(No Model.) 3 Sheets—Sheet 1.

C. W. H. BLOOD.

CHAIN FEED FOR WOODWORKING MACHINES.

No. 562,756. Patented June 23, 1896.

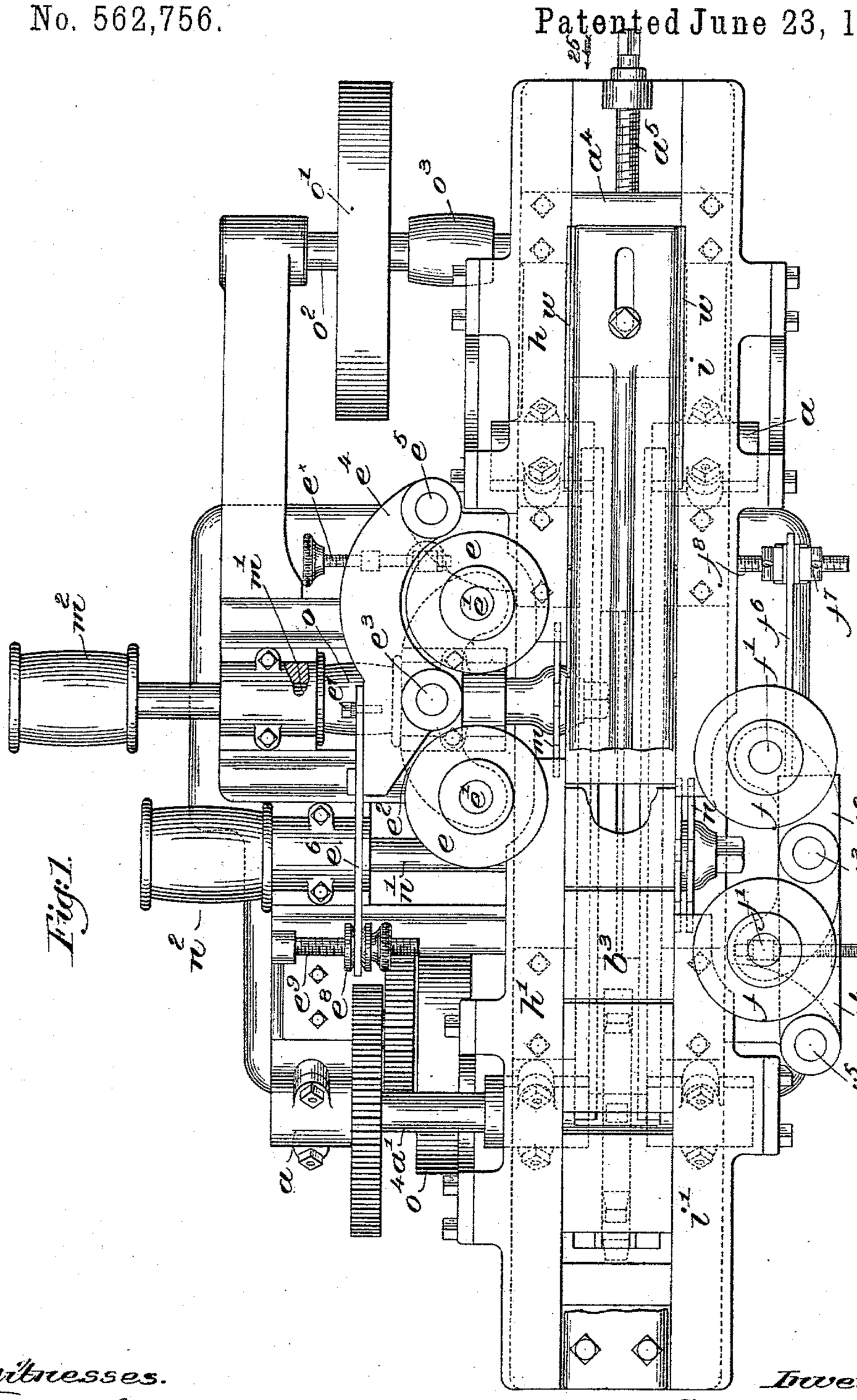


Fig. 1.

Witnesses.
Fred. S. Grinnell.
Thomas J. Drummond.

Inventor.
Charles W. H. Blood.
by Crosby & Gregory
attys

(No Model.) 3 Sheets—Sheet 2.

C. W. H. BLOOD.

CHAIN FEED FOR WOODWORKING MACHINES.

No. 562,756. Patented June 23, 1896.

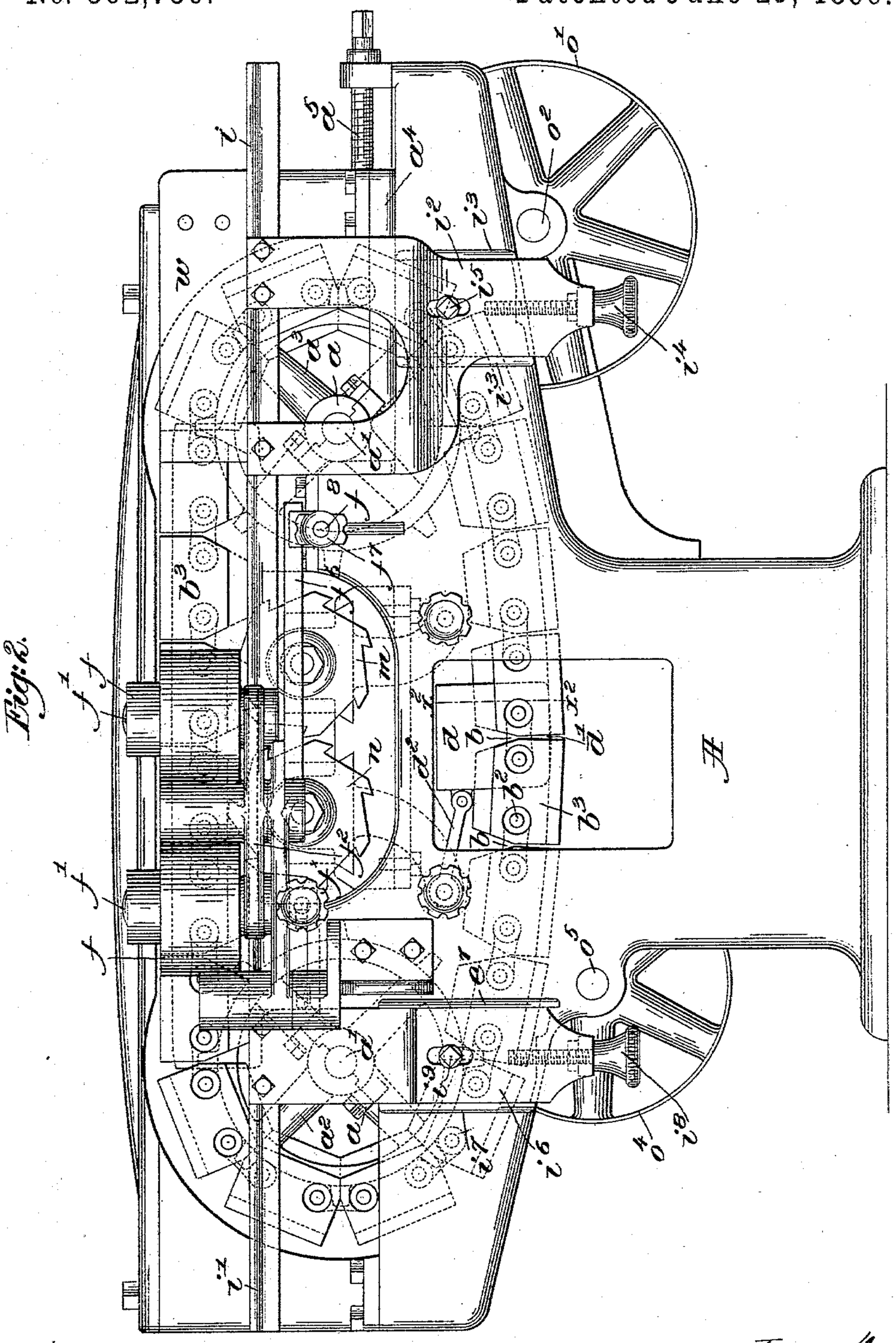


Fig. 2.

Witnesses.
Fred S. Greenleaf.
Thomas J. Drummond.

Inventor:
Charles W. H. Blood.
by Crosby & Gregory
Attys.

(No Model.) 3 Sheets—Sheet 3.

C. W. H. BLOOD.

CHAIN FEED FOR WOODWORKING MACHINES.

No. 562,756. Patented June 23, 1896.

Fig. 3.

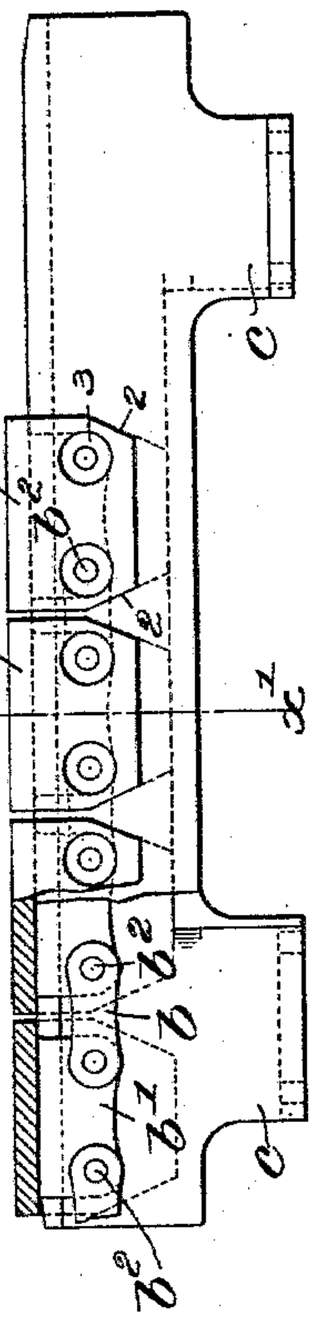


Fig. 5.

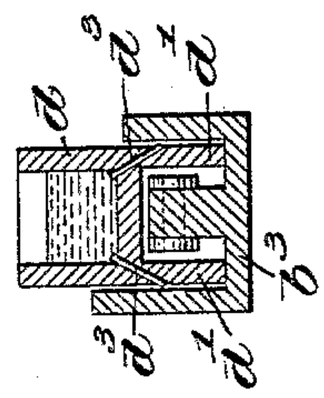


Fig. 6.

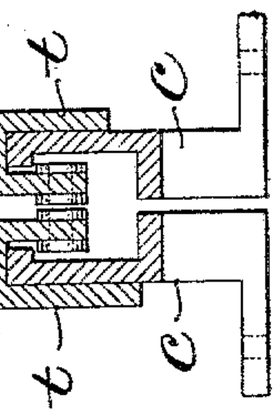
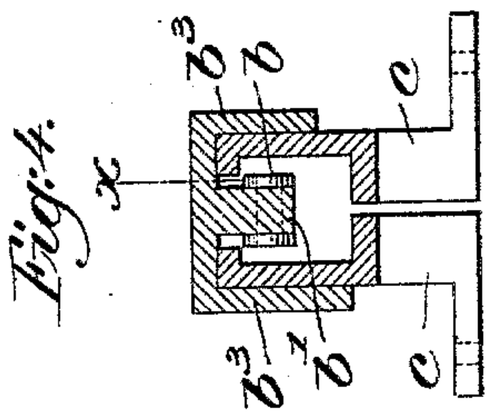


Fig. 4.



Witnesses.
Fred S. Grunlaf.
Thomas J. Drummond.

Inventor:
Charles W. H. Blood.
By Crosby Gregory
attys.

UNITED STATES PATENT OFFICE.

CHARLES W. H. BLOOD, OF BOSTON, MASSACHUSETTS, ASSIGNOR TO THE S. A. WOODS MACHINE COMPANY, OF SAME PLACE.

CHAIN-FEED FOR WOODWORKING-MACHINES.

SPECIFICATION forming part of Letters Patent No. 562,756, dated June 23, 1896.

Application filed May 16, 1895. Serial No. 549,474. (No model.)

To all whom it may concern:

Be it known that I, CHARLES W. H. BLOOD, of Boston, county of Suffolk, State of Massachusetts, have invented an Improvement in Chain-Feed Woodworking-Machines, of which the following description, in connection with the accompanying drawings, is a specification, like letters and numerals on the drawings representing like parts.

This invention relates to that class of woodworking-machines wherein is employed an endless or chain feeding device, as distinguished from roller-feeds.

My invention is particularly adapted for use in tonguing-and-grooving machines, or, as they are sometimes called, "matching-machines," and in the following specification I shall describe my invention in connection with a machine of this class, it being understood, however, that my invention is not limited in its application to matching-machines alone.

My invention relates principally to the endless or chain feed.

Prior to my invention endless or chain feeds have been employed wherein the links or feeding-surfaces of the chain have formed, in effect, the table of the machine, the work being fed through the machine upon the top of the chain, the feeding-surfaces of the chain being in planes perpendicular to the plane of rotation of the wheels about which the chain is carried.

In matching-machines of the type above referred to, used principally for matching box-stock, it has been customary to feed the stock through the machine on its edge, the working devices or saws being arranged beneath the table. To feed the stock in this way, the feeding devices must be vertical, and have usually been in the form of rollers to act upon the sides of the stock, or in the form of an endless flexible feeding device moved about wheels having vertical axes and rotating in horizontal planes.

An endless or chain feed for many classes of work is superior to a roller-feed, yet a chain-feed, moving about wheels which rotate in horizontal planes, is also objectionable because it must be arranged entirely above the work-table, and the principal object of this invention is to provide a chain-feed which shall be arranged partly above and principally below the table, as with the bed-feed referred to, yet act upon the sides of the stock fed through the machine upon its edge.

One part of my invention consists in the employment of an endless feeding device or chain adapted to travel about, preferably, a plurality of wheels mounted to rotate about horizontal axes, the said chain being provided with feeding-surfaces which are at the sides of the chain, that is, in planes substantially parallel with the planes of rotation of its carrying-wheels. The feeding device may be provided at its opposite sides with parallel series of feeding-surfaces, so that the same chain may constitute a feed for two sets of working devices arranged at opposite sides of the chain. Suitable pressers, preferably in the form of rollers, are employed to hold the stock in contact with the lateral feeding-surfaces adjacent the working devices.

The above, together with other features of my invention, will be hereinafter described, and pointed out in the claims.

Figure 1 of the drawings is a plan view, partially broken out, of a machine embodying my invention; Fig. 2, a side elevation of the machine shown in Fig. 1; Fig. 3, a detail partial section showing a part of the endless feeding device and its guide, the section being taken on the dotted line x, Fig. 4; Fig. 4, a vertical cross-section on the dotted line x', Fig. 3; Fig. 5, a section on the dotted line x^2, Fig. 2, showing the lubricating device; and Fig. 6, a modification of my invention, showing independent feeding devices or chains for the independent working devices or sets of working devices.

In the particular embodiment of my invention selected to illustrate the same and shown in the drawings, the frame A is of suitable shape and construction to sustain the several working parts, it, as herein shown, being provided with suitable bearings a a for the shafts a' a', carrying the sprocket-wheels a^2 a^3, about which the endless feeding device or chain to be described is passed.

In the present instance of my invention, the bearings for the sprocket-wheel a^3 are connected by a yoke a^4, (see Fig. 1,) which is

made adjustable in suitable guideways on the frame and is provided with an adjusting device, (shown as a screw a^5,) by which the position of its bearings may be varied as necessary to take up slack in or to properly adjust the feeding device or chain.

The endless feeding device constituting the principal part of my invention is best shown in Figs. 2, 3, 4, and 5, it, as herein shown, comprising a sprocket-chain made up of outer and inner links $b\,b'$, jointed together at b^2 in usual manner, the outer links b being arranged in pairs and embracing between them the inner links b'. This chain, in the mechanism shown, travels edgewise, that is, in a vertical plane, and, as shown, its inner links b' are provided at their upper edges with the laterally-extended and depending wings $b^3\,b^3$, (see Fig. 4,) the outer surfaces of which constitute what I term "lateral feeding-surfaces," they standing in planes which are substantially parallel with the planes of rotation of the carrying or driving wheels $a^2\,a^3$, that is, the said feeding-surfaces travel in planes which are substantially perpendicular to the axes of the driving or carrying wheels, so that they constitute lateral feeding-surfaces for and at opposite sides of the chain. These feeding-surfaces (see Figs. 2 and 3) have their corners cut, as at 2, in order that adjacent surfaces may be brought close together without interfering with each other when curving about the carrying-wheels, and the said surfaces or wings are preferably provided with openings 3, arranged opposite, and through which access may be had to the joints b^2, connecting the several links of the chain. To support this endless feeding device against lateral vibration, I have herein provided at the top of the machine where the work is performed a suitable guide, shown as comprising two independently-adjustable members $c\,c$, (see Fig. 4,) which members at their upper edges support the overhanging wings of the inner links of the chain, and the sides of which constitute guiding-surfaces along which the depending portions of the said overhanging wings travel, the said guiding members $c\,c$ restraining the chain from lateral movement, and being made adjustable toward and from each other to take up wear and for adjustment. To oil the inner surfaces of these overhanging wings b^3 in order that they may travel with the least friction along the guides $c\,c$, I have provided at the under side of the machine (see Figs. 2 and 5) a lubricating-reservoir d, shown as provided with depending ears d', which rest upon the inverted wings of the chain as the latter passes beneath the bed, the said chain supporting or taking the weight of the lubricating-reservoir, which latter is restrained against movement in the direction of and by the chain by a link d^2, jointed to the reservoir and to the frame. (See Fig. 2.) Lubricating-ducts d^3, which may be filled with wicking or other suitable conducting material, lead from the interior of the reservoir to the outer surfaces of the depending ears d', to conduct oil or other lubricant from the reservoir to the inner faces of the wings b^3 of the feeding device or chain.

Referring now to Figs. 1 and 2, to hold the stock, usually thin boards of considerable width, against, that is, in frictional contact with the lateral feeding-surfaces of the feeding device, I have provided the pressers e and f, (shown as rollers,) and arranged in pairs with the pairs arranged at opposite sides, respectively, of the feeding device. These presser-rollers e and f are shown as journaled at e' and f' in the opposite ends of the yokes e^2 and f^2, which in turn are jointed at e^3 and f^3 to the ends of arms or levers $e^4\,f^4$, pivoted at $e^5\,f^5$, to the frame. The presser-rollers e are held in position in the present instance by a resilient arm or flat spring e^6, pivoted at e^7 to the lever e^4, and at its outer end adapted to drop into a circumferential groove in a nut e^8, threaded upon the screw e^9 on the frame, adjustment of this nut varying the action of the spring in pressing the roller-pressers toward or in the direction of the feeding-surfaces at that side of the chain.

When it is desired to turn the lever e^4 back to remove the roller-pressers for adjustment or for access to the working device, to be described, the spring e^6 is turned into a vertical position about its pivot e^7, thereby disengaging the lever e^4 from the screw e^9, and enabling the said lever to be swung back to remove the pressers. The pressers f are held in position, pressing the work against the feeding-surfaces, by means of a spring f^6, (see Fig. 2,) shown as rigidly secured to the lever f^4, and at its free end dropped into a groove in a flattened nut f^7, threaded on the screw f^8 on the frame. Adjustment of this nut varies the pressure of the pressers f upon the work, and by turning the nut a quarter of a rotation in either direction, its flattened sides cause disengagement of the spring f^6 therefrom, and permit the lever f^4 with its pressers f to be turned back for access to the working devices at that side of the machine.

The working devices are herein shown at m and n in the form of saws mounted, respectively, upon the shafts m' and n', journaled in suitable bearings in the frame, and provided, respectively, with belt-pulleys m^2 and n^2, there being in the present instance of my invention two working devices n, adapted to act upon opposite corners or sides of a board fed edgewise between them to form a tongue at that edge of the board, and a single working device m to cut a single groove or channel in the opposite edge of the board.

In the present instance of my invention, the shaft m' is provided with a small pulley o, adapted to be connected by a belt with a larger pulley o', on a shaft o^2 at one end of the machine, the shaft o^2 being provided with a small pulley o^3, adapted to be connected by a belt with a larger pulley o^4 on a shaft o^5, journaled in suitable bearings at the

opposite end of the machine. This shaft o^5 is connected by suitable gearing with and to drive the shaft a' of the sprocket-wheel a^2, which constitutes the driving-wheel for the endless chain.

In the present instance of my invention I have provided the four independently-adjustable tables h h', and i i', the tables h and h' being arranged substantially in line but at opposite sides the working device m, the tables i i' being arranged substantially in line but at opposite sides the working device n, said tables being adjustably mounted on the machine-frame in suitable manner.

In the present instance of my invention the tables h and i (see Fig. 1) are similarly mounted upon brackets, one of which is shown at i^2, adapted to slide vertically in suitable bearings i^3 on the frame and provided with suitable adjusting-screws i^4, by which to vary their level, a clamping device i^5 being provided to hold it in vertically-adjusted position. The tables h' and i' are also similarly mounted upon suitable brackets, one of which is shown at i^6, mounted in vertical guideways i^7 on the frame, and with a frictional clamping device i^9.

Referring to Fig. 4, it will be seen that the feeding-surfaces at the left of the feeding device are deeper than those at the right, that is, those at the left depend nearer to the working devices than those at the right, and for this reason, at the right are located the two working devices for forming the tongue upon the edge of the board, and in order to properly form such a tongue, these working devices or saws must project from the tongue laterally beyond the opposite faces of the board, and the feeding-surfaces at that side the feeding device are therefore shortened to clear these laterally-projecting working devices, while at the opposite side the feeding device, where a central working device or saw alone is used to cut a groove, the feeding-surfaces may be carried down even at the side of the working device or saw. To provide a safeguard, and also to prevent the stock as it is first fed into the machine being caught by the front edges of the rising surfaces or wings on the chain, I have provided at the feeding-in end of the machine (indicated by the arrow 25) suitable vertical shields or guards w w, secured to the tables h and i, and which hold the stock away from the feeding-surfaces until the latter reach and begin their travel in a horizontal line. The oscillations of the yokes which carry the presser-rollers e and f are limited by the respective limiting-screws $e^{\times}$ $f^{\times}$.

Referring now to Fig. 6, I have shown two feeding devices arranged side by side, each having its inner links provided, respectively, with a single laterally-extended and depending wing t, which furnish lateral feeding-surfaces at one of the sides of the chains only. This arrangement is advantageous in certain instances, as each chain is independent of the other and remains unaffected by any wear or improper adjustment of the other.

I find that an endless feeding device acting upon and driving the stock at its side, with pressers to hold the stock laterally against the feeding device, holds the stock better in alinement during its travel through the machine and over the openings in the bed in which the working or cutting devices are located than is possible where the stock is fed by rollers.

So far as known to me, I am the first to employ an endless or chain feed in which the feeding-surfaces are lateral, *i. e.*, at the sides of the chains, so that they travel in planes substantially parallel with the planes of rotation of the wheel or wheels which carry the chain, and I therefore consider myself entitled to claim these features broadly and without reference to detailed construction or to the particular machine or working devices in connection with which they may be used, they presenting obvious advantages viewed from a constructional standpoint, which render them desirable for various kinds of machinery.

I claim—

1. The combination with a frame, and one or more working devices mounted therein, of one or more wheels, an endless flexible feeding device passed over the same and provided with links and lateral feeding-wings extending from said links to receive and feed the work on their outer surfaces substantially perpendicular to the axis of said wheel or wheels, means to move the said feeding device, and a presser or pressers opposed to and to hold the work against the said lateral feeding-surfaces, substantially as described.

2. The combination with a frame, and one or more working devices mounted therein, of an endless feeding device consisting of a sprocket-chain, and lateral feeding-surfaces arranged outside of the outer links on either side of said chain and connected with and driven by the inner links thereof, substantially as described.

3. The combination with a frame, and one or more working devices mounted therein, of an endless feeding device consisting of a sprocket-chain, and lateral feeding-surfaces arranged outside of the outer links and connected with and driven by the inner links thereof, and openings through the said feeding-surfaces through which access may be had to the joints connecting the links back of the said feeding-surfaces, substantially as described.

4. In a machine of the class described, a frame, tonguing-and-grooving devices arranged therein, and two endless lines of connected independent feeding-surfaces arranged between the said tonguing-and-grooving devices, means to drive the said feeding-surfaces, those feeding-surfaces at the grooving side of the machine being made deeper than the feeding-surfaces at the tonguing side, substantially as and for the purpose specified.

5. The combination with a frame and one or more working devices mounted therein, of an endless feeding device, wheels about which the same is carried, feeding-surfaces on the said feeding device, and substantially parallel with the plane of rotation of the said wheels, a lateral guide for said feeding device, and a lubricating device resting upon and supported by said feeding device and arranged to act upon and lubricate the side surfaces thereof adjacent said guide, substantially as described.

6. In a machine of the class described, the combination with a frame, work-tables and the working devices, of the endless feeding devices provided with lateral feeding-surfaces, and the presser-rollers, a yoke carrying the same, a pivoted lever to which the said yoke is jointed, and means to move the said pressers against and away from the work, substantially as described.

7. In a machine of the class described, the combination with a frame, one or more working devices, and the work-table, of the sprocket-wheels a^2, a^3, and an endless feeding device consisting of a sprocket-chain, part of the links of which are provided with the laterally-extended and depending wings b^3, furnishing on their outer sides lateral feeding-surfaces, substantially as described.

8. The combination with a frame, a work-support, and one or more working devices mounted in said frame, of an endless traveling feed device provided with extended lateral wings having their outer sides constituting feeding-surfaces lying in a plane passing outside of and entirely uninterrupted by said feeding device, said feeding-surface being substantially perpendicular to said work-support to engage the side of the work, and a presser to hold said work laterally against said endless feeding device, substantially as described.

9. The combination with a frame having a work-table, and one or more working devices mounted in said frame, of a wheel or wheels and an endless feeding device passed about the same and provided at its opposite sides with lateral feeding-surfaces arranged substantially perpendicular to the axis of said wheel or wheels, and substantially parallel to the plane of rotation of the latter, a lateral guide for the said feeding device and arranged between the feeding-surfaces at opposite edges of the latter, and a lubricating device arranged beneath the work-table and provided with oppositely-extended ducts to lubricate said feeding device between the feeding-surfaces thereof, and at such portions as contact with the said lateral guide, substantially as described.

10. The combination with a frame, and a working device, of an endless feeding device, consisting of a sprocket-chain and lateral feeding-surfaces connected to said sprocket-chain by an overhanging portion, and a guide therefor extending between said chain and feeding-surfaces, substantially as described.

11. The combination with a frame, and working devices, of an endless feeding device, consisting of a sprocket-chain, some of whose links are provided with laterally-extended and depending wings, said wings constituting lateral feeding-surfaces, and a guide or guides for and inclosed between said depending wings, substantially as described.

12. The combination with a frame, and working devices, of an endless feeding device, consisting of a sprocket-chain, some of whose links are provided with laterally-extended and depending wings, said wings constituting lateral feeding-surfaces, and two adjustable guides for and inclosed between said depending wings, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

CHARLES W. H. BLOOD.

Witnesses:
FREDERICK L. EMERY,
EMMA J. BENNETT.