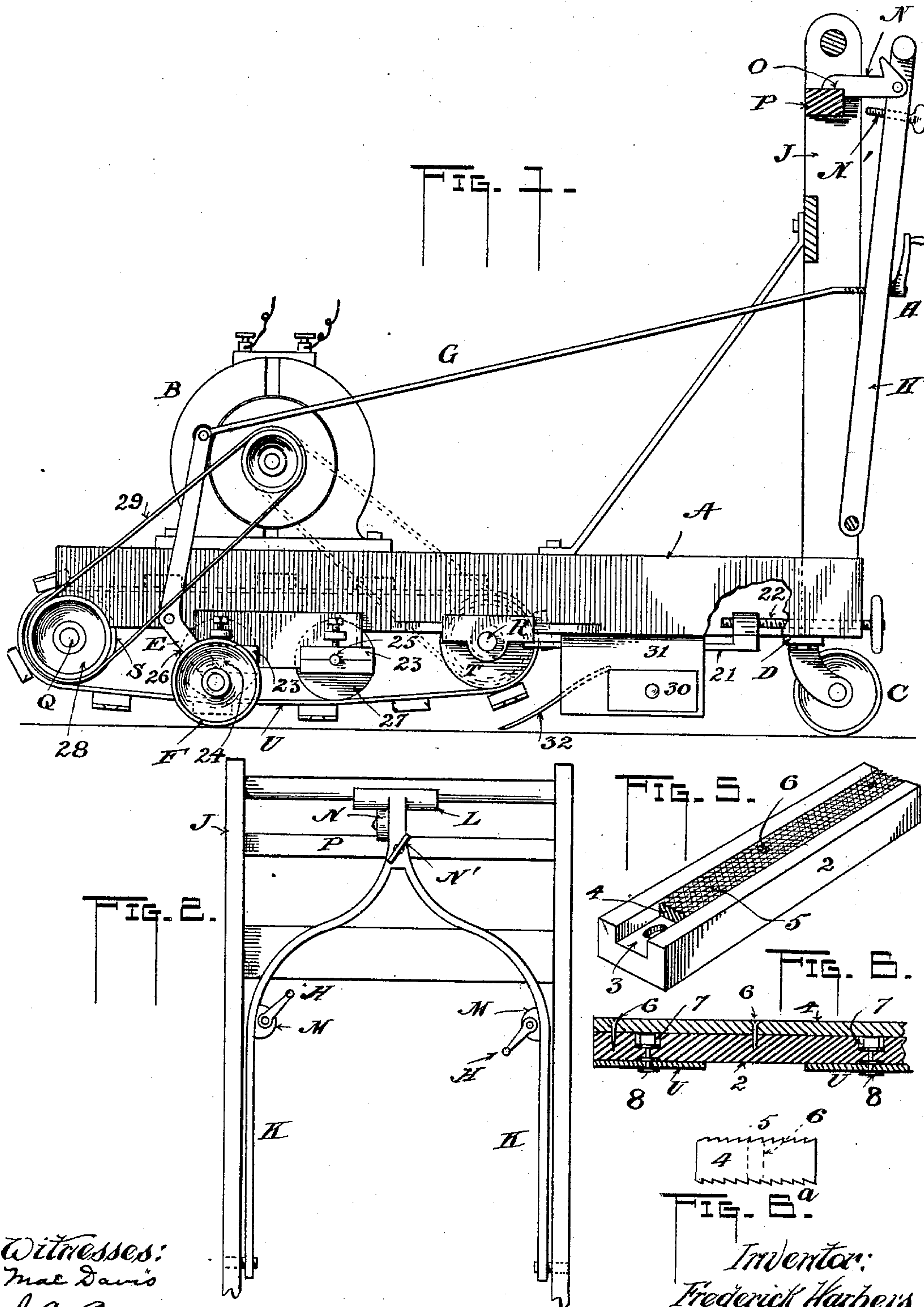


F. HARBERS.
PLANING AND SANDPAPERING MACHINE.
APPLICATION FILED JAN. 8, 1906. RENEWED NOV. 12, 1906.

932,466.

Patented Aug. 31, 1909.

2 SHEETS—SHEET 1.



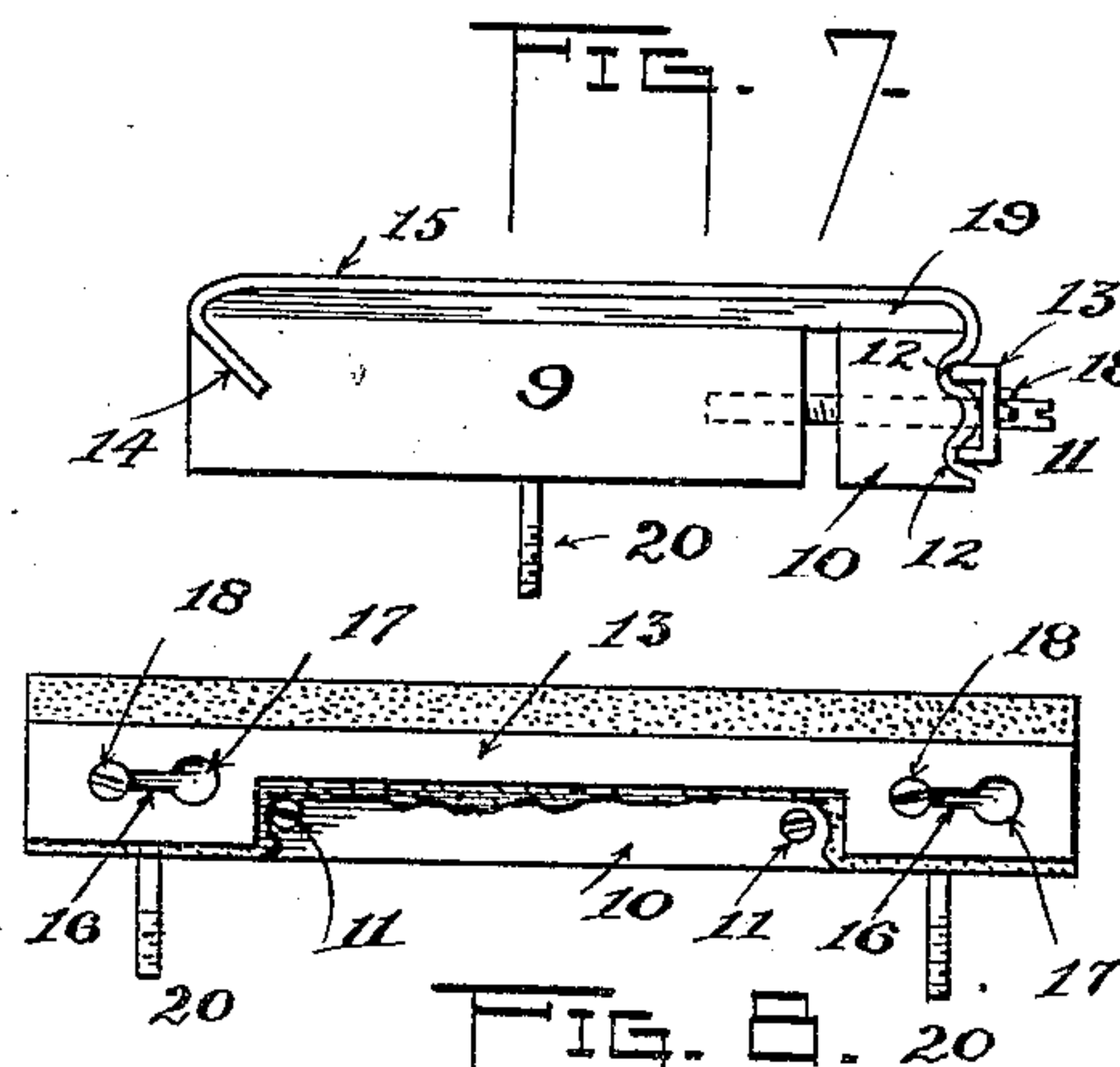
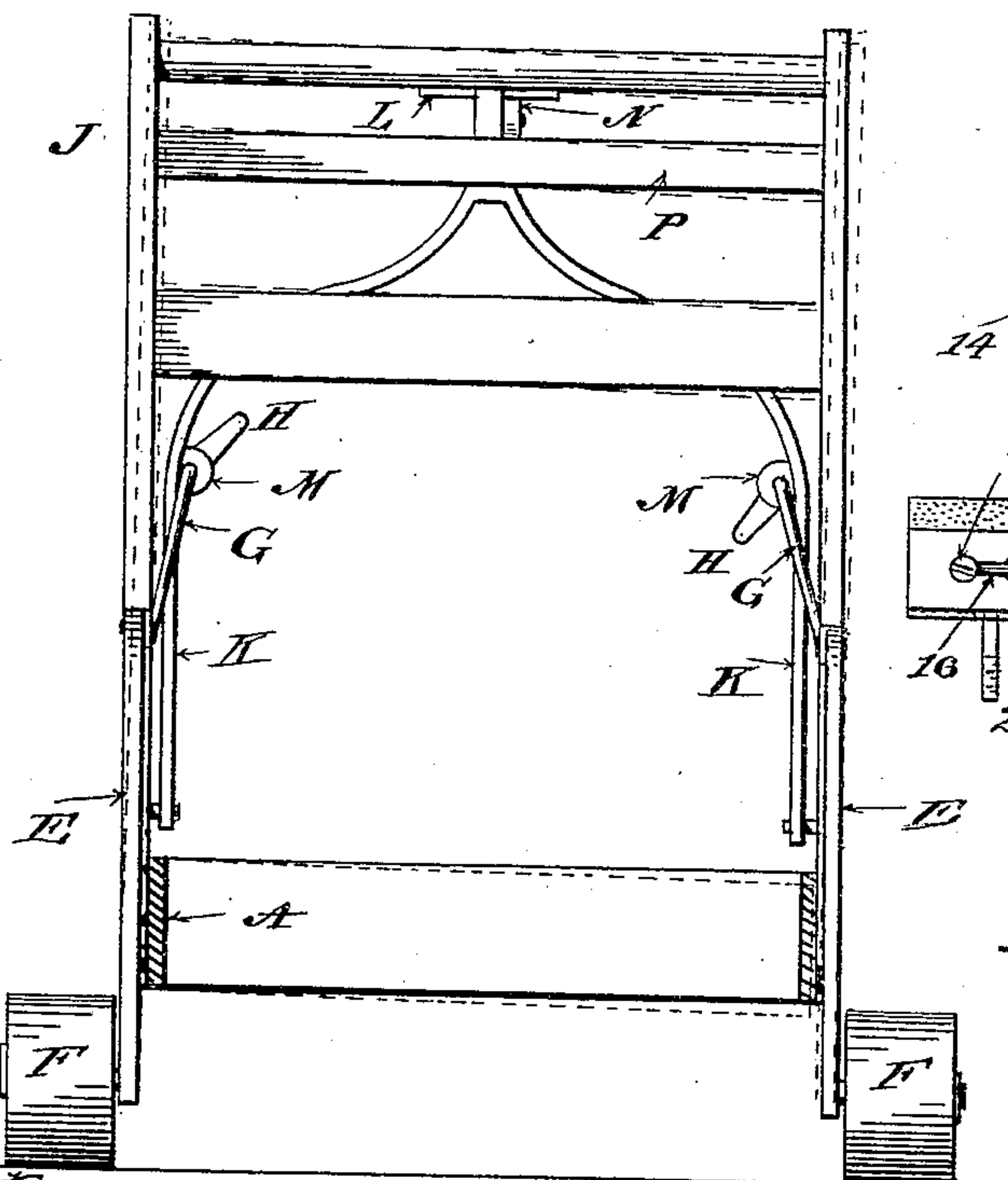
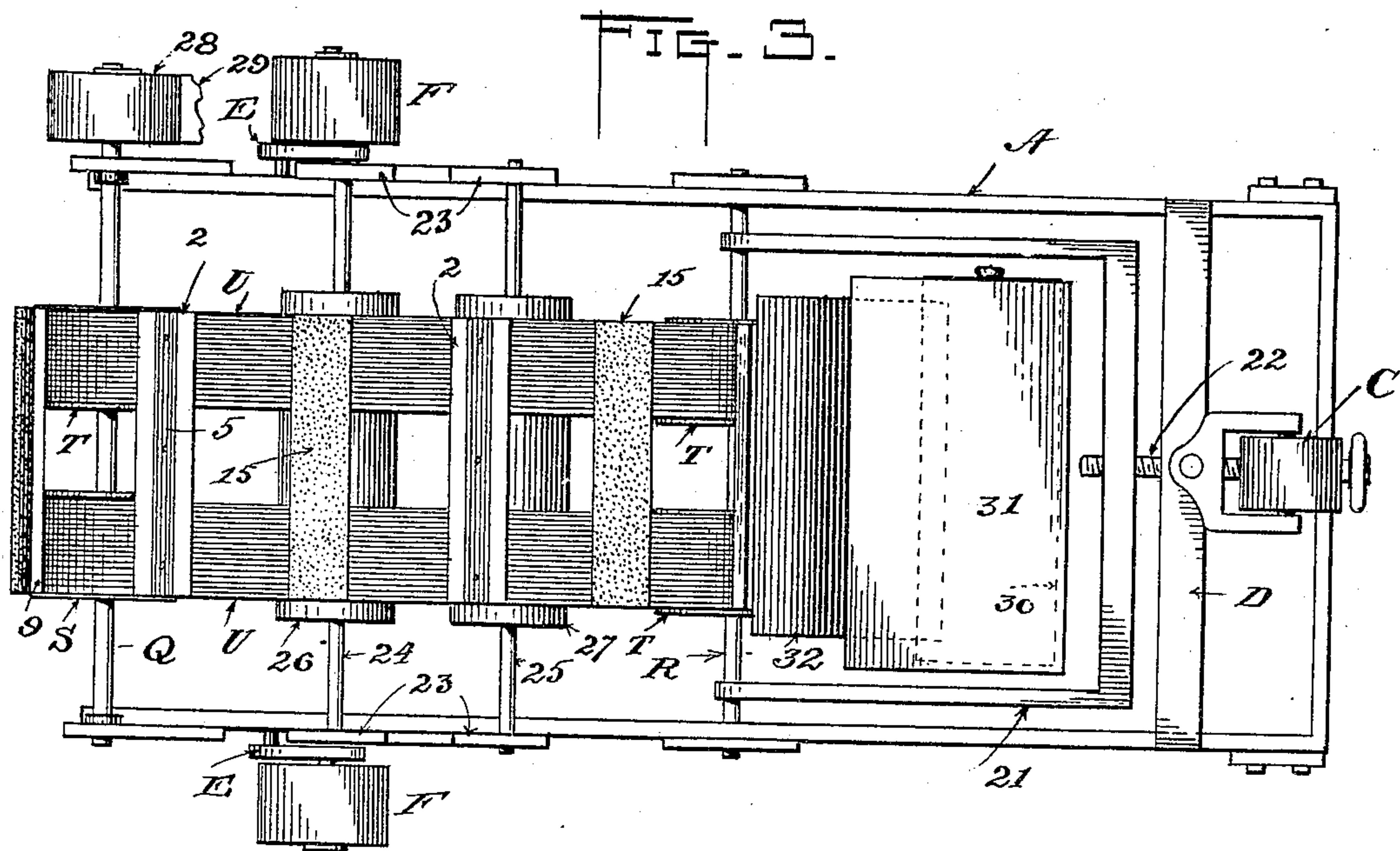
Witnesses:
Mac Davis
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Inventor:
Frederick Harbers,
by I. N. Thurlow,
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UNITED STATES PATENT OFFICE.

FREDERICK HARBERS, OF PEORIA, ILLINOIS.

PLANING AND SANDPAPERING MACHINE.

932,466.

Specification of Letters Patent. Patented Aug. 31, 1909.

Application filed January 8, 1906, Serial No. 295,193. Renewed November 12, 1906. Serial No. 343,119.

To all whom it may concern:

Be it known that I, FREDERICK HARBERS, citizen of the United States, residing at Peoria, in the county of Peoria and State of Illinois, have invented certain new and useful Improvements in Planing and Sandpapering Machines; and I do hereby declare that the following is a full, clear, and exact description of the invention, which will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to machines for smoothing floors.

The invention has for one of its objects to provide a machine that will both plane the floor and sandpaper it.

A further object is to provide a machine for planing floors.

A still further object is to provide a machine for sandpapering floors.

Another object is to provide a machine for both planing and sandpapering floors.

Another object is to provide a machine for smoothing floors that will be power driven and in which the smoothing means travels and is driven parallel to the grain of the wood.

Another object is to produce a machine of the class named that can be readily adjusted to make any depth of cut desired.

A further object lies in the provision of means for raising and lowering the smoothing devices without affecting the adjustment thereof.

In the accompanying drawings, Figure 1 is a side elevation of the machine parts thereof being represented in section to show construction. Fig. 2 is a rear view of a portion of the adjusting portion of the machine. Fig. 3 is a view of the underside of the machine. Fig. 4 is a front view of the machine with parts removed. Fig. 5 is a perspective view of a planing block. Fig. 6 is a longitudinal section of the same. Fig. 6^a is an end view of a double faced metal planing iron. Fig. 7 is an end view of a block for holding sandpaper, and Fig. 8 is a side view of the same.

A indicates a frame upon which is carried a power device preferably an electric motor. The frame is supported at its rear end upon a caster-wheel C suitably pivoted on a cross member D bolted to the frame. Pivoted near the front end of the frame at each side is a lever E having a depending short extremity which carries a supporting wheel F and a long upward extension. It is to be noted that said

levers E are formed as shown in Fig. 1 with the lower extremity extending rearward and downward from the pivot thereof so as to locate the wheel back of the said pivot the purpose of which will be explained later. The upper long extension of the lever has attached thereto a rod G whose rear end is threaded and provided with a crank H.

Secured in an upright position on the back of the machine frame is a guiding frame J by which the entire machine is controlled. Pivoted to said guiding frame is a yoke K having a handle L at the top. Said yoke has on each arm thereof a lug M through which the rods G extend, the cranks H bearing against said lugs. On the said yoke K is pivoted a latch N having a notch O for engaging a cross-piece P on the guiding frame J.

Beneath the frame A are two shafts Q and R the former occupying a fixed position at the front of the said frame, the latter being rearward thereof and adjustable horizontally. These shafts carry pulley wheels S and T respectively being spaced apart on their axles substantially as shown and over which run endless belts U U. Extending from belt to belt parallel to the shafts Q R is a series of planing and sandpapering members which are clearly illustrated in Figs. 5, 6, 6^a, 7 and 8. The first two of these figures show the planing member which comprises a block 2 provided with a channel 3 within which is seated a steel block 4 having serrations or teeth 5 at each side, the said block 4 being held in place within the channel 3 by means of screws 6 or other suitable means. In the bottom of the channel 3 are holes 7 to receive bolts 8 for securing the block to the belts as in Fig. 6.

In Figs. 7 and 8 the sandpapering member is shown, in which 9 indicates a large block as viewed from the end, and 10 a smaller companion block. Screws 11 serve to adjust the portions relatively for tightening or loosening the sandpaper held thereon. At one side of the part 10 are two grooves 12 within which is seated a piece of channel iron 13 the limbs of the latter resting in said grooves. At one upper corner of the portion 9 is a diagonal slit 14 into which one edge of a piece of sandpaper 15 is inserted the opposite edge of the paper being carried over beneath the channel iron as shown. The iron is slotted at two places as at 16

each slot having an enlargement 17. Two screws 18 are secured in the block 10 in such a manner that the member 13 may be placed thereover and pushed beneath them thereby locking said member in place and firmly binding the paper. Now by turning the screws 11 the parts 9 and 10 are separated until the paper is drawn tight. Preferably I place between the paper and the block a pad of rubber so that a partially yielding backing for the paper is provided. Stud bolts 20 are used by means of which the member thus constructed may be secured to the belts.

The rear shaft R hereinbefore described is adjusted by means of a yoke-member 21 the extremities of which are connected to said shaft by means not shown, and a thread-bar 22 carried in the rear part of the frame A serves to shift the yoke and the shaft for tightening the belts.

Journalled in bearings 23 on the side of the main frame A are two shafts 24 and 25 carrying rollers 26 and 27 respectively against which the belts are designed to travel. The said shafts are placed somewhat below the shafts Q and R so that their rollers will lie with their peripheries below the peripheries of the pulleys which carry the belts as shown in Fig. 1. The shaft Q is provided with a belt pulley 28 and a belt 29 serves to impart motion from the motor B to the belts U. In operation the motor drives the belts from front to rear on the lower stretches thereof so that the planing blocks or sandpapering blocks, or both, are made to travel at high speed. In Fig. 1 both series of blocks are shown in place on the belts, the sandpapering blocks being thinner than the others so that they will not touch the floor when the planing blocks are at work. In the figure referred to the blocks are shown raised from the floor and out of use with the notch O of the latch N engaging the member P. When desired to lower the blocks for work the latch N on the yoke K is raised thus permitting the latter to approach the guiding frame J until stopped by a screw N' which contacts with the member P of said frame. This screw limits the movement of the yoke and consequently the amount of depression of the planing blocks. The weight of the machine at its forward end rests upon the carrying wheels F through the bent levers E, before described, and as the fulcrums of the levers are forward of the wheels the frame will lower to the extent allowed by the amount of travel of the yoke K from its position shown in Fig. 1 to the position it would occupy when the screw N' contacts with the member P, the movement of the levers E being transferred from the yoke through the rods G. By having the rollers 26 and 27 lower than the belt wheels S and T the planing blocks gradually approach the floor as

they travel from said wheels S and T to said rollers and are therefore made to take hold of the work when their working faces are parallel to the floor surface when beneath and moving from one roller to the other, the said rollers 26 and 27 serving to hold the blocks, by the weight of the machine thereon, in firm working position upon the floor. The serrations or teeth 5 of the planing iron 4 act to remove the surface of the wood in a quick and thorough manner and after their portion of the work has been done the blocks are removed from the machine leaving the sandpapering members to impart the sanded finish to the floor. Said members are brought in position by further lowering the machine frame by turning the screw N' to permit the yoke K to approach nearer to the guiding frame J resulting in allowing the levers E to shift by reason of the weight of the frame thereupon as before. The sandpapering blocks being thus positioned are driven by the motor to accomplish their work.

Rearward of the belts U is a dust receiving drawer 30 carried by an inclosing framing 31 and extending from the top of said drawer forward and downward to the floor surface is a chute member 32. In practice the wood dust and the sand from the paper is carried, both by momentum and the air movements, due to the rapid travel of the belts, into the drawer the latter being emptied of its contents at intervals.

I have described the manner in which the machine frame and the belts U are lowered as a unit to permit the blocks to contact with the floor to perform their work. It is sometimes desirable and even necessary to lower one side of the machine or the other to cause the blocks to approach nearer the floor when a low place occurs which cannot be reached when the said blocks are perfectly horizontal. To the end that this tilting may be accomplished I have provided the separate adjustments of the rods G by means of the cranks H described. In Fig. 4 the dotted lines indicate one side of the frame, slightly lowered this having been accomplished by allowing the rod G at that side to slacken by turning its crank backward as in loosening a nut. This action permits the ends of the blocks to approach nearer the floor when the surface is lower at that side. When the smoothing has been accomplished at that angle the machine is again raised to the normal horizontal since the motor B and the frame A are relatively rigid, the tilting described does not change the tension of the driving belt 29, nor affect the belts U in the least. It is seen that in using the two series of blocks it is only necessary to remove or replace the planing blocks while permitting the sandpapering blocks to remain in position as has been hereinbefore described. By having the caster wheel C at the rear of the

frame the machine can be easily guided and shifted or turned around. When in actual operation the weight of the machine is upon the blocks 2 or 9 as the case may be so that said blocks are kept in actual working and cutting position.

An advantage is found in my machine in that it is automatically drawn forward at a slow rate of speed, actually feeding itself to its work by the bite of the smoothing blocks upon the floor. The operator is thus free to go about the machine observe its action and the work it is performing and adjust it accordingly and he can go back to that part of the floor that has just been traversed to ascertain if the proper height or tilt of the machine has been had. However, the machine can be pushed forward by means of the frame J as well as being allowed to operate automatically. The very slightest change in the elevation of the frame and its belts U is had by means of the screw N' on the yoke K as has been intimated.

An important point in my machine is that the carrying wheels F are stationed substantially in line with the roller 26 so that in passing over the floor if the wheels descend into a low place the belts U with their blocks will do the same and by the same reason the high places will be treated with the same degree of pressure from the blocks.

Unlike some machines in use, my machine moves the smoothing members parallel to the grain of the wood, with obviously advantageous results, and still further, it leaves the smoothed floor entirely free from plane marks and undulations produced by the common and laborious method of planing and scraping by the use of simple tools.

In bringing out my machine I do not intend to confine myself to the precise details of construction set forth, but wish to claim my invention as broadly as the prior art will permit.

The carriers may be driven from the shaft R, as shown in dotted lines in Fig. 1, instead of being actuated by the shaft Q. By thus driving it, the upper stretch is always slack while the lower stretch is tight which is not the case in driving said shaft Q. A better working machine is the result as is obvious.

The belts U may of course, be replaced by a single broad belt if desired since such a change will come within the scope of my invention.

I claim—

1. In a floor smoothing machine, an endless flexible member adapted for traveling in the direction of its length and substantially parallel to the floor surface, means thereon for smoothing the floor, means operable from the rear of the machine for the initial adjustment of the member vertically for the purposes set forth, and other means also operable from said point for obtaining

further and more delicate independent vertical adjustments of the opposite sides of said member after such initial adjustment.

2. In a floor smoothing machine, an endless member adapted for traveling in a direction parallel to its length and substantially parallel to the floor surface, means carried thereon for floor smoothing purposes, means for carrying and driving the member, other means for vertically moving the member for lifting the smoothing means from the floor or lowering the latter into contact with the floor, while the member is traveling, and means for obtaining a fine vertical adjustment of the member relative to the floor surface after being initially lowered and while the machine is advancing in operation.

3. In a floor smoothing machine, the combination of, a suitable frame, floor smoothing devices mounted upon the frame, means for causing said devices to travel in a non-circular endless path touching the floor along the middle portion only of its lower side, means for varying the distance of the end portions of said side from the floor, and means for independently varying the distance of the intermediate portion from the floor.

4. A floor smoothing machine comprising a series of planing and sandpapering members adapted for traveling in a substantially elliptical orbit which orbit lies in a vertical plane, the working faces being carried parallel to the floor surface when approaching the latter for work, and while at work means for carrying said members and other means for imparting motion thereto.

5. In a floor smoothing machine, a series of planing and sandpapering members adapted for an orbital travel the orbit lying in a vertical plane, the working faces being carried substantially parallel to the floor surface, said members adapted for vertical adjustment and angular adjustment relative to the said floor surface for the purposes described, there being means for carrying and driving said members.

6. A floor smoothing machine comprising a series of planing and sandpapering members adapted for an orbital motion, the orbit lying in a vertical plane, the working surfaces of the members moving parallel to the floor surface in the lower portion of the orbit for working on the floor surface, means for vertically adjusting the members and means also for angularly adjusting them for the purposes described.

7. A floor smoothing machine comprising a series of planing and sandpapering members adapted for an orbital motion, the orbit lying in a vertical plane and elongated in a horizontal direction whereby the said members are carried along the surface of the floor parallel thereto, and means for carrying and driving said members.

8. A floor smoothing machine comprising

a series of planing and sandpapering members, endless means for carrying them, such endless means moving in an orbit which lies in a vertical plane and which is elongated horizontally, and means for imparting motion to said carrying means for the purposes described.

9. A floor smoothing machine for the uses and purposes set forth comprising an endless carrier the upper and lower stretches of which travel in a substantially horizontal plane, a series of planing and sandpapering members carried thereon, means for vertically adjusting the carrier to raise or lower the members with relation to the floor, and means for angularly adjusting said carrier for the purposes set forth.

10. A floor smoothing machine for the uses and purposes set forth comprising a main frame, carrying wheels therefor, a series of planing and sandpapering members, a carrier to which said members are secured, said carrier having an upper and a lower stretch which move parallel to the floor surface, means for vertically adjusting the members through the carrier and main frame, and means for holding the members in engagement with the floor, and means for imparting power to the carrier.

11. In a machine of the class described, a main frame, carrying wheels therefor, means between the wheels and the frame by which the frame may be adjusted vertically for the purposes set forth, an endless carrier, wheels for driving it, and a series of planing and a series of sandpapering blocks detachably secured to said carrier for the purposes described.

12. In a machine of the class described, a main frame, carrying wheels therefor, means by which the frame may be vertically adjusted through the wheels said frame being also adjusted angularly through the wheels for the purposes explained, an endless carrier, the upper and lower stretch of which move in a horizontal plane for the purposes described, planing members detachably secured to the carrier and members in contact with the carrier for holding the said members in working position upon the floor.

13. In a machine of the class described, a main frame and its carrying wheels, means

for vertically adjusting the said frame on its wheels, pulley wheels carried on the frame, an endless carrier traveling upon the same in a horizontal direction, a series of planing members detachably secured to said carrier, means for holding the members in working contact with the floor, and means for driving the carrier and the members.

14. A machine of the class described, comprising an endless carrier, means for driving it, a series of sandpapering members secured thereto, and a series of planing members likewise secured to the carrier and detachable therefrom, said latter members being thicker than the sandpapering members, means for lowering the carrier to bring the planing members in working position on the floor, said means adapted also for still further lowering the carrier to bring the sandpapering members into working position on the floor after the removal of the said planing members.

15. In a floor smoothing machine, a main frame, an endless flexible member therein carried and driven substantially in the manner described, floor smoothing devices carried by the members, means for positively holding the devices in cutting engagement with the floor, levers fulcrumed on the frame at each side, a floor wheel for each said lever, and means attached to the levers for moving them on their fulcrums to impart vertical movement to the frame through said wheels substantially as described.

16. A machine of the class described comprising an endless flexible member adapted to travel substantially as described and shown, removably attached planing devices carried by said member, and sandpaper carrying devices carried also by said member, the planing devices being thicker than the sandpaper carrying devices and thereby adapted for working engagement with the floor irrespective of the said sandpaper carrying devices.

In testimony whereof I affix my signature, in presence of two witnesses.

FREDERICK HARBERS.

Witnesses:

J. M. DAVID,

L. M. THURLOW.