(No Model.) 3 Sheets—Sheet 1.

J. EMIG.

MACHINE FOR PLANING BOWLING ALLEYS.

No. 567,821. Patented Sept. 15, 1896.

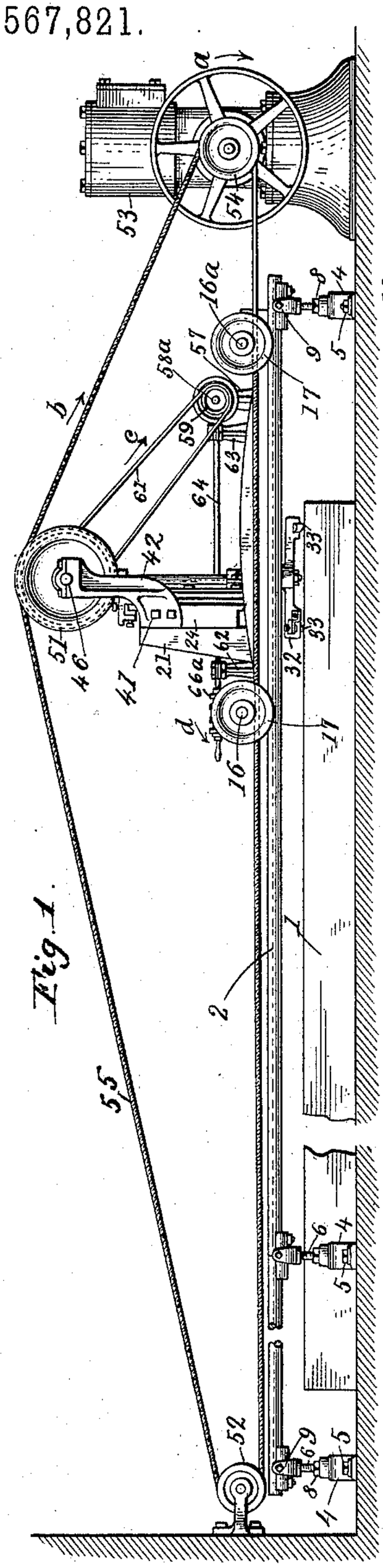


Fig. 1.

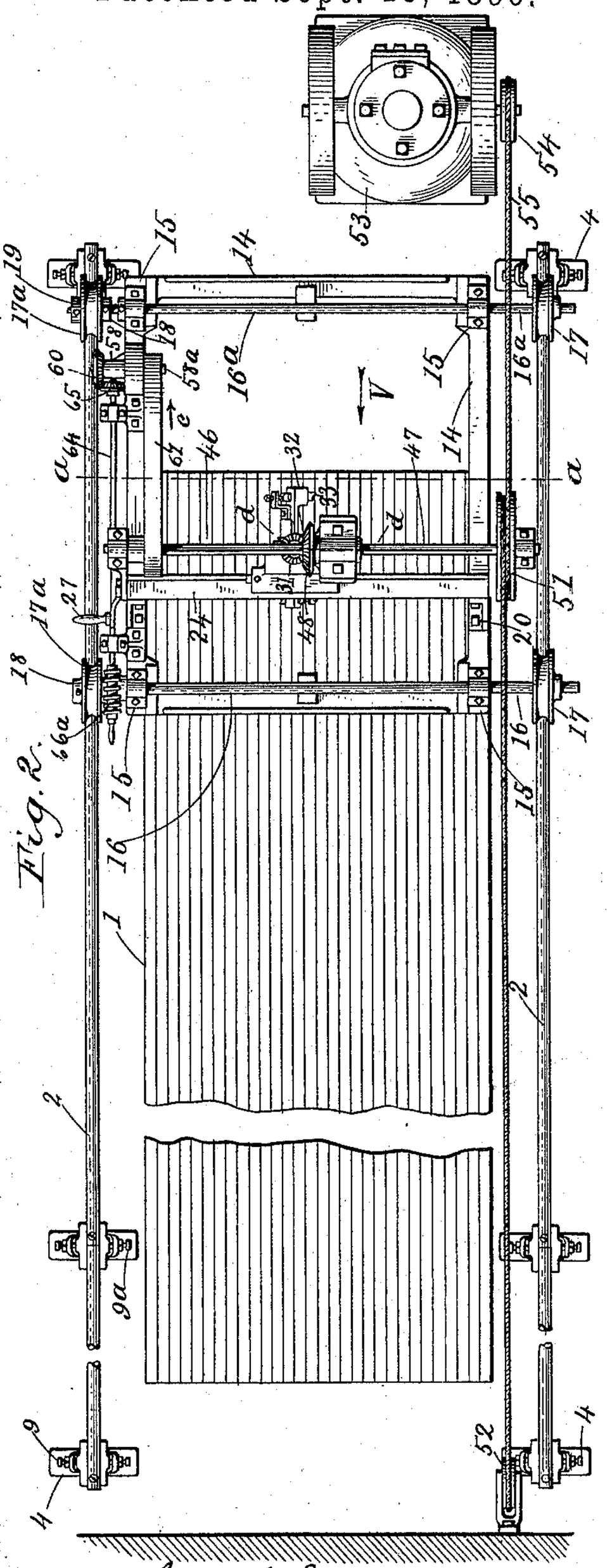


Fig. 2.

Witnesses,
L. M. Spong.
Emil Neukart.

Jacob Emig. Inventor.
By James Sangster. Attorney.

(No Model.) 3 Sheets—Sheet 2.

J. EMIG.

MACHINE FOR PLANING BOWLING ALLEYS.

No. 567,821. Patented Sept. 15, 1896.

Fig. 3.

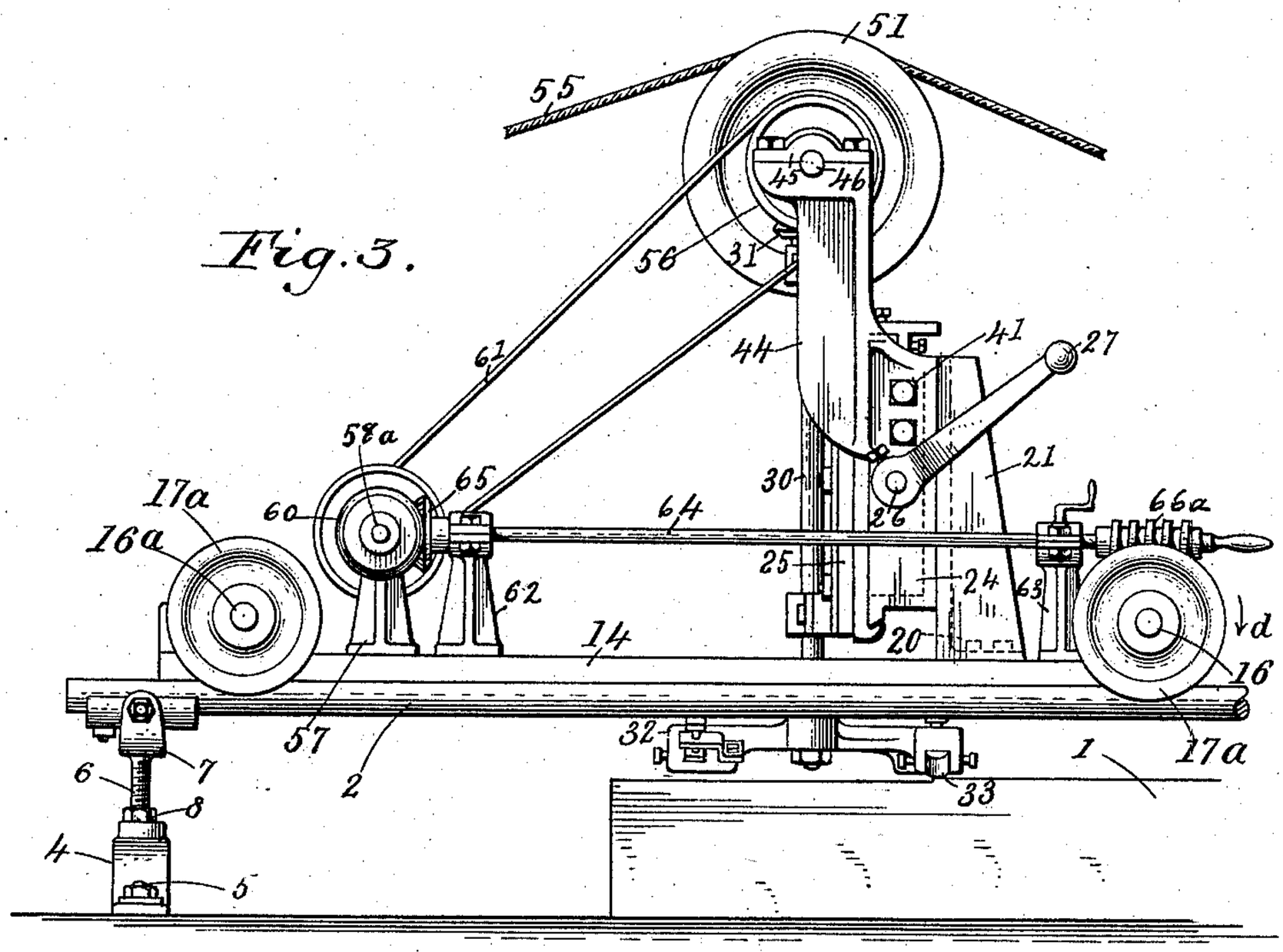
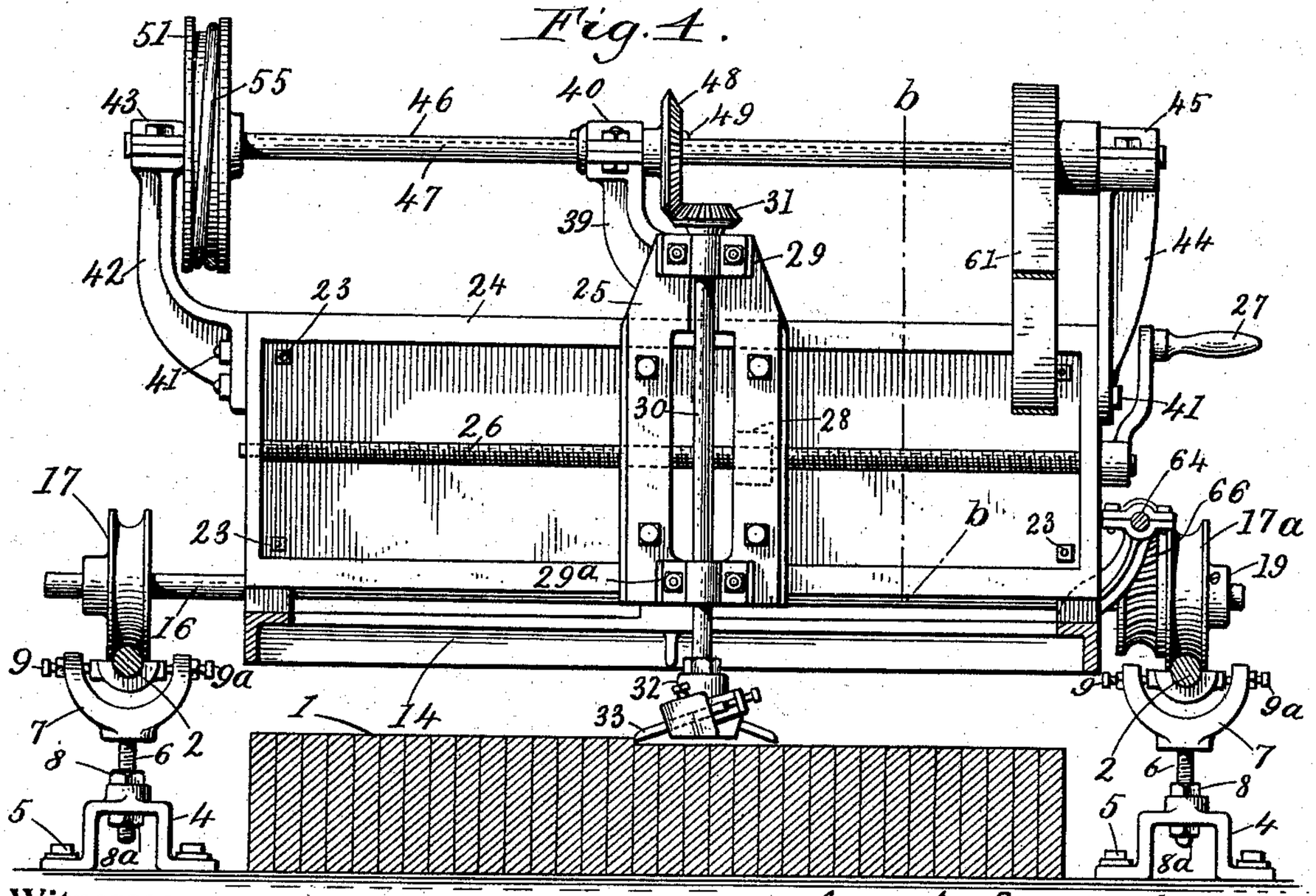


Fig. 4.



Witnesses,
L. M. Spong.
Emil Neuhart.

Jacob Emig Inventor.

By James Sangster, Attorney.

(No Model.) 3 Sheets—Sheet 3.

J. EMIG.

MACHINE FOR PLANING BOWLING ALLEYS.

No. 567,821. Patented Sept. 15, 1896.

Fig. 5.

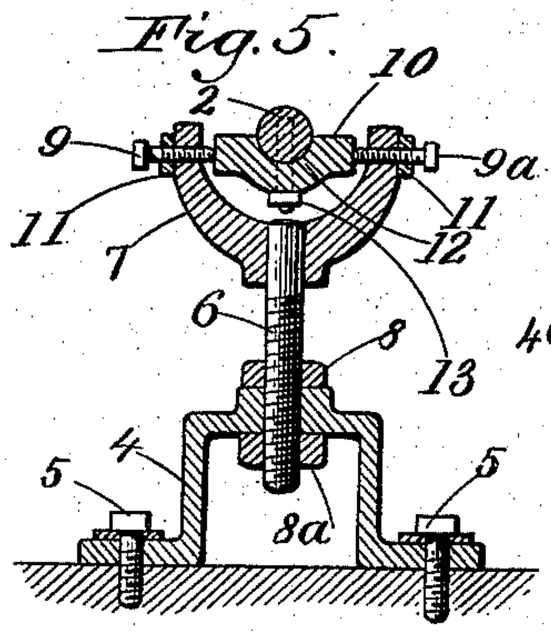


Fig. 7.

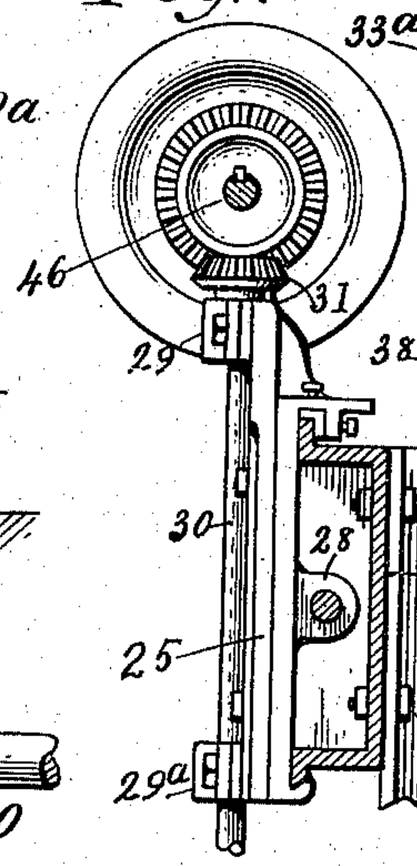


Fig. 8.

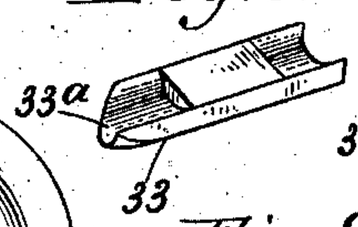


Fig. 9.

Fig. 10.

Fig. 11.

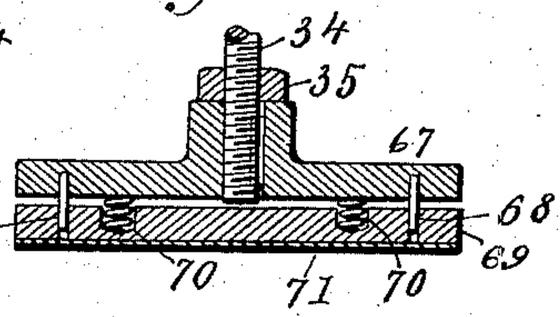


Fig. 6.

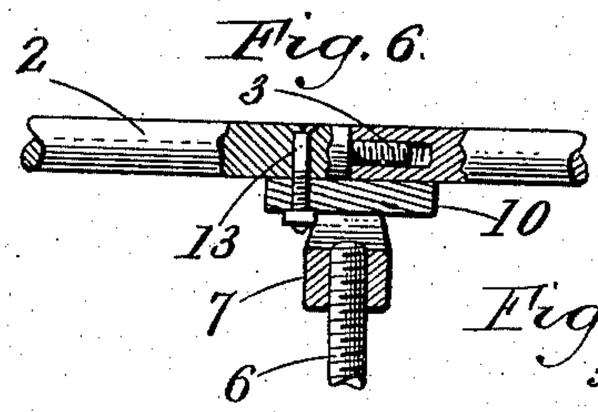


Fig. 11a.

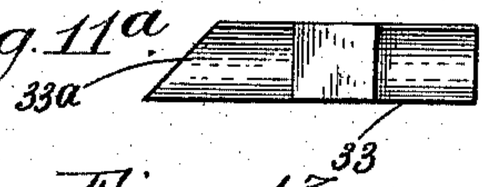


Fig. 13.

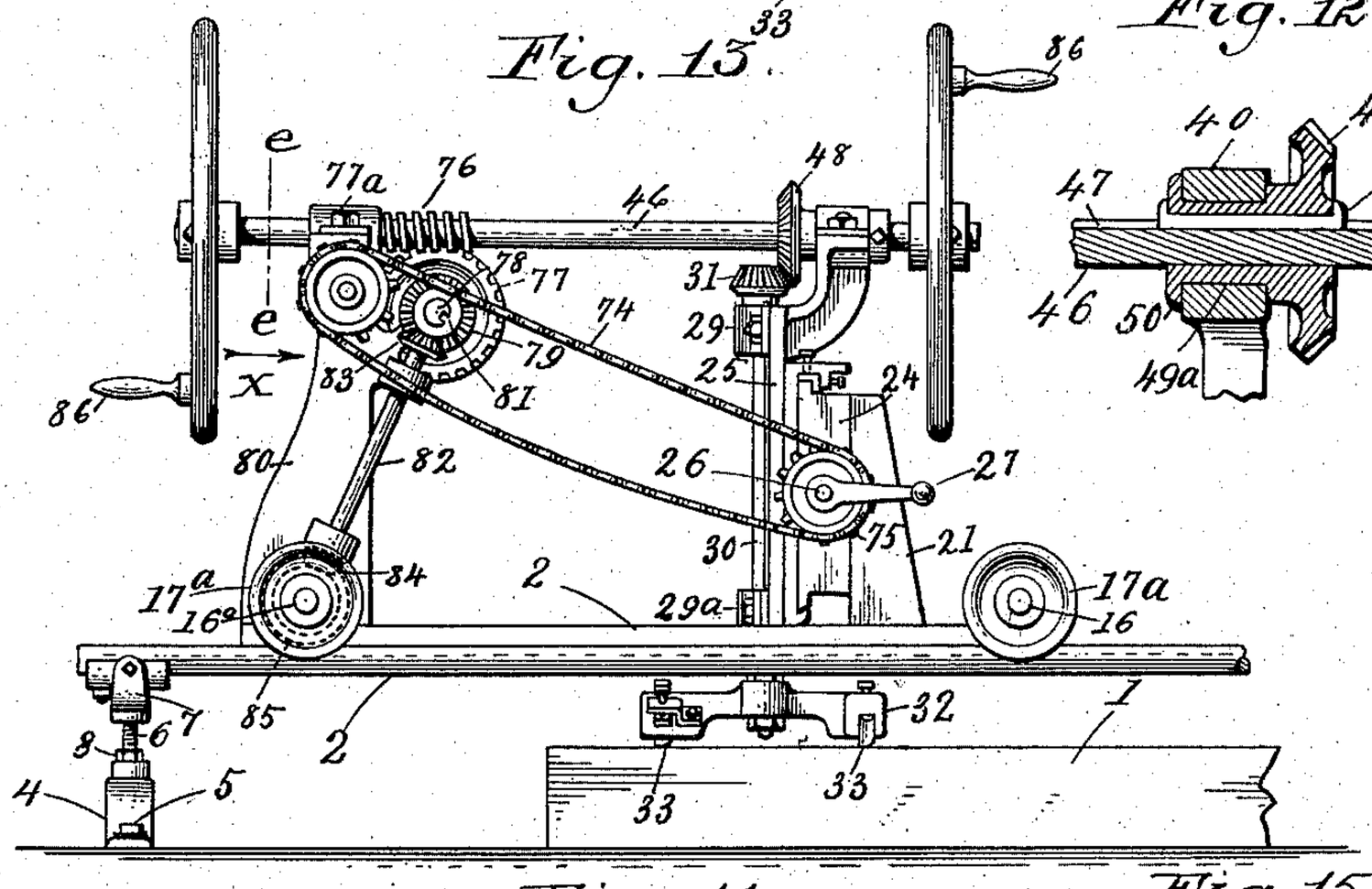


Fig. 12.

Fig. 14.

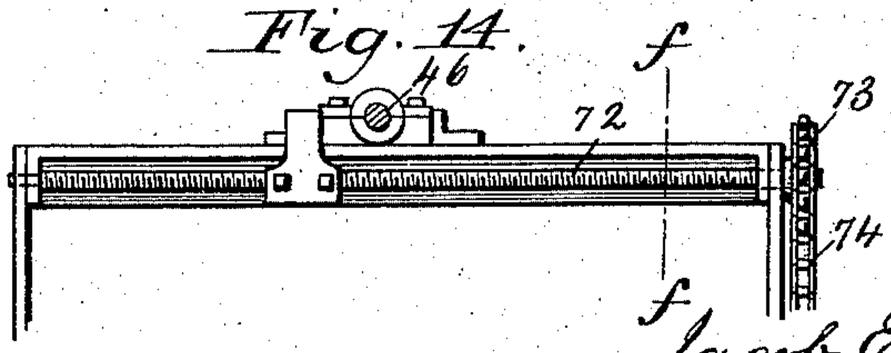
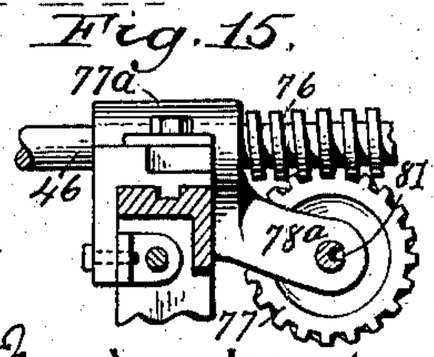


Fig. 15.



Witnesses,
L. M. Spong.
Emil Neuhart.

Jacob Emig. Inventor.

By James Langster Attorney.

UNITED STATES PATENT OFFICE.

JACOB EMIG, OF BUFFALO, NEW YORK, ASSIGNOR OF ONE-HALF TO GEORGE SHAFFER, OF SAME PLACE.

MACHINE FOR PLANING BOWLING-ALLEYS.

SPECIFICATION forming part of Letters Patent No. 567,821, dated September 15, 1896.

Application filed January 20, 1896. Serial No. 576,134. (No model.)

To all whom it may concern:

Be it known that I, JACOB EMIG, a citizen 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 Machines for Planing Bowling-Alleys, of which the following is a specification.

My invention relates to a new and useful machine whereby a bowling-alley can be easily and quickly leveled to a true horizontal plane, and will be fully and clearly hereinafter described and claimed, reference being had to the accompanying drawings, in which—

Figure 1 represents a side elevation of the machine and the bowling-alley with which it is connected. Fig. 2 represents a top plan view of the same, showing a similar view of the bowling-alley in connection therewith. Fig. 3 represents an enlarged side elevation of the machine, showing the side opposite to that shown in Fig. 1. Fig. 4 is a transverse section through the machine and bowling-alley on or about line *a a*, Fig. 2, looking in the direction of the arrow V in said Fig. 2. Fig. 5 represents a vertical central section through the adjustable track-support, cutting through all except the bolts and vertically-adjustable screw portion. Fig. 6 is a fragmentary side elevation showing two ends of the track secured together and the manner of attaching the track to the track-support, a portion of each part being broken away to show the construction. Fig. 7 represents a vertical section on or about line *b b*, Fig. 4. Fig. 8 represents a detached perspective view of one of the cutters. Fig. 9 represents a vertical central section through the cutter-head and cutters. Fig. 10 represents a horizontal section on or about line *c c*, Fig. 9. Fig. 11 represents a vertical central section through the removable sandpapering-head. Fig. 11ª represents a plan view of one of the cutters. Fig. 12 represents a vertical section on or about line *d d*, Fig. 2. Fig. 13 is a side elevation of the machine, showing the construction and arrangement of the parts when adapted to be operated by hand. Fig. 14 represents a vertical section on or about line *e e*, Fig. 13, looking in the direction of the arrow *x*. Fig. 15 represents a vertical section on or about line *f f*, Fig. 14.

Referring to the several parts of the mechanism in detail, 1 in said drawings represents an ordinary bowling-alley platform.

It is well known that a bowling-alley while in use becomes out of level or untrue.

The object of my invention is to provide a portable machine that may be quickly and easily adjusted to any bowling-alley and adapted to plane its surface to a true level.

I will first describe the track upon which the machine runs while in operation. It consists of two series of round iron or steel bars or rails 2, which can be easily turned in the lathe or otherwise made perfectly true. They are mounted upon adjustable foot-pieces, one end of each rail being provided with a reduced screw portion 3, adapted to screw into a correspondingly screw-threaded opening in the end of the other, thereby forming a long continuous track or rail 2. (See Fig. 6.) These rails are mounted on a series of adjustable supports or foot-pieces, consisting of a stationary supporting-base 4, (see Fig. 5,) which is rigidly secured to the floor on each side of the bowling-alley by bolts 5. In the top of this base is bored a vertical opening through which passes a central round bar 6, which depends from the forked portion 7, to which it is rigidly attached. It is provided with a screw-threaded portion adapted to receive the screw-nuts 8 and 8ª, by which it is firmly secured in place on the supporting-base 4 and by which it may be adjusted vertically up or down. At the top of the forked portion is secured by the pointed pivotal screws 9 and 9ª a transverse supporting-piece 10, which is thus held securely in place, so as to be movable on the screw-centers. The screws, when adjusted, are securely held in their adjustment by means of the usual jam-nuts 11. (See Fig. 5.) In the top of the cross-piece 10 is a semicircular depression 12, in which the track-bar 2 is laid and then rigidly secured in place by a countersunk-head screw-bolt 13. (See Figs. 5 and 6.) It will now be seen that the bolts 9 and 9ª provide the means for adjusting the track-bars laterally, or from

side to side, while the supporting-piece 10, being on pivotal centers, coincides with any movement of the track in that direction, and the screws 8 and 8ª allow the shaft to be adjusted vertically, so that the means of adjustment in any direction required are at hand in the supporting foot-pieces for supporting the track. A track is thus provided that can be readily secured in place on each side of a bowling-alley and easily adjusted to a true horizontal plane, as will appear farther on. The base-frame portion 14 is formed substantially in a square and preferably in one integral piece of cast-iron. It is provided with boxes 15, in which the transverse shafts 16 and 16ª are rigidly secured, so that they cannot turn thereon. On each shaft 16 and 16ª is mounted a grooved wheel 17 and 17ª, adapted to turn easily thereon, the groove in the periphery of the wheels being adapted to fit the tracks 2 and run thereon. To prevent the wheels 17 and 17ª from coming off from the shafts 16 and 16ª, I secure on said shafts two collars 18 and 19, one at each side of the wheels 17ª. (See Fig. 2.) The collars are secured rigidly in place by set-screws or in any well-known way, and so as to allow the wheels to have a free rotary movement on the shafts between the collars. The wheels 17 do not require anything to hold them onto their shafts 16 and 16ª except their grooved peripheries, that rest and tread upon a track made to fit said grooves. The object of this construction is to permit said wheels to move very slightly in a longitudinal direction back and forth along the shafts, so that if the parallelism of the tracks should not be exactly true the wheels will adapt themselves to the track without binding.

To the base-frame are secured, by bolts 20, (shown in Fig. 2 and by dotted lines in Fig. 3,) two upright side frame-pieces 21, to which is rigidly fastened, by bolts 23, (see Figs. 4 and 7,) a transverse slideway portion 24, on which is mounted a transverse sliding cutter-head frame 25. (See Figs. 4, 7, and 13.) In the transverse slideway portion 24 is mounted in suitable bearings thereon a screw-shaft 26, provided with a handle 27, by which it is operated by hand, as will appear farther on. This screw-shaft 26 passes through a correspondingly screw-threaded box 28 (shown in Fig. 7, also by dotted lines in Fig. 4) on the vertical cutter-head frame 25. On the vertical cutter-head frame is mounted in boxes 29 and 29ª a vertical shaft 30, having at its upper end a bevel gear-wheel 31, rigidly secured to it. At the lower end of the shaft 30 is secured, in the well-known way, a cutter-head 32, carrying the cutters 33. The construction of the cutter-head and the manner of its attachment to the shaft 30 are shown in the sectional view Fig. 9. It is attached to the shaft 30 by means of the screw portion 34 and nuts 35 and 36, which hold it rigidly to the shaft, and at the same time provide a convenient means for adjusting it vertically up or down, as will be seen. The shaft 30 is also prevented from turning in the cutter-head by means of a key 36ª. (Shown in Fig. 10.) The means for securing and adjusting the cutters 33 by means of the set-screws 37 and 38 is also shown in Fig. 9. The vertical cutter-head frame is also provided with an arm 39, which extends upward and is provided with a box 40, (see Fig. 4,) the office of which will appear farther on.

To one side of the slideway portion 24 is rigidly secured by bolts 41 an arm 42, having a box 43 at the top, and at the opposite end of the slideway portion 24 is rigidly secured another arm 44, also by bolts 41. At the top of this arm 44 is a box 45. In the boxes 43 and 45 is mounted a transverse shaft 46, having a longitudinal groove 47. (See Figs. 2, 4, and 12, where this groove is shown.) On this shaft 46 is mounted a bevel gear-wheel 48, having a key 49 secured thereto and adapted to slide in the groove 47, (see Fig. 12,) so as to prevent the bevel-wheel from turning on the shaft 46 and at the same time permit it to be moved longitudinally back and forth along said shaft. The bevel gear-wheel 48 is provided with a sleeve extending outward and having a reduced portion 49ª and a collar 50. This reduced portion fits in the box 40 and turns therein when the shaft 46 and gear-wheel 48 turn. The bevel gear-wheel 48 gears in with the bevel gear-wheel 31. (See Fig. 12, also Figs. 2 and 4.) It will now be seen that by turning the handle 27 the vertical frame 25, carrying the cutter-head and cutters and the bevel-gearing 31 and 48, may be moved transversely from one side of the machine to the other.

On one side of the machine, next to the arm 42 on the shaft 46, is mounted and rigidly secured a grooved pulley 51. At the rear end of the bowling-alley is secured in any well-known way, so as to be easily removable, a grooved pulley 52, (see Figs. 1 and 2,) and at the opposite end of the alley is located the engine 53, (a gas-engine, for instance.) Mounted on the engine crank-shaft and rigidly secured to it is a grooved pulley 54. The grooved pulleys 51, 52, and 54 are located so as to be in a line with each other and are connected with each other by a cable or rope 55, or a belt may be used if desired. The cable or rope passes entirely around the pulley 51, as will be seen by reference to Fig. 4, so that by the operation of the engine the pulley 51 and its shaft 46 are made to rotate. On the opposite end of the shaft 46, near the supporting-arm 44, is rigidly secured a pulley 56, (shown in Fig. 3,) and secured to the base-frame is a pillow-block 57, (see Figs. 1 and 3,) in the top of which is mounted in a well-known box short shaft 58ª, (see Fig. 2,) carrying on the inner side a small pulley 59 (see Fig. 1) and at its opposite end a bevel gear-wheel 60. (Shown in Figs. 2 and 3. The two pulleys 56 and 59 are connected together by a belt 61.

Rigidly secured by bolts to the base-frame of the machine are two pillow-blocks 62 and 63, (see Figs. 1, 2 and 3,) at the top of which is mounted in the usual boxes a longitudinally-arranged shaft 64. At one end of the shaft 64 is a bevel gear-wheel 65, (see Figs. 2 and 3,) and at the opposite end of said shaft is a screw-worm 66ª, adapted to gear in with the worm gear-wheel 66, mounted on the shaft 16 and located next to one of the grooved wheels 17ª, to which it is rigidly secured by a screw-bolt or other well-known means, so as to turn said wheel when the machine is in operation. The worm gear-wheel 66 is shown in Fig. 4. The object of the worm-gear is to give the proper feed to the machine while in operation. The cutters are made in the form of a gouge or hollow, and the cutting end 33ª is cut diagonally across, as more clearly shown in Fig. 11ª. This form insures a sliding cut, which is important in planing a bowling-alley, where the cut requires to be clean and smooth.

The operation of the machine is as follows: The several parts being adjusted to a bowling-alley, substantially as hereinbefore described, and motion being given to the engine so as to turn its fly-wheel in the direction of the arrow *a*, (see Fig. 1,) the cable or rope 55 will be moved in the direction of the arrow *b*. This operation will turn the grooved pulley 51 and the shaft 46 in the same direction, and through the bevel gear-wheels 48 and 31 will give the required rotary movement to the cutter-head and cutters. While this operation is going on, the belt 61, moving in the direction of the arrow *c*, will, through the bevel gear-wheels 60 and 65, give the shaft 64 and its screw-worm a movement in the proper direction to turn the worm gear-wheel 66 and the wheel 17ª in the direction of the arrow *d*, and thus give a sufficiently slow speed to the machine to plane the surface of the alley smooth. When the machine advances from the head of the alley to the rear and a portion of the alley is planed as wide as the cutters will sweep, the machine is moved forward, and by means of the handle 27 the cutter-head frame and cutters are adjusted sufficiently to one side to take another cut, which operation is repeated until the whole width of the alley is planed. After the planing is done it is often necessary to sandpaper the alley. This is done by removing the cutter-head and substituting therefor a rotary-disk sandpapering-head 67. (See Fig. 11, where a section through this head 67 is shown.) At the bottom of the head 67 are two or more downward-depending pins 68. A circular disk 69 is provided with holes in which the guide-pins pass when the disk is in place, as in Fig. 11. This disk 69 is provided with springs 70, which tend to force it downward. At the bottom of the disk 69 is a disk of sandpaper 71, secured thereto by cement or in any well-known way. With the sandpapering-head the operation of the machine is the same, the sandpapering being done in longitudinal courses until completed. When it is desired to run the machine with hand-power, the transverse shaft is arranged longitudinally. (See Figs. 12, 13, and 14.) The bevel-gears 48 and 31 communicate motion to the cutter-head in the same way as before. The cutter-head frame, with its cutters, is moved laterally by means of a screw-bar 26 and handle 27 in the same way, but in order to keep the shaft 46 parallel, or so that both ends move at the same time it is connected with a transverse screw-bar 72, (see Fig. 14,) having a sprocket-wheel 73, and a sprocket-chain 74 connects with a sprocket-wheel 75 on the shaft 26. (See Figs. 13 and 14.) The required longitudinal movement is given to the machine along the tracks 2 by means of a worm 76 on the shaft 46, which gears with a worm-wheel 77. The worm-wheel 77 is mounted on a horizontal shaft 78, between two holding-pieces 78ª, one of which is shown in Fig. 15, and which forms a part of the box 77ª.

The shaft 78 carries the bevel gear-wheel 79, which is rigidly secured to it, (see Fig. 13,) and is mounted in bearings secured to the upright frame-pieces 80, and while it is stationary longitudinally it can rotate easily in its bearings. The worm gear-wheel 77 is mounted on the shaft 78 so it can move longitudinally back and forth along said shaft 78, but cannot turn thereon. This is done in the usual way by means of a longitudinal groove in the shaft and a feather extending from the worm gear-wheel into said shaft, substantially as shown at 81 in said Fig. 13. A shaft 82 is mounted in boxes on the frame 80 and is provided with a bevel gear-wheel 83 at the top, adapted to gear in with the bevel gear-wheel 79. At the lower end of the shaft 82 is another bevel gear-wheel 84, (shown by dotted lines in Fig. 13,) which gears in with the bevel gear-wheel 85 on the shaft 17.

From the above description it will be seen that by turning the crank-handles 86 in said Fig. 13 the machine will be operated by hand and moved slowly along the track, while the cutters are being operated at the same time.

I claim as my invention—

1. The combination with a bowling-alley of a portable railway-track, consisting of a double series of supporting-frames one series for each side of the track, each supporting-frame carrying a pivoted box in which the track-bars are supported and made adjustable, allowing either end to be adjusted up or down and means for adjusting the track-bars laterally and vertically substantially as described.

2. The combination with a bowling-alley of tracks, secured to supports extending lengthwise each side of the alley, a planing-machine located directly over the alley on grooved wheels adapted to fit over each side of the track-bars and be moved longitudinally back or forth thereon, one wheel being secured between collars at one end of each shaft so as to rotate freely between them, the other wheel on said shaft being free to rotate and move

lengthwise of the shaft at its opposite end and be guided by the rail on which it treads, substantially as described.

3. In a bowling-alley, an adjustable track-holding supporting-frame, consisting of a base portion 4, an upper forked portion between the forks of which is pivoted on centers a cross-piece or box carrying the track-bars and capable of movement on its centers when adjusting the track, means substantially as above described for adjusting the track laterally, and a vertical screw portion 6, carrying the pivoted track-bar supports and adapted to be adjusted vertically in the base 4, as and for the purposes described.

JACOB EMIG.

Witnesses:
JAMES SANGSTER,
L. M. SPONG.