^6 may be interposed between the head of the bolt D^6 and the case A in order that said bolt may yield to a chosen pressure upon the yoke.

E E are idle-rollers supported in any suitable manner between the cylinders B and C, with the upper portions of their peripheries substantially in plane with the upper portions of the peripheries of the cylinders B and C.

F is an idle-roller similar to the roller D and located at the rear of the cylinder C, with its upper portion substantially in plane with the upper portions of the rollers and the cylinders, and this may or may not be supported adjustably, as described of the roller D.

G is a slatted endless feed-apron located a short distance above the cylinders B and C, and the rollers D, E, and F, and parallel to the plane to which the upper portions of said cylinders and rollers extend. At the rear of the machine said apron extends around and is supported by a shaft H. At its front said apron surrounds and is supported by a shaft I. Said shafts are arranged parallel to each other and to the cylinders B and C, and are journaled in side-plates J J, located at each side of the apron G, and having vertical depending arms J′ extending loosely between guide-plates J^2, supported by the case A. Suitable sprockets or flanges H′ and I′ may be placed upon the shafts H and I.

L (see particularly Figs. 3 and 5) is a shaft extending through and journaled in the case A in a horizontal position and parallel to the cylinders B and C and beneath the arms J′.

At each end of said shaft an eccentric L′ surrounds and is keyed to said shaft, and each of said eccentrics is embraced by an eccentric-strap L^2. From each eccentric-strap a pitman L^3 extends to the arm J′ and is hinged to the latter.

From the foregoing it will be understood that the rotation of the shaft L will alternately bring the major and minor portions of said eccentrics above said shaft. This, of course, raises and lowers the eccentric-straps and the pitmen L^3, and since the latter are coupled to the arms J′, the latter, and the plates J and the apron G are raised and lowered. The object in varying the elevation of said apron is to vary the space between the lower face of said apron and the rollers D, E, and F, in order that the machine may be adapted to pass over the working cylinders lumber of different thicknesses. On the shaft L is a worm gear-wheel L^4. At right angles to said shaft L is a shaft L^6 suitably journaled in the case A, and preferably extending outward through the latter and there having a crank l^6. The inner end of said shaft extends over the worm gear-wheel L^4, and has surrounding it a worm L^5 engaging the wheel L^4. By turning the crank l^6, the shaft L^6 and worm L^5 are rotated. This causes the rotation of the wheel L^4, shaft L, and eccentrics L′, and the reciprocation of the rest of the mechanism leading to and supporting the apron.

At each end the shaft H is extended through the adjacent plate J and provided with a worm gear-wheel H^2. H^7 is a shaft extending along the rear of the case A, below and parallel to the shaft H, and supported in suitable bearings h^7. At each side of the case A said shaft H has a bevel-gear H^6. H^4 is a shaft arranged at right angles to the shaft H^7, and near enough the latter to support at its lower end a bevel-gear H^5, meshing with the bevel-gear H^6. Above said bevel-gear H^5 said shaft H^4 is embraced by a bearing H^9, and above said bearing a collar h^9 is fixed to said shaft. Said collar and said bevel-gear H^5 prevent movement of said shaft H^4 in a vertical direction. Bearings h^4 h^4 are supported by the plates J above and below, and in a vertical line passing at the rear of the worm gear-wheel H^2. The upper end of the shaft H^4 extends loosely through said bearings. Between said bearings h^4 a worm H^3 surrounds and is feathered to said shaft in such manner as to permit the vertical reciprocation of said worm upon said shaft, while said worm and said shaft are adapted to rotate in unison.

H^8 is a band-wheel surrounding and keyed to one end of the shaft H^7. It will now be understood that by rotating said wheel H^8 the shaft H^7, bevel-gears H^6 and H^5, the shafts H^4, worm H^3, and worm gear-wheel H^2, and shaft H, and the apron G will be set into motion. By feathering the worm H^3 upon the shaft H^4 provision is made for raising and lowering the apron G without destroying the gear connection between said apron and the shaft H^7.

M is a band-wheel upon the shaft C′ of the cylinders C, and N is a band-wheel upon the shaft B^3. Belts are to be applied to these band-wheels to operate said cylinders.

I claim as my invention—

1. In a planer, the combination with the case of the machine, of mechanism for guiding lumber through said machine and a working cylinder arranged transversely to the path formed by said guiding mechanism and having spiral radial faces, B^2, and spiral knives, B′, applied to said faces, substantially as described.

2. In a planer, the combination with a working cylinder having a support or supports permitting reciprocation in a direction perpendicular to said cylinder, of links, B^9, sliding blocks, C^{10}, and mechanism for moving said sliding blocks toward and from each other, substantially as described.

3. In a planer, the combination with a working cylinder, having a support or supports permitting reciprocation in a direction perpendicular to said cylinder, of links, B^9, sliding blocks, C^{10}, cross-head, C^{13}, and suitable connections from said cross-head to said blocks, and suitable mechanism for partially rotating said cross-head, substantially as described.

4. In a planer, the combination with a working cylinder having a support or supports permitting reciprocation in a direction perpendicular to said cylinder, of links, B^9, sliding blocks, C^{10}, links, C^{12}, cross-head, C^{13}, arms, C^{14}, screw-shaft, C^{15}, and threaded bearing, C^{16}, substantially as described.

5. In a planer, the combination of an idle roller, D, and frame, D′, to which said roller is journaled, of a pivoted yoke, D^3, and screw-bolt, D^6, for varying the elevation of said roller and the portion of said frame to which said roller is journaled, substantially as described.

6. In a planer, the combination with the case of the machine, of a vertically reciprocable feed mechanism located above said cylinder, eccentrics suitably connected with the support of said feed mechanism, and means for rotating said eccentrics, substantially as described.

7. In a planer, the combination with the case of the machine, of a vertically reciprocable feed mechanism located above said cylinder, of eccentrics suitably connected with the support of said feed mechanism, a shaft for supporting said eccentrics, a worm gear wheel located upon said shaft, and a shaft having a crank at one end and at the other end a worm engaging said worm gear wheel, substantially as described.

8. In a planer, the combination with the case of the machine, of an endless feed apron, vertically-reciprocable plates located at the side of said apron, shafts for supporting said

apron and having bearings in said plates, gearing extending from said case to one of said shafts and supported in part in bearings attached to said case and in part in bearings attached to said plates, two parts of said gearing being adjustably connected to each other, substantially as described.

In testimony whereof I affix my signature, in presence of two witnesses, this 24th day of May, A. D. 1893.

HARVEY FRASER.

Witnesses:
J. O. JARWIN,
A. ALDRICH.