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PLANING MACHINE.

No. 509,435. Patented Nov. 28, 1893.

Fig.1

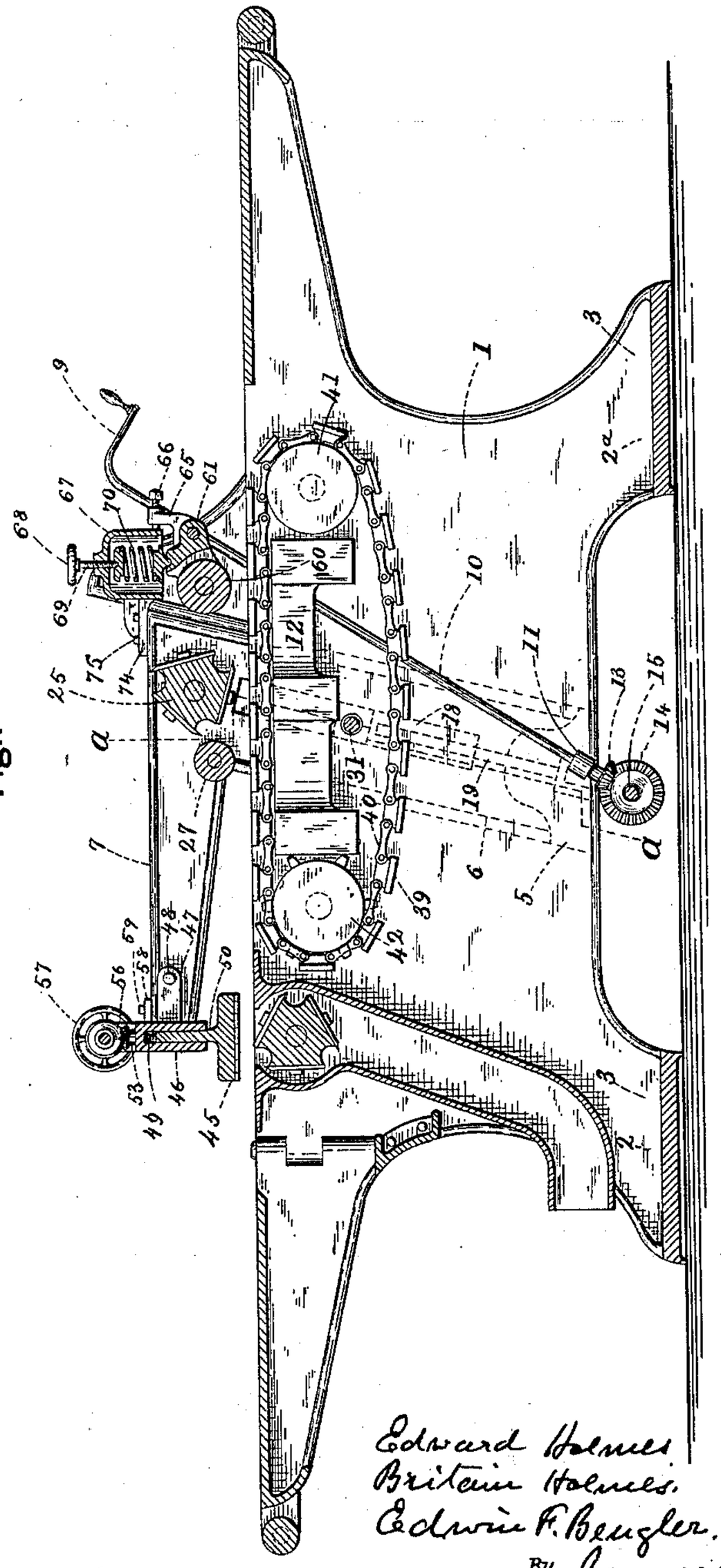

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Fig. 2

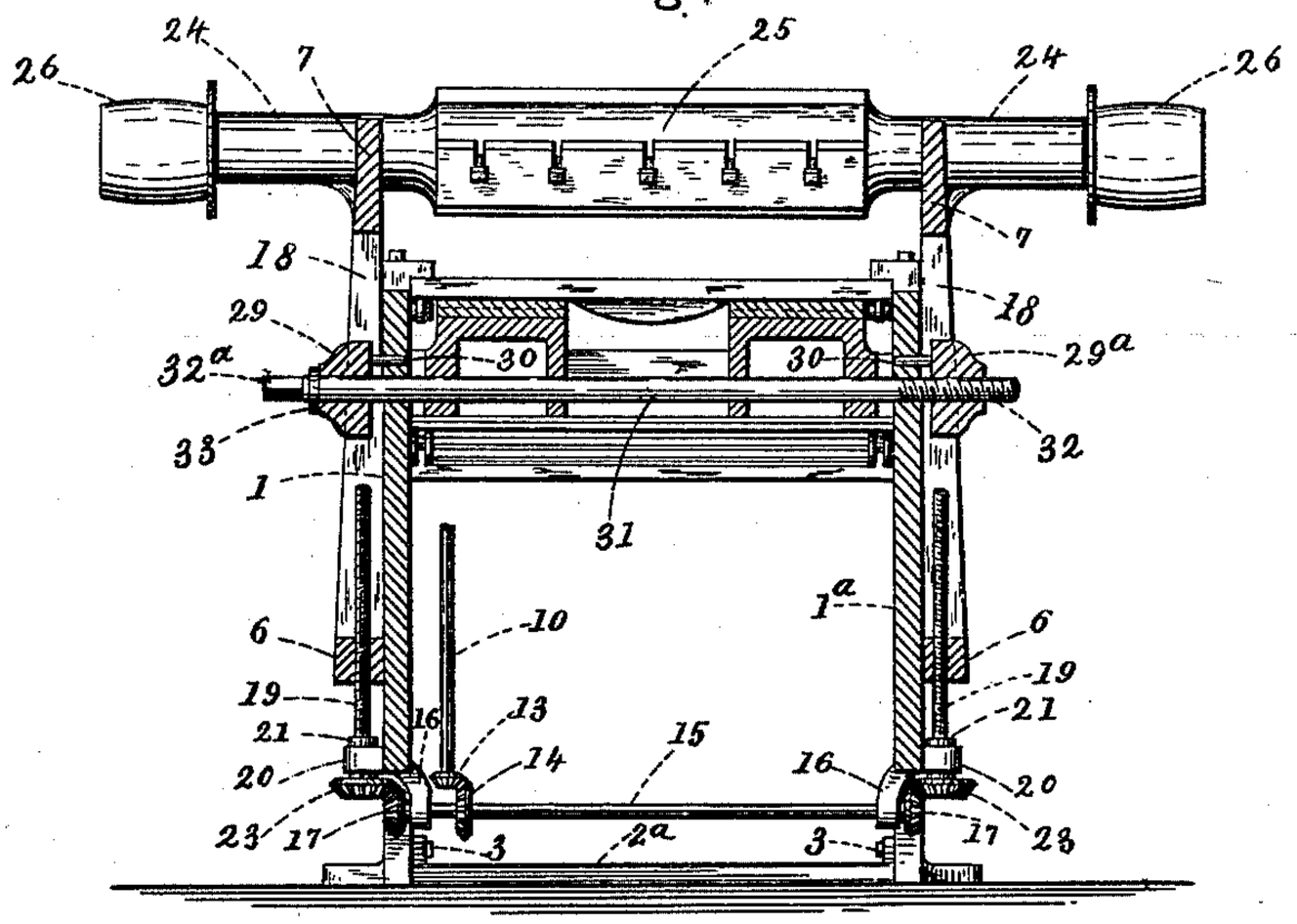

Fig. 3

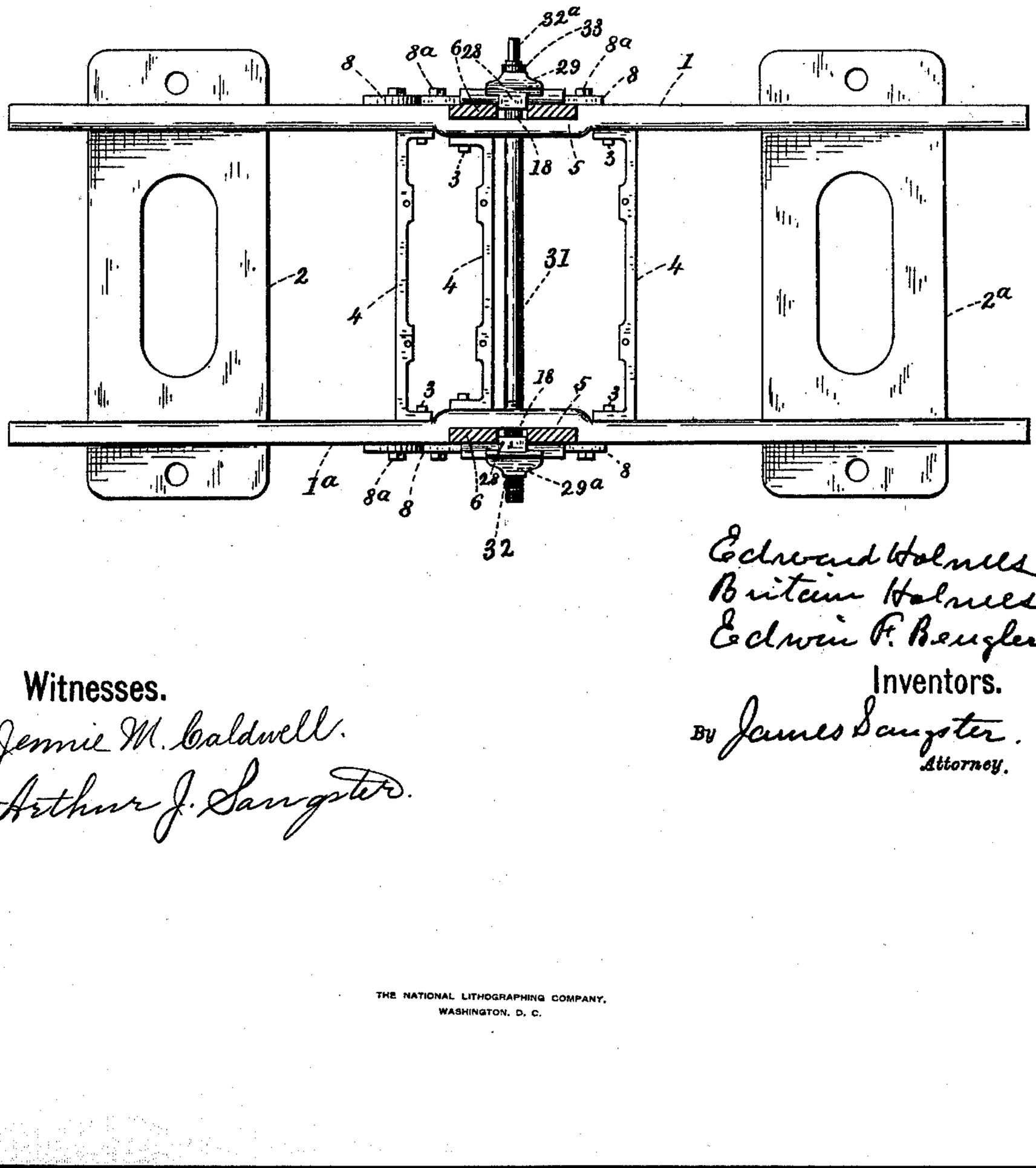

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Fig.4.

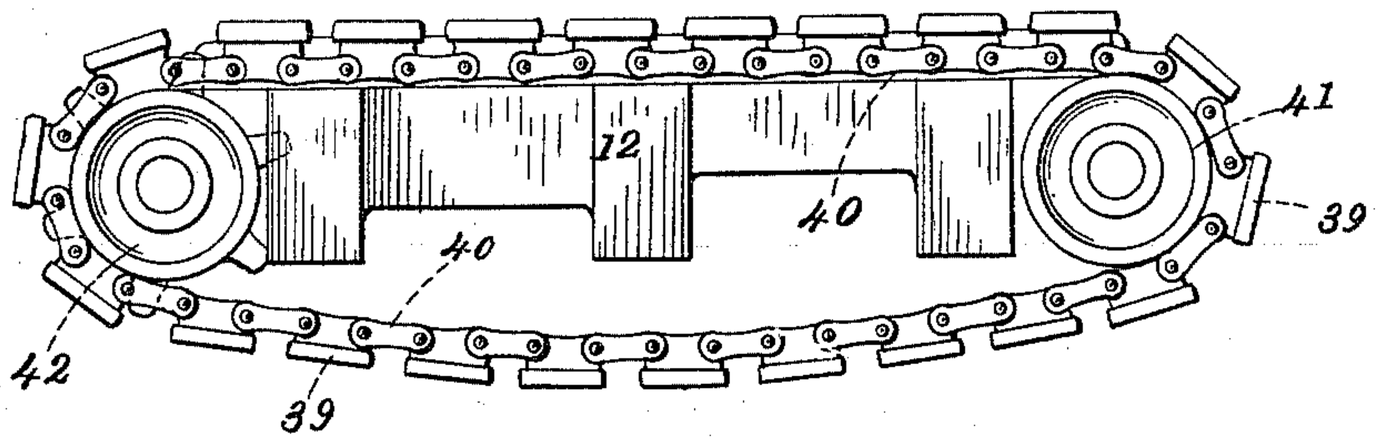

Fig.5.

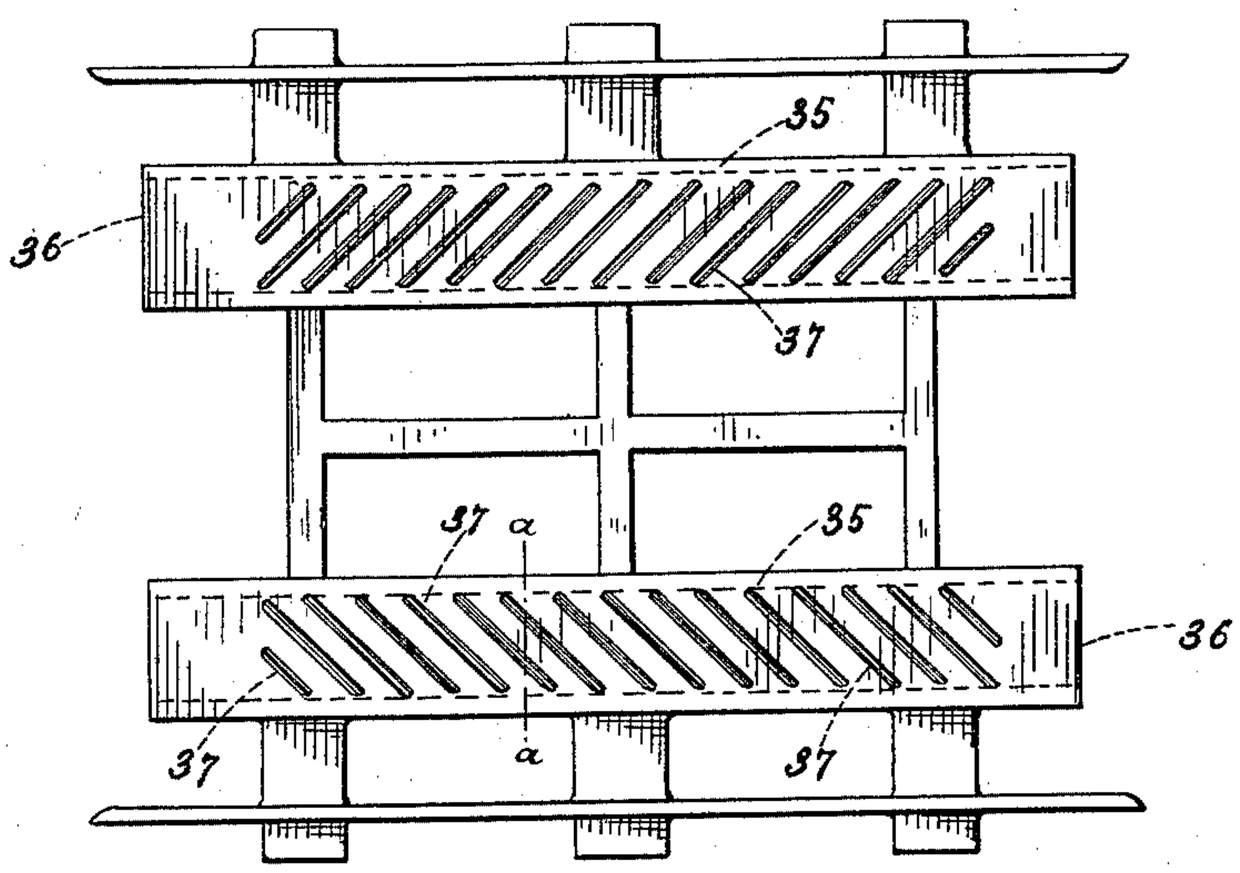

Fig.6

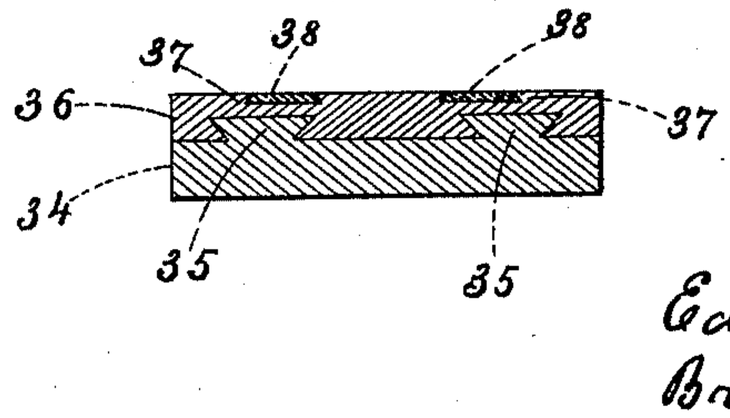

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Fig. 7.

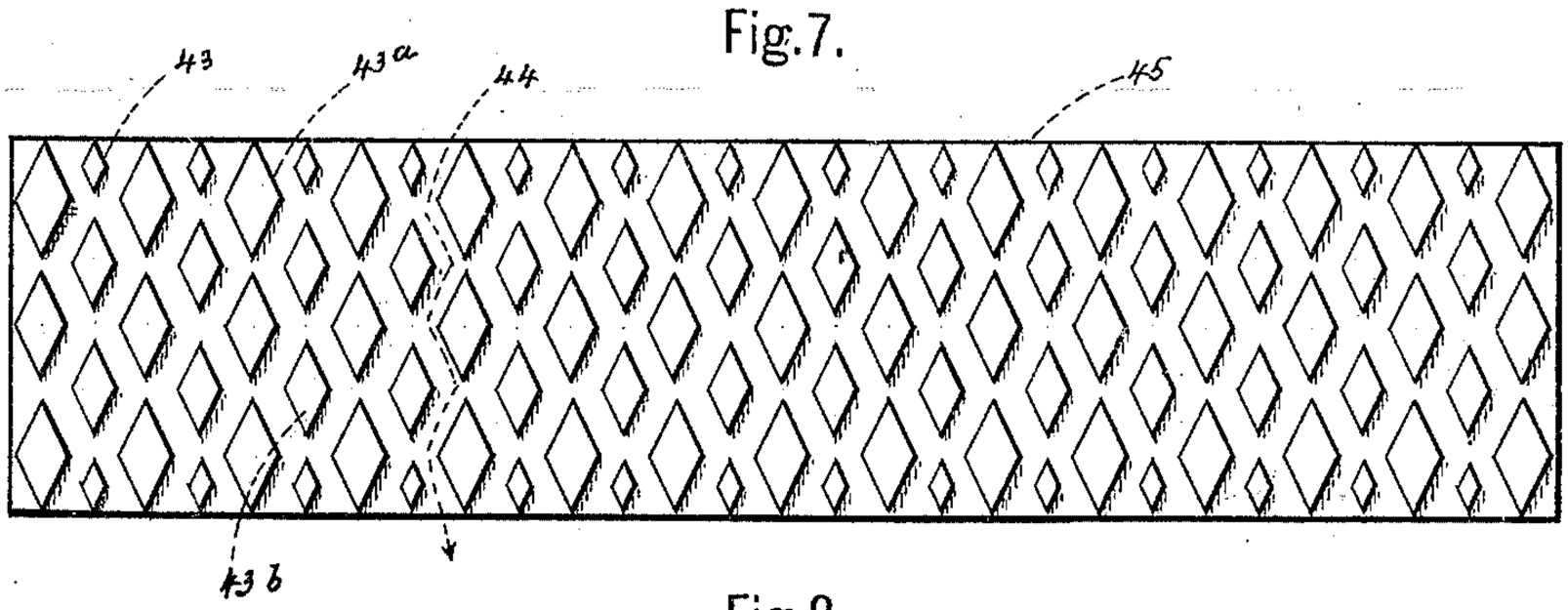

Fig. 8.

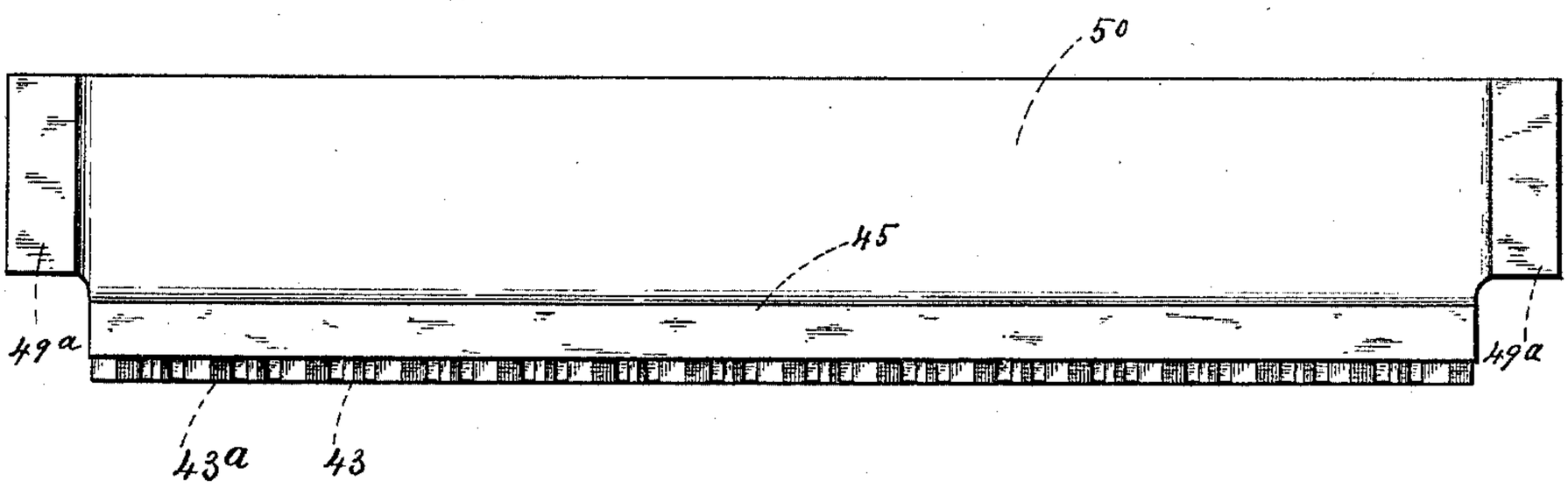

Fig. 9.

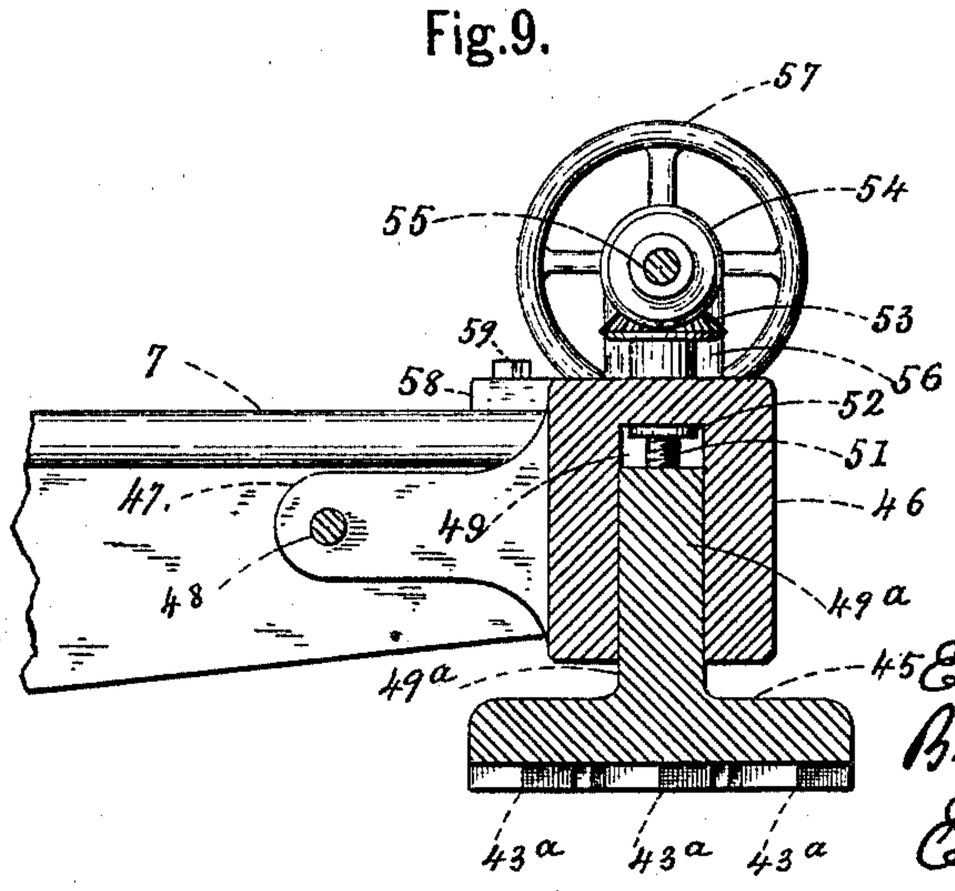

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Fig.10

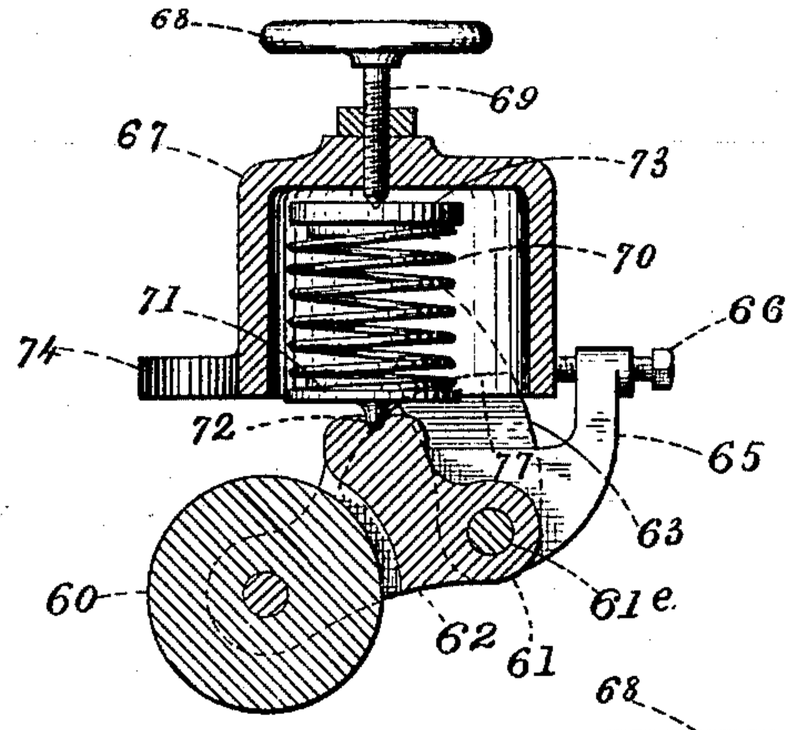


Fig.11.

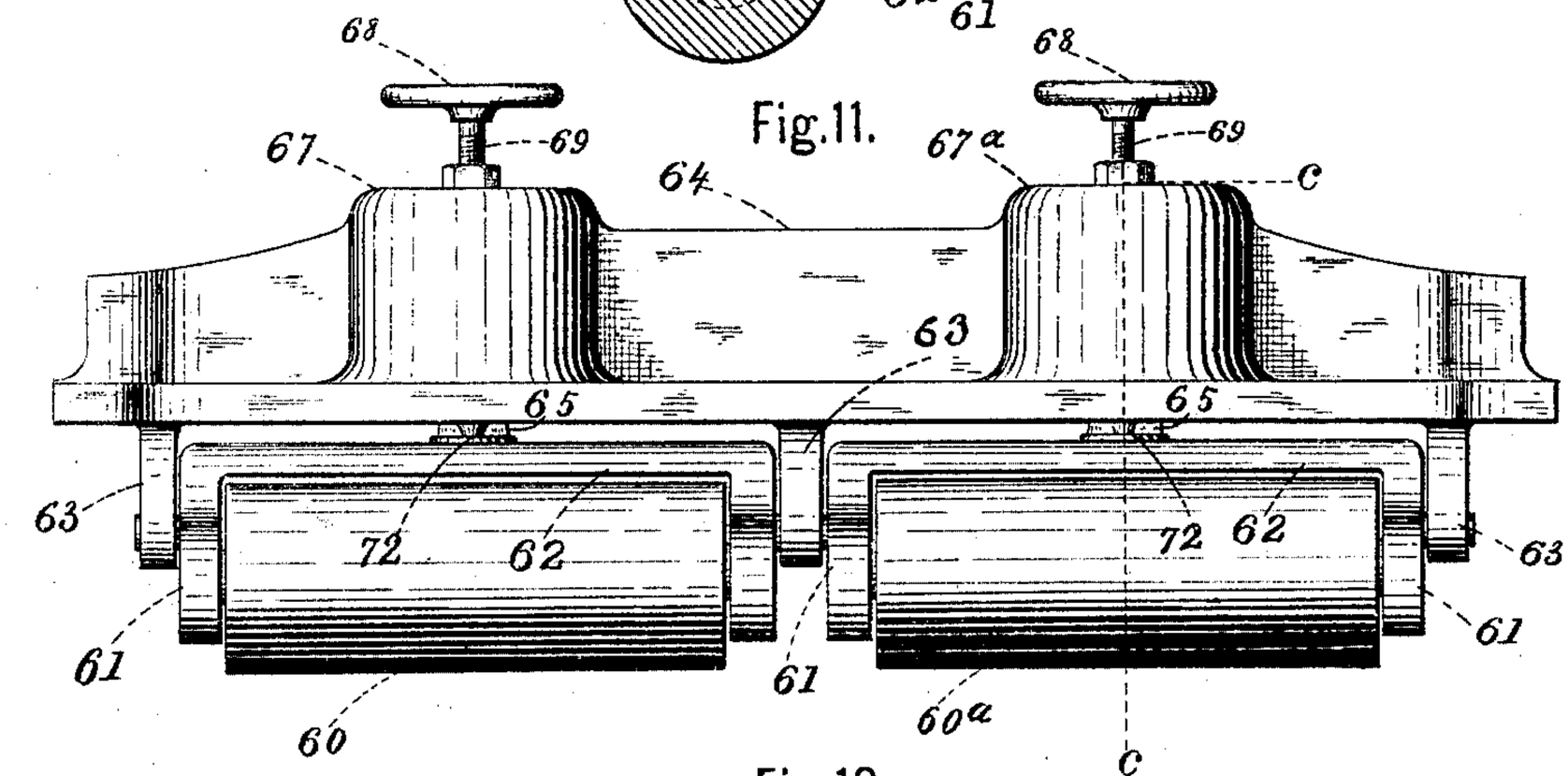
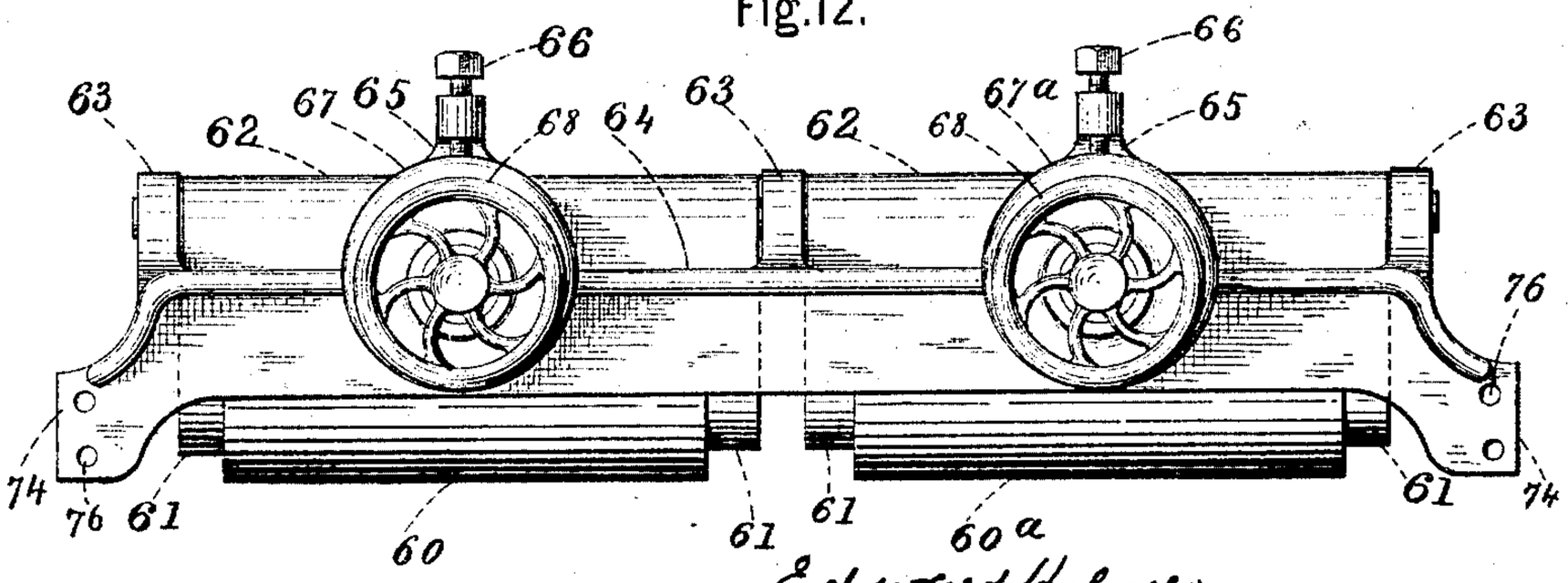


Fig.12.



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UNITED STATES PATENT OFFICE.

EDWARD HOLMES, BRITAIN HOLMES, AND EDWIN F. BEUGLER, OF BUFFALO, NEW YORK.

PLANING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 509,435, dated November 28, 1893.

Application filed April 12, 1892. Serial No. 428,860. (No model.)

To all whom it may concern:

Be it known that we, EDWARD HOLMES, BRITAIN HOLMES, and EDWIN F. BEUGLER, citizens of the United States, residing at Buffalo, in the county of Erie and State of New York, have invented certain new and useful Improvements in Planing-Machines, of which the following is a specification.

Our invention relates to a new and improved wood planing machine and will be fully and clearly hereinafter described and claimed, reference being had to the accompanying drawings, in which—

Figure 1 is a sectional elevation, cutting longitudinally through the frame of the machine and some of its working parts. Fig. 2 is a vertical cross section in or about line *a a*, Fig. 1. Fig. 3 is a plan view of the frame of the machine. Fig. 4 is a detached side elevation of the planer bed, showing the endless bed connected therewith. Fig. 5 is a detached plan view of the stationary portion of the bed, showing a similar view of the improved shoe plates connected thereto. Fig. 6 is an enlarged cross-section through one of the shoe-plates in or about line *a a*, Fig. 5. Fig. 7 is a detached under side face view of the diamond faced pressure plate, all parts beyond it being omitted. Fig. 8 is a front side elevation of the same. Fig. 9 is a side elevation of a portion of one of the overhanging, vertically adjustable side arms, showing a cross section through the diamond faced pressure plate, and the means by which it is pivoted and fastened to the side arms. Fig. 10 is a cross section through one of the divided pressure rollers and their pivoted and supporting frames, in or about line *c c*, Fig. 11. Fig. 11, is a detached front elevation of the divided pressure rollers and their supporting frames. Fig. 12 is a top view of the same.

Referring to the drawings—the frame of the machine is generally and preferably made of cast iron and consists of the two side frame pieces 1 and 1^a, connected by cross-binding pieces 2 and 2^a, secured to the frame pieces by cross frame pieces 4, also secured by bolts 3. See Fig. 3.

The first part of our invention relates to a new and improved means for keeping the upper cutter-head, pressure-roll, pressure-plate and connecting parts in place, when adjusted and secured at any desired point.

At each outer side of the machine is an inclined slide-way, 5. See Figs. 1 and 3. In Fig. 1 they are shown by the dotted lines, 5. In each of these slideways are placed an inclined sliding plate or side frame-piece, 6, having a horizontally extending portion or overhanging arm, 7. These side frame pieces, 6, are secured so as to be movable when required, in the inclined slide-ways, 5, by the bars, 8, which are secured to the side of the machine so as to lap over the sides of the side frame pieces, 6, see Fig. 3, and are fastened by bolts 8^a, to the sides of the machine. It will be noticed that the inclined plates, 6, and their overhanging arms, 7, are located so as to be directly opposite each other and carry the pressure plate, the pressure roll and the cutter head as will be more clearly hereinafter shown. These arms, 7, with the pressure plate, the cutter head and pressure rolls are made adjustable vertically, or nearly so by means of the crank arm, 9, (see Fig. 1) which is connected with an inclined rod, 10, set in suitable bearing boxes in the side of the frame, one of which is shown at, 11, in said Fig. 1. The other being behind the bed, 12, of the machine is not shown but as these boxes are made in the well known way a further description here is not required.

At the lower end of the rod, 10, below the bearing 11, (see Figs. 1 and 2,) is rigidly secured a bevel gear pinion, 13, which gears in with the bevel gear wheel, 14. This bevel gear wheel, 14, is rigidly secured to the horizontal shaft, 15, the shaft, 15, being mounted in bearings, 16, on the frame of the machine, (see Fig. 2,) and projects out beyond the outer side of the bearings so as to receive at each end a bevel pinion, 17, (shown in Fig. 2) which is rigidly secured thereto in any well known way.

The side plates, 6, are each provided with a slot or opening, 18, and at the lower end of each plate, 6, is a screw shaft, 19, which screws through the bottom of the plate and projects up into said slots as shown in Fig. 2 and by dotted lines in Fig. 1. At the bottom the screw shafts, 19, are mounted in boxes, 20,

and are provided with a collar, 21, resting against the top side of the box and at the opposite side of the boxes each is provided with a bevel gear wheel, 23, which gears in with the bevel pinions, 17, see Fig. 2 where these bevel gear wheels are shown. From the above construction it will be seen that by turning the handle 9 and its rod, 10, their motions will be communicated by the bevel gearing to the screw shaft, 19, which will raise or lower the side frame pieces, 6, in accordance with the direction in which the crank arm 9 may may be turned. (See Fig. 1.)

At the top of the side frame pieces, 6, are journal boxes 24, (see Fig. 2,) in which is mounted a shaft carrying the upper cutter-head, 25. Shown in Figs. 1 and 2. On the outside of the boxes, 24, are secured to the cutter-head shaft, in the usual way, the driving pulleys, 26. Forward of the cutter-head is mounted a small pressure roller, 27, and forward of that, at the ends of the arms, 7, (see Fig. 1) is the pressure plate having diamond shaped projections.

By reference to Fig. 2, it will be seen that the outer sides of the adjustable side frame pieces, 6, incline inward from the bottom to the top, and in the slot or openings, 18, the reduced portions, 28, (shown in Fig. 3,) of the sliding blocks, 29—29^a, (see Figs. 2 and 3) are fitted so that they will allow the plates, 6, to slide easily up or down in their slide-ways when free. To prevent these blocks from dropping down, a strong pin, 30, shown in Fig. 2, is rigidly secured to each block and is fitted in the openings, 18, substantially as shown in Figs. 2 and 3. Through the block, 29, is passed a shaft 31, having a screw portion, 32, which screws into the block, 29^a. On the opposite end of the shaft, 31, is a square head or wrench section, 32^a, by which the frames 6 and arms 7, are fastened rigidly in place when adjusted vertically. The shaft, 31, is also provided with a collar, 33, to prevent the portions, 32, from being drawn through the block, 29, when the several parts are all tightened up. Heretofore, when the cross-bar, 31, has been screwed up so as to tighten every thing in place when adjusted by the handle, 9, (shown in Fig. 1) as securely as it was possible to do so, it has been found impossible to keep the side-bars, 6, and consequently the cutter-head, rollers and pressure plate from gradually working up by the pressure of the rolls on the lumber during the operation of the machine; the rapid rotary movements and constant jarring of the same, tending to loosen the several parts, however tightly they may be drawn together. One of the objects of our invention is to avoid this serious objection by making the outer sides of the frame bars, 6, to incline inward from the bottom up and thereby act like wedges so as to tighten the several parts if they start to move up and thereby effectually prevent them from rising.

The second part of our invention consists in certain improvements in shoe plates for the bed of the planer, whereby a smooth, durable and comparatively frictionless bed is provided for the lags composing the endless bed, to slide over, reference being had to Figs. 4, 5 and 6. This antifriction shoe consists of a lower base plate, 34, of cast iron, having the longitudinal dovetail pieces, 35, preferably cast or formed in one piece with it. (Shown in cross section in Fig. 6, and by the longitudinal dotted lines, 2, in Fig. 2. Over the plate, 34, is placed or cast in any well known way a continuous top layer of antifriction metal, 36 Babbitt metal for instance, or any metallic composition having similar properties and a lower melting point than cast iron. The dovetail pieces 35, hold the two plates rigidly together but if desired, the ordinary bolts or rivets may be used to secure them in any well known way. In this antifriction plate is a series of diagonally arranged grooves, 37, which are made in the form of a dovetail the widest part of the groove being at the bottom. These diagonal grooves are filled with an antifriction composition, 38, composed mainly of plumbago and other ingredients of well known lubricating properties, the whole being secured together in the grooves so as to fill them even with the top of the plate, 36. We have shown two of these antifriction plates, see Fig. 5 where they are shown in dotted lines, but more may be used if desired.

In Fig. 4, I have shown an ordinary planer bed, the endless portion being composed of the lags, 39 secured together by the chain links, 40, the roller 41, supporting one portion of the bed, and the sprocket wheels, 42, supporting the opposite portion and giving the endless bed its proper movements by the well known connecting parts. This endless bed is also shown in Fig. 1 in its proper position on the machine.

The object of the antifriction shoe-plate is to provide a suitable bearing and a comparatively frictionless surface for the lags to slide over and to a large extent prevent the usual wear incident to endless-bed planers.

The third part of our invention relates to the construction of the pressure plate whereby the pressure plate affords a clear passage for the chips or shavings as the board being planed passes under it and still every portion of the width of the board is covered by the diamond shaped pressure portions which are distributed over the face of the pressure plate so that the widest portions of one row will overlap a line drawn through the widest portions of its adjacent row as will more clearly hereinafter appear, reference being had to Figs. 1, 7, 8 and 9. In Fig. 7 where the under face of the pressure plate is shown, 43, 43^a, and 43^b, represent the diamond shaped pressure portions which press upon the board and hold it down to its place as it passes under. These pressure portions project down from the face of the pressure plate a half inch

or an inch more or less and are preferably arranged diagonally across the plate so that diagonal channels are formed across the plate in both directions. The crossing of these channels form the zig zag passage, 44, through which the chips, shavings, or other matter can freely pass. By the above construction of the plate it is evident that if a chip should happen to get between the board and any one of the projections it would not move far until it would pass from under the edge of the projection into a channel and as soon as it would reach the edge of the succeeding projection which is inclined to the line of travel of the chip, the chip would be deflected to one side or the other according to which side of the angle of the diamond the chip should come in contact with. The continued forward movement of the board would cause the chip to be deflected by the succeeding projections until it would finally be thrown off the board. In this manner the chips are prevented from remaining on the board for any great distance and are thereby prevented from disfiguring the surface of the board during its passage through the machine. The pressure plate consists of the pressure plate 45, and its holding pieces, 46. At each side of the holding pieces, 46, is a backwardly projecting piece or ear, 47, see Fig. 9 the two being far enough apart to fit nicely between the overhanging arms, 7, and are each pivoted thereto by pins or bolts, 48, see Figs. 1 and 9. In each of the holding pieces is a deep groove or slot, 49, into which the thicker end portions 49[a] of the rib, 50, which extends upward from the center of the top of the pressure plate, are made to fit closely so that the pressure plate may be adjusted up or down. This vertical adjustment is effected by a screw, 51, one at each end of the pressure plate which passes down through it, as shown in Fig. 9, and is kept from moving longitudinally (as shown in Fig. 9) by a collar, 52, on the lower side, and a bevel gear wheel, 53, resting against the top of the same. The gear wheel, 53, gears in with a bevel gear wheel, 54, and the gear wheel 54 is mounted on a shaft 55, set in bearings, 56, on the holding pieces. This shaft extends from one end of the pressure plate to the other end and is set in similar bearings, 56, at the opposite end and is also provided with a bevel gear wheel 53, connected with a vertical screw shaft constructed and the whole fitted the same as that shown in Fig. 9, so that by turning the shaft, 55, by means of a hand wheel, 57, secured to one end of the shaft, 55, the pressure plate is easily raised and lowered. To prevent the pressure plate from dropping down out of line when turned down as shown on its pivots 48, each holding piece, 46, is provided with a lug, 58, which rests on the top of the arm, 7, and thereby prevents any further movement of the pressure plate downward. This lug is rigidly secured by a bolt, 59, so that when in place as shown in Figs. 1 and 9, the holding pieces are rigidly held in position.

The vertical adjusting device being a well known means for vertically adjusting a wood planer pressure plate, a further description of this portion of the machine is not required here.

The fourth part of our invention consists in a means by which an even or equal spring pressure is given to the divided pressure rolls at any point to which they may be raised or lowered by the varying thickness of lumber passing under them reference being had to Figs. 1, 10, 11 and 12. The divided rolls, 60 and 60[a], are mounted so as to turn in bearings, 61, in the holding frames 62. These frame pieces, 62, are pivoted to the lugs, 63, which are rigidly secured to and project down from the cross-head, 64. At the rear of each frame piece, 62, is an arm, 65, projecting outward and upward. Each arm, 65, is provided at its upper end with a set screw, 66, whereby the front ends of the frames, 62, and the rollers, 60, and 60[a], may be adjusted either up or down, the points of the set screws, 66, bearing against the rear sides of the cross-head, 64. On the top of the cross-head, 64, are two housings 67 67[a], each housing being located centrally between the ends of the rollers (as shown in Figs. 11 and 12), and partly back of each roller, as shown in Fig. 10. Slightly forward of the centers of the tops of each of the housings is a hand wheel, 68, each having a central pointed screw portion, 69, which passes down through the top of the housings. Within each housing is a spiral spring, 70, each resting on a disk 71, having a central downwardly projecting pointed portion, 72. See Figs. 10 and 11. This pointed portion, 72, rests in a pointed recess in the top of the roller holding frames, 62, the recess in the frame being located not exceeding forty-five degrees (and preferably less) from a vertical line drawn through the pivotal point 61[e], so that, as the frame is swung on its pivot by the upward movement of the roller, the recess and the disk and end of the spring are carried in toward said vertical line, and the increased pressure of the spring, caused by such upward movement of the roller is exerted more nearly in a direct line toward the pivotal point, and thus a more uniform pressure is secured for the roller. On the top of each spring is another plate, 73, see Fig. 10, each having a central pointed depression into which the pointed ends of the screw portions, 69, project. The cross-head, carrying the divided rolls and the other parts above described, is secured to the machine by means of the end portions, 74, shown in Figs. 1 and 12 and bolts, 75, shown in Fig. 1, which pass through the holes, 76. Shown in Fig. 12. Each end, 74, is thus secured to the top rear portions of the overhanging arms, substantially as shown in Fig. 1. From the above described construction, it will be seen that as the roller,

60, (see Fig. 10) is forced upward against the spring, 70, it moves in the direction of the dotted line 77, turning on the pivotal centers, 61^e, and bringing the point 72, nearer to it, thereby diminishing the leverage as the compressing, and consequently the force of the spring, increases, so that the pressing force of the roll, 60, is substantially the same at its lowest position as it is at the limit of its upward position, or at any intermediate point.

We claim as our invention—

1. In a planing machine, the combination of adjustable incline-side frame pieces having the over-hanging arms, 7, and carrying the upper cutter-head, pressure plate and pressure rollers, with the sliding blocks 29—29^a, having faces which bear against the inclined faces of the adjustable frame pieces, and an adjusting transverse tightening-rod, 31, for the purposes described.

2. In a planing machine, the combination with the upper cutter-head, pressure plate and pressure rollers and their over-hanging supporting arms, 7, of the adjustable side frame-pieces, 6, the outer faces of which incline inward from the bottom upward, blocks fitted in slots in said frame pieces, 6, having their faces bear against the inclined sides and a means for tightening said frame pieces when adjusted to the point desired, whereby the upper cutter head, pressure plate and pressure rollers are rigidly secured in place when adjusted, substantially as described.

3. In a planing machine, the combination, with the side pieces of the machine, of a cross head secured thereto provided with downwardly projecting lugs, spring actuated frames journaled in said lugs, a roller in each frame, an outwardly and upwardly projecting arm at the rear end of each frame, a set screw in the end of said arm engaging with the cross head, and means for adjusting the pressure of each of the frames, substantially as set forth.

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