

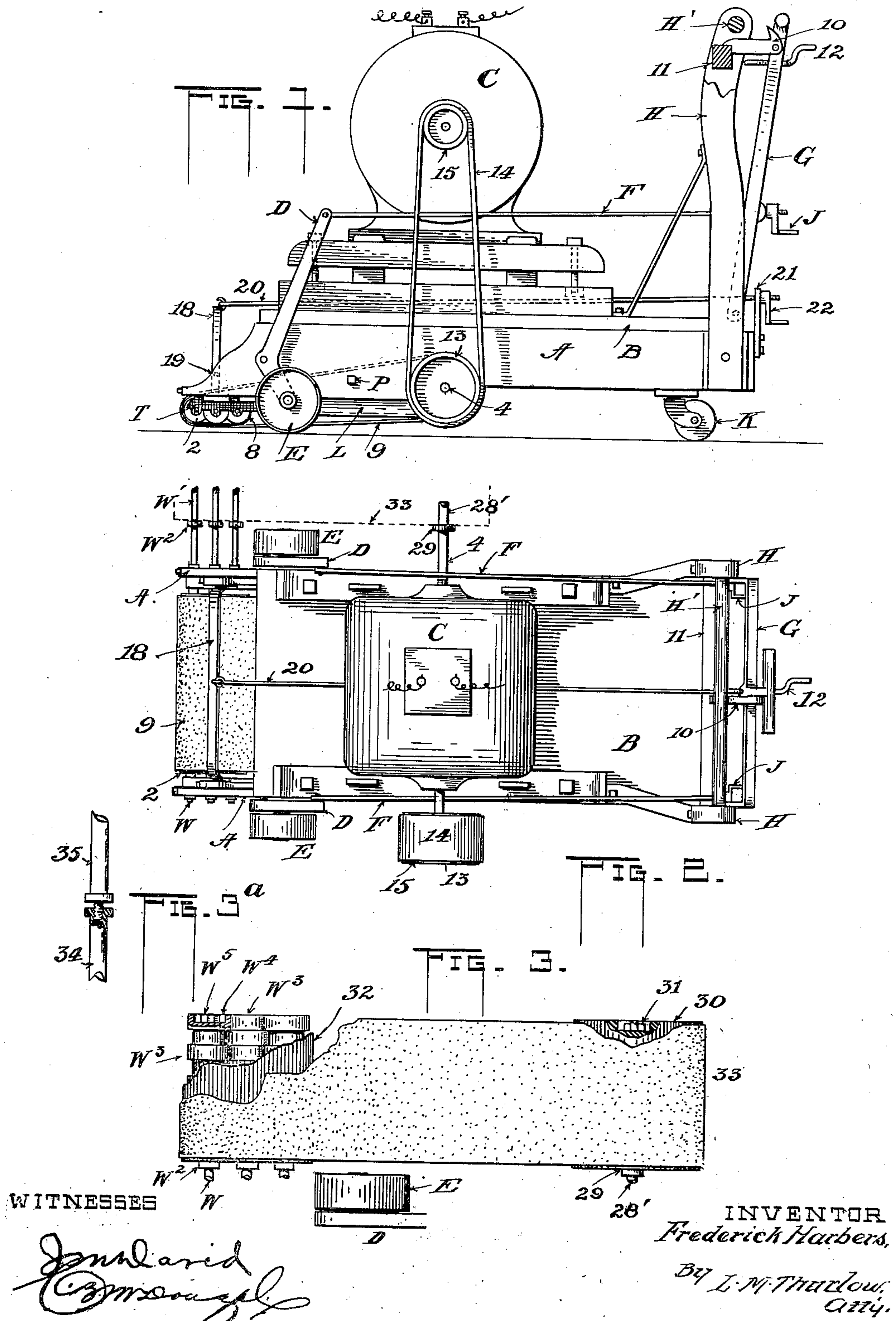
No. 891,251.

PATENTED JUNE 23, 1908.

F. HARBERS.
FLOOR SANDPAPERING MACHINE.

APPLICATION FILED NOV. 2, 1906.

3 SHEETS—SHEET 1.



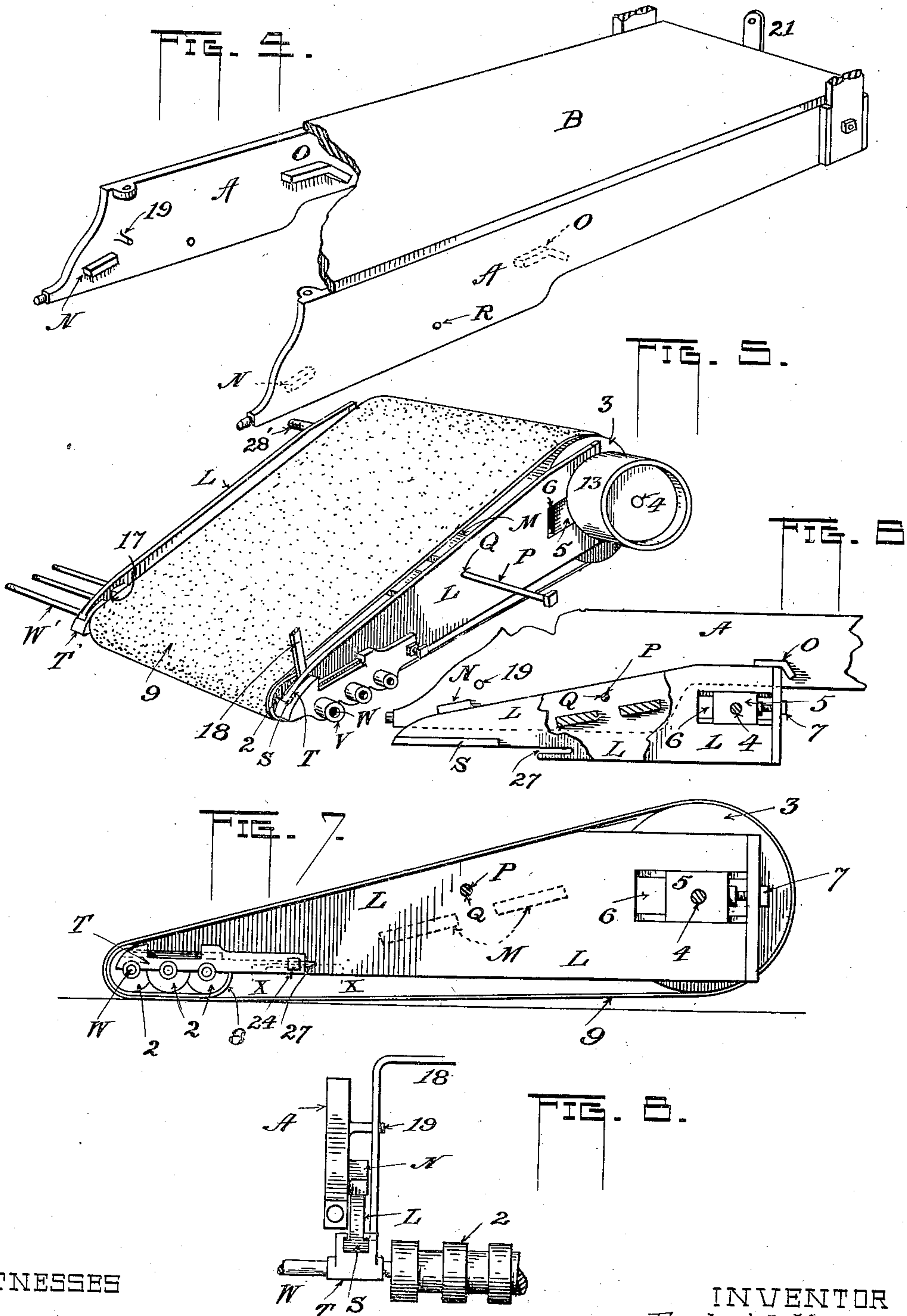
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WITNESSES

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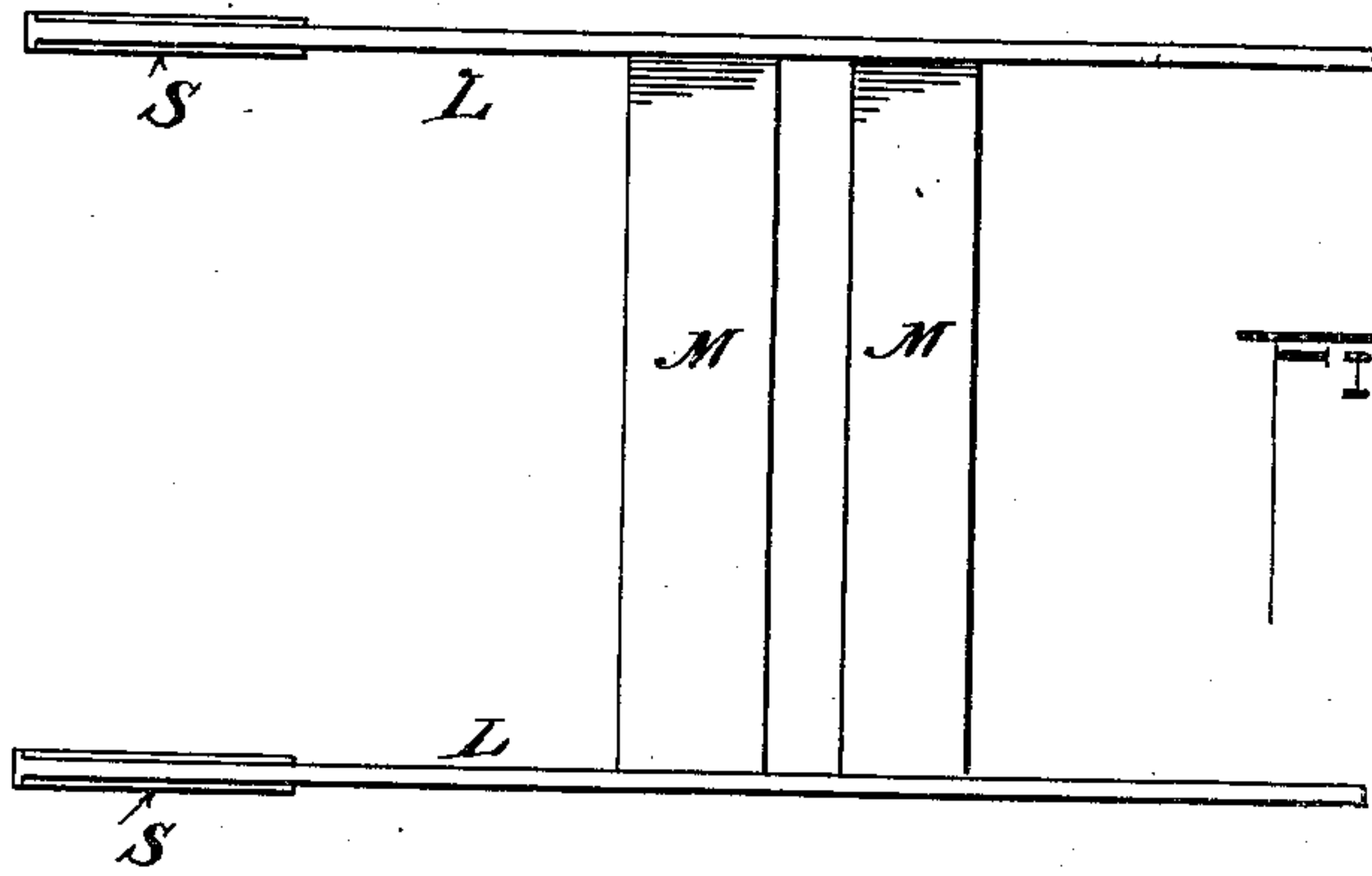


FIG. 9.

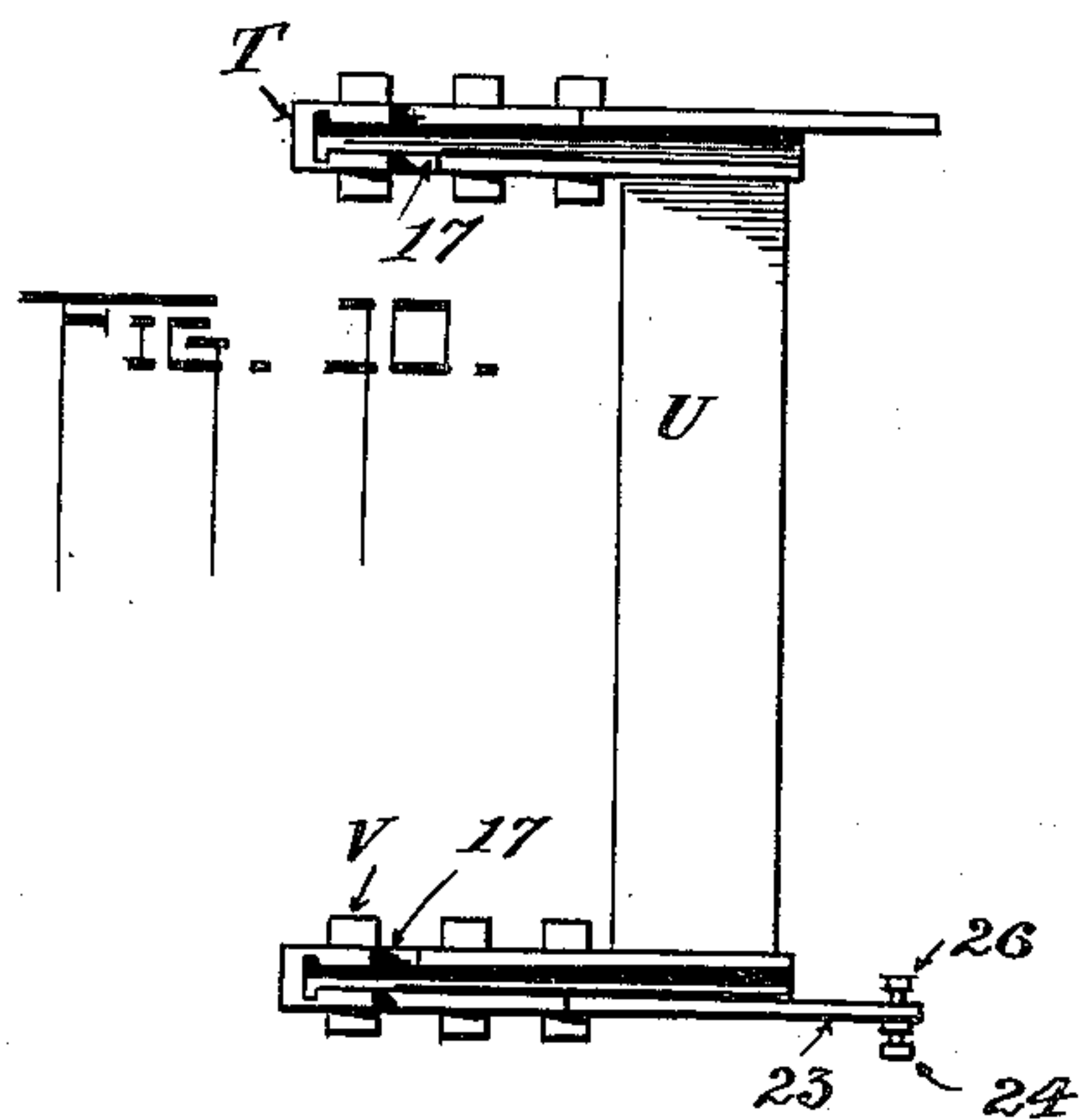


FIG. 10.

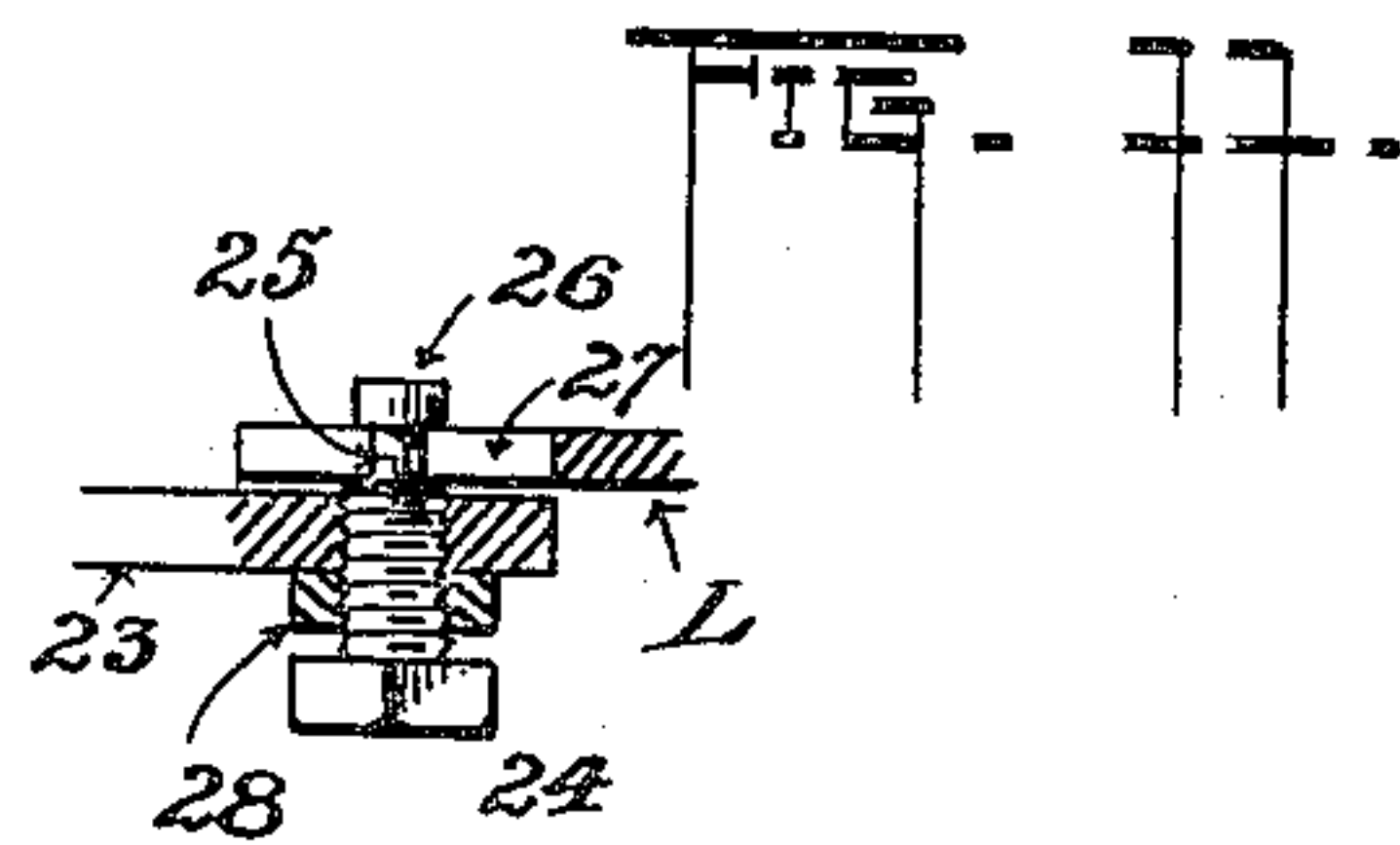


FIG. 11.

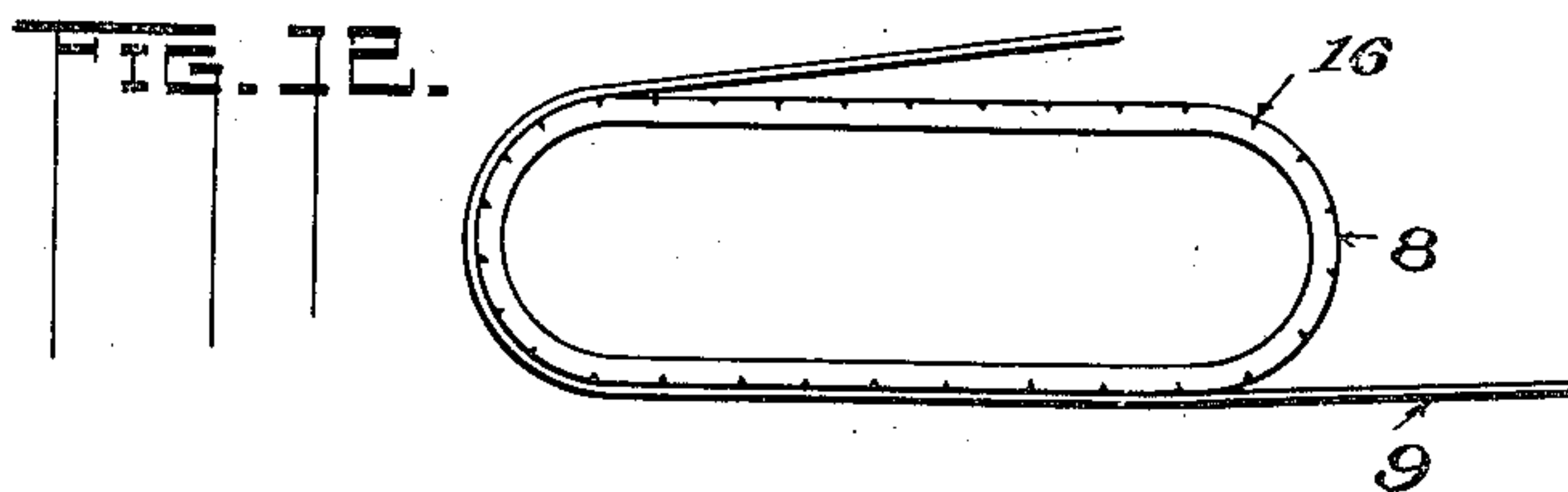


FIG. 12.

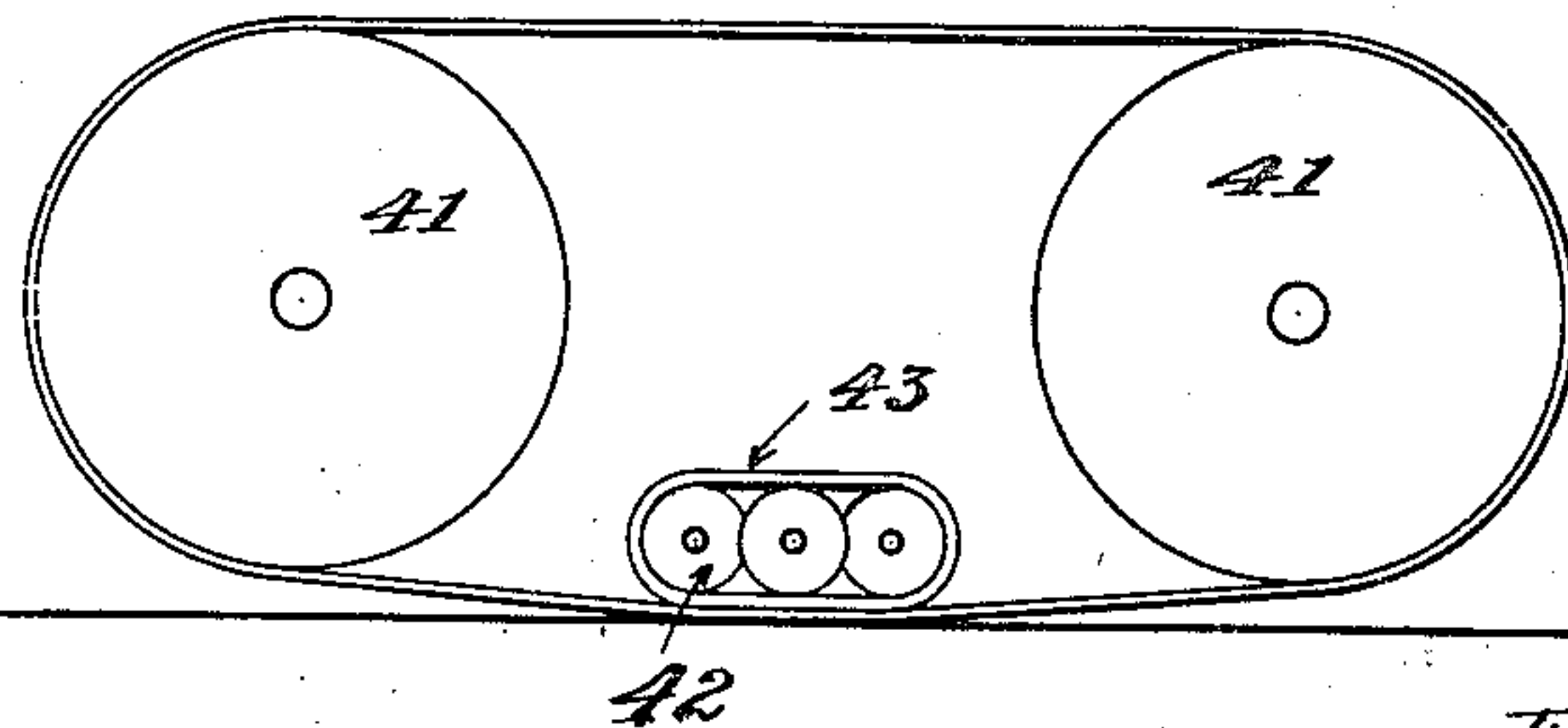


FIG. 13.

WITNESSES

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UNITED STATES PATENT OFFICE.

FREDERICK HARBERS, OF PEORIA, ILLINOIS.

FLOOR-SANDPAPERING MACHINE.

No. 891,251.

Specification of Letters Patent.

Patented June 23, 1908.

Application filed November 2, 1906. Serial No. 341,811.

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 Floor-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 pertains to a machine for sandpapering floors; relating more particularly to a portable machine that can be moved over the surface to be smoothed and which uses a continuous band or belt of the smoothing material.

An object of my invention is to provide a machine of the class described having a continuous band of sandpaper for traveling continuously in one direction.

Another object is to provide a continuous band of sandpaper so mounted and carried that it will keep cool under the heaviest work.

Another object is to provide a continuous band of sandpaper having combined therewith means for keeping the sandpaper cool so that the glue therein will not become softened and hold the wood dust therein.

Another object is to provide a continuous belt of sandpaper and means about which it may travel while having a comparatively small area in contact with the floor while in operation.

Another object is to provide a machine which may be used close to a wall as well as in the middle of the floor.

Still another object is to provide a machine in which the sandpaper is driven continuously in one direction and always parallel to the grain of the wood being smoothed.

A further object is to provide a machine having simple means for permitting the easy removal of the band or belt of sandpaper whereby others may be easily substituted.

An additional object is to improve upon the machine described in my former application for a sandpapering machine, filed January 8, 1906, Serial No. 295,193.

In the appended drawings Figure 1 is a side elevation of the sandpapering machine. Fig. 2 is a top view of the same. Fig. 3 is a top view of a portion of the machine and a sandpapering belt for use close up to the walls of the rooms whose floors are being smoothed.

Fig. 3^a is a modified form of a roller-carrying shaft. Fig. 4 is a perspective view of the main body of the machine with the parts removed. Fig. 5 is a perspective view of a detachable sandpapering mechanism showing the sandpaper belt carried thereby. Fig. 6 shows a portion of the inside surface of one of the sides of the body shown in Fig. 4 with the device shown in Fig. 5 in connection therewith. Fig. 7 is a side elevation of the mechanism shown in Fig. 5. Fig. 8 is a front view of a portion of the machine. Fig. 9 is a top view of a roller carrying member shown in Figs. 5, 6, 7, and 8. Fig. 10 is a top view of a frame member shown in Figs. 5, 7 and 8. Fig. 11 is a horizontal section on line X X, Fig. 7. Fig. 12 is a side view of a portion of the sandpaper belt showing a member around which it partially travels. Fig. 13 is a modified form of sandpaper carrying means.

In the machine described in my former application I employ a continuous belt to which is secured a series of blocks covered with sandpaper, but I have found that a continuous sandpapering belt lasts longer and gives better results, and requires less power than a belt having the blocks. I have found that the continuous sandpaper belt does not clog with wood dust, since the glue in the sandpaper does not become softened by heat caused by friction and therefore the wood dust cannot adhere to and fill the paper but this will be more fully explained later.

AA indicates the two sides of the main body of the machine which carry a floor B upon which is mounted an electric motor, or other power device indicated at C. To the sides A are pivoted two levers D the lower ends of which have mounted thereon the supporting wheels E; the long extensions of each said lever having attached thereto one end of a rod F. These latter members extend rearwardly to and through an adjustable member G whose lower end is pivoted to a pair of side arms H used for guiding the machine over the floor by means of a handle bar H'. The rods F are threaded at their rear ends and are provided with crank arms J by which they may be shifted in the direction of their lengths for the purposes hereinafter named.

At K is a caster wheel beneath the body AA, this together with the wheels E furnishing the support for the entire machine and permitting the latter to be shifted and turned and directed at will.

In Figs. 6 and 9 is shown a frame comprising side members L rigidly connected as by members MM or other suitable means and designed to occupy a fixed position within the main body between the side members AA. The inner surface of the sides AA are provided with lugs N and O the former being near the front, the latter substantially midway of the length as clearly shown in Fig. 4 as well as in Fig. 6. In the latter figure it will be seen that the sides LL are designed to rest against these lugs, the position of the latter being such as to hold the said sides L with the lower edges in a horizontal line. A bolt or rod P is designed to hold the body LM within the body AA said bolt passing through holes Q and R in the former and latter respectively, both bodies being thus made to have rigid relation. At the forward end of each side L, at the bottom, are two horizontal extensions S forming together with said side an inverted T for receiving a roller carrying member shown in Fig. 10, which is a top view. This latter member is a casting having the sides T connected as by the member U or similar means forming a rigid body. The sides T are vertically slotted the bottom of the slots being enlarged as shown to conform to the T-shaped extremities of the body LM just described which they are designed to receive. It will be noted that in Figs. 5, 7 and 8 the body TU is slipped upon the T-shaped extremities where it has a longitudinal shifting movement when desired. On the sides T of the body TU are hubs V which are bored as shown in Fig. 5 to form bearings for shafts W. Said shafts W are each provided with a roller 2 each being preferably grooved at intervals as shown in Fig. 8, the portions of the full diameter of one roller entering a corresponding groove in its neighbor. Fig. 3 shows this idea clearly. By this means the rollers can be of large size while their axes are kept as close together as those of rollers of a smaller size. At 3 is a large roller mounted on a shaft 4 having bearings in a slidable block 5 suitably held in a slot 6 in the rear ends of the sides of the body LM, Figs. 6 and 7, there being an adjusting screw 7 for shifting the said block whereby the shaft and roller may be placed at a desired point.

At 8 in Fig. 12 I have illustrated an endless belt which fits upon and is carried by the rollers 2, as shown in Fig. 7, and upon this endless belt 8 and the roller 3, just described, is placed an endless belt 9 of sandpaper or preferably what is known as "garnet cloth". However, other suitable material such as leather, canvas or the like, which is flexible and strong could be sanded for use also. It is to be observed that the outlines of the combined bodies LM and TU, as shown in Fig. 7, is enough smaller than the sanded belt 9 to permit the latter to be slipped from the roll-

ers over said body so that a new belt may replace an old one as often as desired, but this will be more fully described later. When the entire machine is assembled it appears as in Fig. 1 the bolt P securing the body LM in place as already described. It will be noted in the figure last named as well as in Fig. 7, that the lower surface of the roller 3 is higher than the three rollers 2 and that the sanded belt, therefore, slants upward and rearward from the rollers 2 to the said roller 3. When not in use said rollers 2 are held raised from the floor as shown in Fig. 1, this being accomplished by raising the body AA through the pivotal levers D. By pulling the rods F in the direction of their length the body AA is raised upon the wheels E through the adjustable member G, before described, which has pivoted thereto a latch 10 which engages a cross member 11 carried between the side arms H described the body being sustained in the raised position, and when it is desired to allow the sanded belt to reach the floor the latch is raised and the member G is allowed to move forward until an adjusting screw 12 therein meets the cross-member 11 thus arresting the lowering movement at the time the sanded belt contacts with the floor. The adjustment of said screw 12 permits of any vertical adjustment to allow of more or less pressure of the sanded belt upon the floor. The shaft 4 of the pulley 3 is provided with a belt pulley 13 by which motion is imparted to the sanded belt through a belt 14 from a roller 15 on the motor C, the roller 3 being thus driven thereby imparts movement of the sanded belt 9, this having a bearing upon the floor equal to the distance between the centers of the outside rollers 2. It is my purpose to keep these rollers as large as possible so that the sand-belt will be bent as little as possible in passing around them, but at the same time it is the desire to have the rollers small enough so that they can work close to the base board. It has been found that a three inch roller will permit the machine to work up slightly inside of the position occupied by the usual carpet strip or floor molding, but in order to permit this and still keep the bearing points of the rollers at the floor as close together as possible I groove the rollers as already described so that they can fit into one another and revolve together in that position. However, I do not intend to confine myself to this construction since smooth rollers can be used with good results but the bearing points would not be as close together. The traveling belt 8 is preferably a piece of rubber belting of good weight having a series of transverse cuts therein indicated by the numeral 16 in Fig. 12. These cuts are merely for the purpose of severing the outer layer of rubber at intervals so that the said belt will be more flexible and will more easily bend around the

small rollers. As a matter of fact leather could also be used for this purpose or perhaps other materials, but I have found heavy rubber belting to give perfect satisfaction.

5 The sandpaper in all sandpapering machines, regardless of the purpose for which such machines are used, have always had the disadvantage of becoming filled with wood dust which it removes from the surface being smoothed. This has been caused by friction which reduces the glue to a soft state, by heat, to which the wood dust at once adheres and in which it remains and which in a very short time almost entirely fills the paper rendering it useless. On machines for sandpapering wheel-spokes this is not so much the case since in shifting and turning the spokes upon the paper the latter does not heat as fast, the spoke in its turning movement always finding an unused cool surface; but in machines used in planing mills for smoothing broad surfaces the filling of the paper always happens for the reasons herein stated. I have found that if beneath the paper a constantly moving member is employed behind the sand belt to receive the pressure, as shown, for instance, in the drawings accompanying this application, the paper is kept perfectly cool with the result that it cannot become filled with the dust and rendered useless. It is a fact, however, that the sand belt will also keep cool if passed over bare rollers since the time of contact with the floor is of but a moment's duration it having had no time to become heated to cause the trouble named.

It will be noted that in Fig. 7 but a very few inches of the paper is in contact with the floor at any time and after leaving the floor it passes upward to the roller 3 having ample time to cool after leaving the floor and before again contacting therewith. It is not my desire to confine myself to the use of the belt 8 therefore, although I prefer to use it since it forms a cushion for the sand belt as well as a cooling agent. Said belt 8 travels with the sand belt 9 being driven by the latter though it may be positively driven, if desired, by any good means. The sand belt may be used continuously until by long use its sand has been removed to an extent where it becomes useless when a new belt can be substituted but it is never replaced by reason of having become filled. The manner of removing the belt is quite simple. It is only necessary to remove the bolt P, hereinbefore described, which secures the body LM within the body AA and this permits the former to drop from the said body AA. It can then be drawn forward from beneath the machine tipped up on one side and the belt removed and replaced by another. It is then again pushed beneath the machine and raised slightly to bring the holes Q and R into register so that the bolt P can be replaced, the machine being

at once ready for further work, the change requiring but a few minutes.

I have not provided means for tightening the traveling belt 8 since it is not found necessary, but I have provided means for tightening the sand-belt which is exceedingly simple. In each of the extensions of the body TU in Figs. 5 and 10, at 17, is a notch into which enter the extremities of a bail 18 pivoted at 19 inside the body AA the notches engaging said extremities when the body LM is raised into position, just described. Connected to the top of the bail is a rod 20 which extends back to the rear of the machine passing through a member 21 secured to the body AA, Figs. 1 and 4. Said rod is threaded at its extremity and receives a threaded crank 22 or similar member by which the rod may be adjusted in the direction of its length to tilt the bail on its pivot, the extremities of the latter consequently shifting the body TU upon the guides S of the body LM to tighten or loosen the sand belt as required, the roller 3 being relatively stationary its adjusting means 5 and 7, Fig. 7, being used merely to properly locate said roller whereby the tilting of the bail, just described, will be within proper limits.

As shown in Figs. 10 and 11 I provide means for properly adjusting the body TU so that the sand belt will be made to centralize itself, that is, so that it will run in the middle of the belt 8 or without running over to one side. The forward end of the groove in the parallel extensions of this body TU snugly fit the guides S of the body LL but gradually widening toward the rear as shown whereby said body can be rocked in a horizontal plane to bring its rollers 2 (not shown in these figures) parallel to the roller 3 for the purposes hereinbefore stated. An extension 23 on the body TU carries a set screw 24 shown clearly in Fig. 11, which is adjusted in the said extension 23 by its screw threads and has a reduced neck 25 and a head 26 at its extremity, the neck being designed to slip into a notch 27 in one of the sides of the body LM as in Fig. 7, and it will be seen that the head and shoulder of the screw will hold it within the notch but by turning it one way or the other the extension 23 of the body TU will be moved toward or away from the body LM being permitted so to do by the widened grooves described. A lock-nut 28 serves to hold the set screw 24 in any adjustment, the body TU being thereby held in a stationary position. I have provided an extension for the machine by which the floors can be sandpapered close up to the walls. The shaft W which carries the rollers 2 are provided at one side of the machine with extensions W' which project beyond the caster wheel E at said right side, each having a flange W², Figs. 2 and 3. Upon each shaft is placed a roller W³ grooved in the manner described their

outer ends having sockets, one of which is shown at W^4 in Fig. 3, to receive nuts one being also shown in the figure last referred to at W^5 , which are placed upon the threaded ends of the said shaft-extensions to hold the roller in place. The shaft 4 carrying roller 3 is likewise extended as shown at 28', Figs. 3 and 5, and has a flange 29 for receiving the end of a roller 30 corresponding substantially in size to the roller 3. This roller is also provided with a socket for receiving a nut 31. A traveling belt 32 corresponding to the belt 8 already described, is carried on the roller W^3 and a sand belt 33 is placed in position and corresponds exactly to the belt 9. It will now be seen that I have duplicated the belt 9 and its carrying means but have placed them outside the machine and they are adjusted in the same manner and by the same means as said belt 9.

It would not be possible to sandpaper a floor close up to a wall that extends parallel to the line of movement of the machine since the sand-belt 9 could be brought no closer to the wall than the distance between it and the outer edge of the wheel E at that side, and it is therefore, my purpose to place a sand belt outside the machine so that its edge will run close to the wall. It is desirable to have the rollers W^3 slightly larger in diameter than the rollers 2 inside the machine, so that when they are in use the belt 9 of the said rollers 2, for obvious reasons, will not touch the floor.

In Fig. 3^a I have shown a modification of the shafts of the rollers 2 and W^3 in which 34 indicates one of the shafts of the rollers 2 into which is screwed the threaded end of a shaft 35 corresponding to W' , Fig. 2. By this means the shaft extensions may be placed in position or removed together with the rollers and other parts as desired. In this form there are no projecting shafts on the machine.

In use the machine is guided parallel to the grain of the wood and when the front of the machine reaches the wall the body A contacts with the wall in front and stops further progress of the machine. The sand belt is then raised from the floor by the means described and the machine is then drawn away from the wall and adjusted to a new position, the sand belt being once more lowered to position for work. An adjustment of the crank 12 on the member G, as before explained, permits the sand belt to be given a permanent adjustment for a particular job, and the cranks K of the rods F when operated independently serve to tip the machine toward one side or the other in order to properly level the belt or make it conform properly to an inclined surface.

In Fig. 13 is a modified form of sand-belt carrying means, wherein two large rollers 41 are illustrated while between them are the small rollers 42 corresponding to rollers 2

and having the traveling belt 43 corresponding to the belt 8. I may use this form for heavy work or for use entirely on floors where it is not necessary to work up close to the walls. The larger rollers do not cause the sand-belt to bend upon as small a curve as that of the rollers 2 there being less chance of cracking the glue on said belt. I have found this machine to work on all kinds of woods in a perfect manner even after having been varnished or oiled, old floors being cleaned as well as newly laid ones. It is also found that the inter-locking rubber tile in use at the present time is readily leveled and smoothed.

By keeping the contact area of the belt 9 small there is less chance for heating and softening of the glue. A small area, however, works just as well as a larger one and obviously requires less power. It would be possible, in this connection, to use but one of the rollers 2 if desired since it is not intended to use exactly three of them or in fact any stated number. It is desirable to have the endless member 8 a non-conductor of heat so that it will retain heat as little as possible and consequently more readily cool. When made of leather or rubber it is sufficiently conductive of heat, however, to readily remove any slight heat from the sand-belt. This would also be true of the rollers if of wood or other non-conducting material if the sand-belt were used on them by preference. The auxiliary sand-belt 33 may be used at either side of the machine since neither a right hand nor a left hand machine could alone meet all contingencies that might arise in sandpapering a floor.

What I claim is

1. In a floor smoothing machine, the combination with a frame provided with supporting wheels adapted to travel over a floor, of an endless abrading belt supported, independently of said wheels, by said frame, in position to have a small portion of its lower fold brought into contact with the floor, means for adjustably fixing the pressure of said portion upon the floor, and means borne by the frame for driving said belt.

2. In a floor smoothing machine, the combination with a series of revolubly mounted parallel rollers each provided with a series of circumferential grooves receiving those portions of contiguous rollers lying between corresponding grooves, an endless belt inclosing and carried by said rollers, and an abrading belt having its lower fold pressed by the belt first mentioned.

3. The combination with a suitable frame, of wheels supporting the frame above the floor upon which the wheels rest, rollers carried by the frame, an endless abrading belt carried by said rollers and having its ends unequally distant from the floor, means for lowering the frame to bring the lower portion

of the belt into contact with the floor, and means carried by the frame for driving one of said rollers.

4. The combination with a frame provided with supporting and steering wheels, of an endless abrading belt carried by the frame with its lower fold below the latter, and means for adjusting the frame vertically with respect to said wheels, to press the belt upon the floor over which the wheels move.

5. The combination with a frame provided with supporting and steering wheels, of an endless abrading belt carried by the frame, and means at one end of the frame for adjusting the opposite end vertically to throw one end of the belt only into and out of contact with the floor.

6. The combination with a frame and wheels for supporting and steering the same, of an endless inclined abrading belt, a roller mounted in the frame for carrying the upper end of said belt, a series of contiguous horizontal rollers for the opposite end of the belt, and means for vertically adjusting the series of rollers last mentioned.

7. The combination with a frame and wheels for supporting and steering the same, of an endless inclined abrading belt, a roller carried by the frame for supporting the upper end of the belt, a series of contiguous horizontal rollers for the opposite end of the belt, a cushioning belt passing around said series of rollers within the abrading belt, and means for adjusting the lower end of the abrading belt vertically.

8. The combination with a wheel-supported frame, of rollers projecting laterally from the frame beyond all other parts of the apparatus, an endless abrading belt carried by said rollers, a motor carried by the frame, for driving said belt, and means for at will forcing a portion of the lower fold of the belt into contact with the floor.

9. In a machine of the class described, a frame carrying all the working parts and provided with supporting and steering wheels, an endless sandpaper belt, means for carrying and driving the same in one direction, part of such means being designed to hold the belt in working contact with the floor, and a traveling member carried on said means and with which and on which the belt travels for the purposes described.

10. In a machine of the class described, a frame carrying all the working parts and provided with supporting and steering wheels, an endless sandpaper belt adapted to be driven in one direction, revoluble means for carrying and for driving the belt, part of said means being of a lower elevation than the other and adapted for holding the belt in working position at the floor surface, and a traveling member between the belt and the carrying means last described, for keeping the belt cool where it contacts with the floor.

11. In a machine of the class described, a wheeled frame, a roller-carrying frame secured therein but removable therefrom, and a sandpaper belt carried on the rollers and adapted to be slipped from the same when said roller-carrying-frame is removed from the said wheeled frame.

12. In a machine of the class described, a wheeled frame, a roller carrying frame detachably secured therein, a series of rollers having bearings in said roller carrying frame, and an endless sandpaper belt carried upon and driven by said rollers and removable from the latter in a direction parallel to their axes after the roller frame is removed from the said wheeled frame.

13. In a machine of the class described, a wheeled frame adjustable for height for the purposes described, a secondary frame removably secured to said wheeled frame, a sandpaper belt carried in said secondary frame, means for driving the belt for the purposes described, said belt being removable from the secondary frame when the latter is removed from the said wheeled frame.

14. In a machine of the class described, a wheeled frame adjustable for height for the purposes described, a secondary frame removably carried thereby, a sandpaper belt within said secondary frame, means in the latter for carrying said belt and for driving the same in one direction, said secondary frame being of smaller area than the area inclosed by the belt whereby said belt can be removed over said frame.

15. In a machine of the class described, a wheeled frame, a secondary frame removably secured thereto, a continuous sand paper belt, means in the secondary frame for carrying and driving the belt, part of said means adapted for holding the belt in working position upon the floor surface, means for adjusting the belt for height for the purposes explained, the secondary frame and the belt being removable from the wheeled frame as a unit, the belt also being removable from said secondary frame.

16. In a machine of the class described, a wheeled frame, a secondary frame removably secured thereto, a sand-paper belt, means carried by the secondary frame for carrying and for driving the said sandpaper belt, the latter frame and its belt lying between the wheels of the said wheeled frame, and means also carried by the secondary frame for carrying and for driving an auxiliary sandpaper belt outside the wheels of the said wheeled frame, and an auxiliary belt for the last named carrying means, both belts being removable from their carrying means.

17. In a floor sandpapering machine a wheeled supporting frame, an endless sandpaper belt, means on which it is carried and by which it is driven, means for adjusting the belt for height and means associated with the

latter means by which to level the belt and tilt it transversely for adjusting it to inclined surfaces.

18. In a floor sandpapering machine, a 5 carrying frame, means by which it is supported and carried, an endless sandpaper belt, means for carrying the same and for driving it, means for varying the tension of the belt, means also for vertically adjusting 10 the belt, and other means associated with the last named means for tilting the belt transversely for the purposes set forth.

19. In a floor sandpapering machine, a 15 supporting frame, means on which it is carried, an endless sandpaper belt, means on which it is carried and by which it is driven, an auxiliary sandpaper belt outside the frame and outside the carrying means and carried and driven by the same means on 20 which the first named belt is carried, and means for raising and lowering both said belts.

20. In a floor sandpapering machine, a 25 supporting frame having carrying wheels, an endless sandpaper belt, means on which the belt is carried and by which it is driven, an auxiliary sandpaper belt outside the frame and outside the carrying wheels, means for carrying and driving it, such means being 30 carried by the same means on which the first

named belt is carried, means for raising and lowering both said belts, and other means for tipping the belts in a transverse direction for the purposes stated.

21. In a floor sandpapering machine, a 35 supporting frame having carrying wheels, an endless sandpaper belt, means on which said belt is carried and by which it is driven, an auxiliary sandpaper belt outside the frame and outside the carrying wheels, means for 40 carrying and driving said auxiliary belt, and means for raising and lowering both said belts for the purposes described, and other means for varying the tension of the belts.

22. In a sandpapering machine, a wheeled 45 frame, an endless sandpaper belt, means carried in the frame for carrying and for driving the belt, an auxiliary belt outside the machine and carried and driven therefrom, means for changing the elevation of the 50 belts, means for tilting the belts in transverse direction for the purposes stated, and other means for affecting the tension of both belts.

In testimony whereof I affix my signature, 55 in presence of two witnesses.

FREDERICK HARBERS.

Witnesses:

L. M. THURLOW,
A. KEITHLEY.