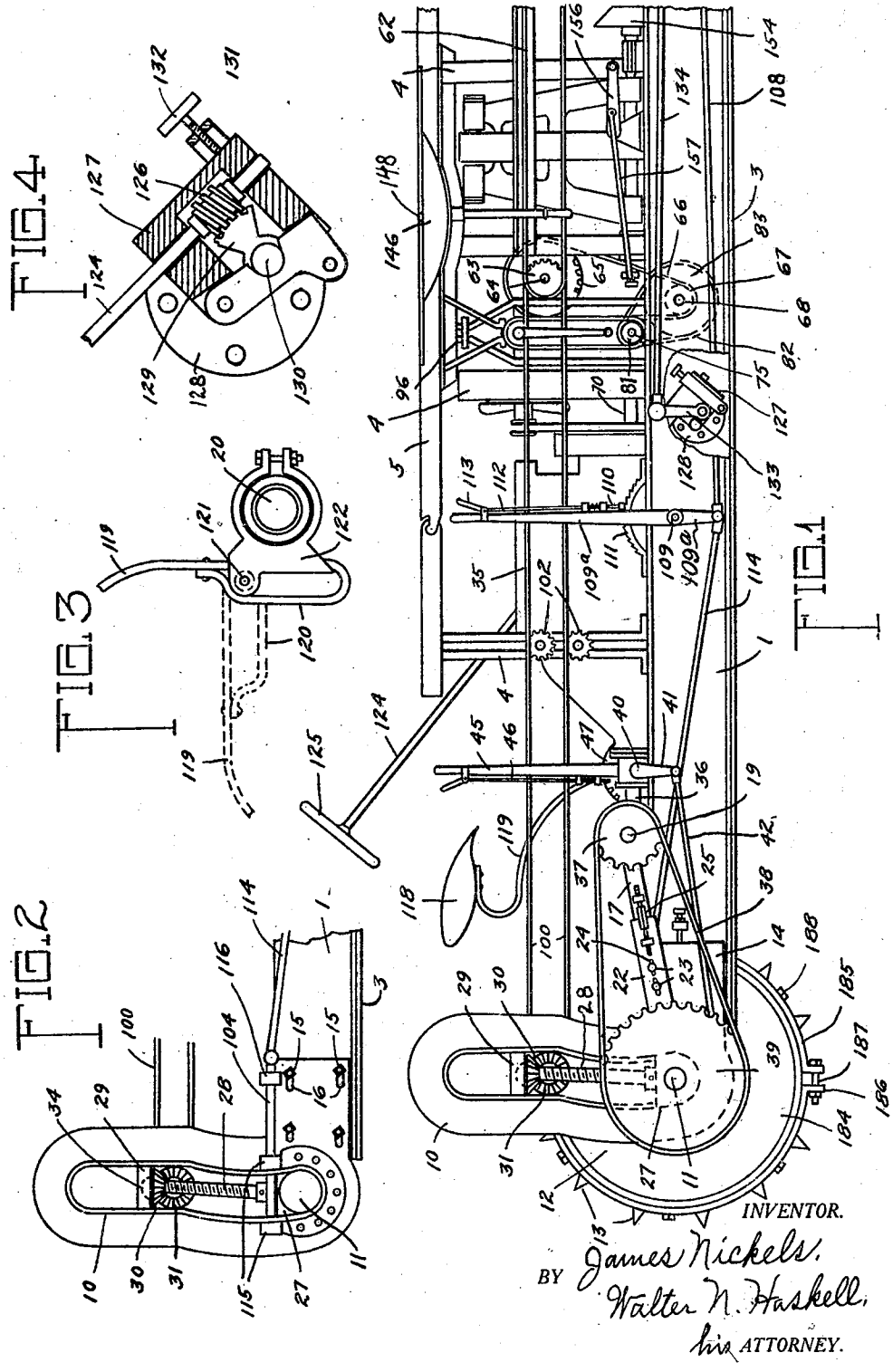
Nov. 13, 1928. 1,691,732

J. NICKELS

PORTABLE MACHINE FRAME

Filed Feb. 3, 1927 5 Sheets-Sheet 1



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PORTABLE MACHINE FRAME

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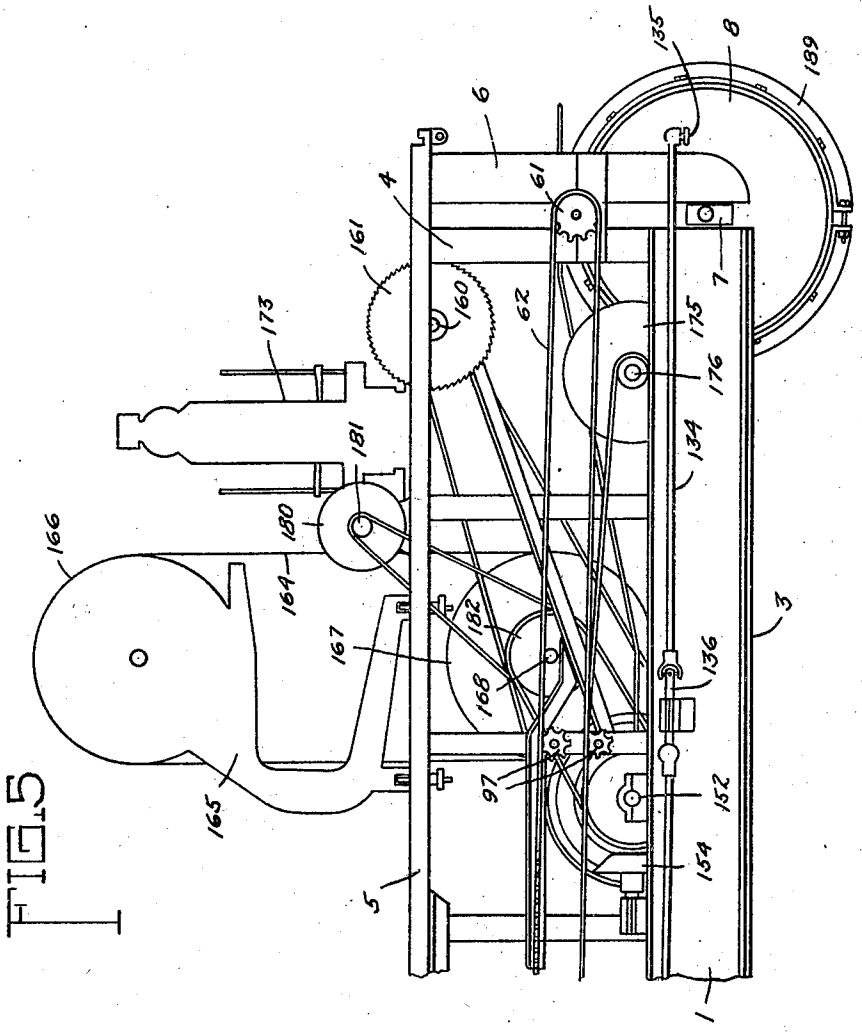


FIG 5

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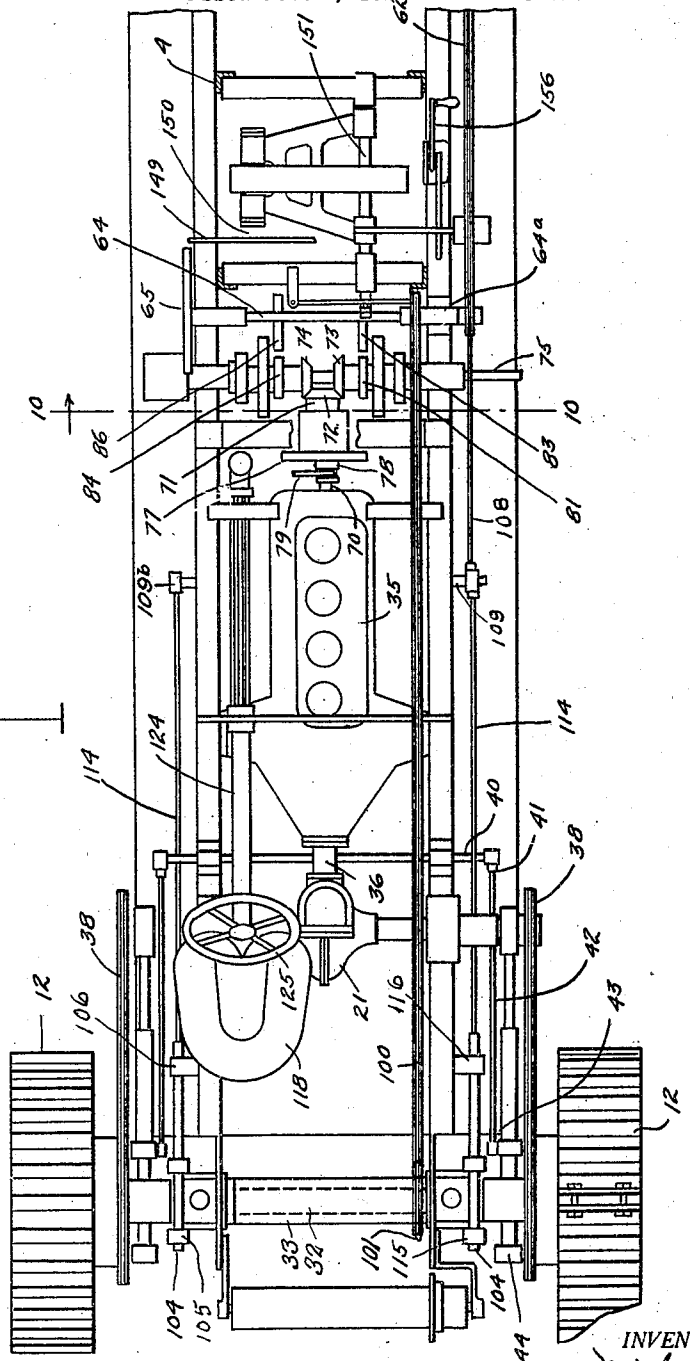
Nov. 13, 1928. 1,691,732

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PORTABLE MACHINE FRAME

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FIG. 6



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PORTABLE MACHINE FRAME

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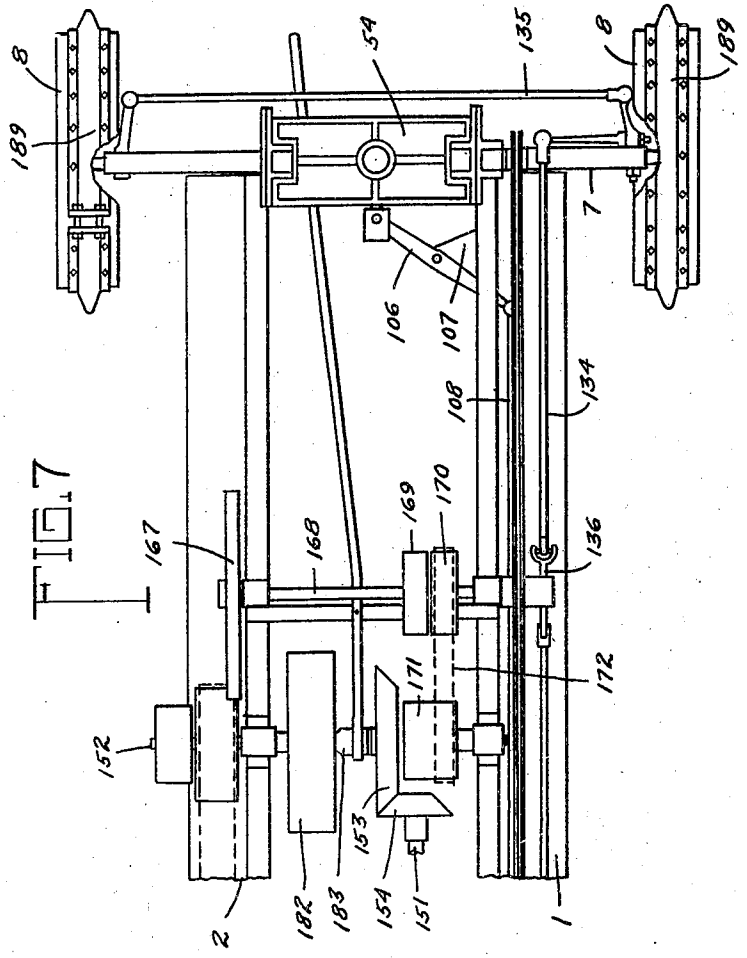


FIG. 7

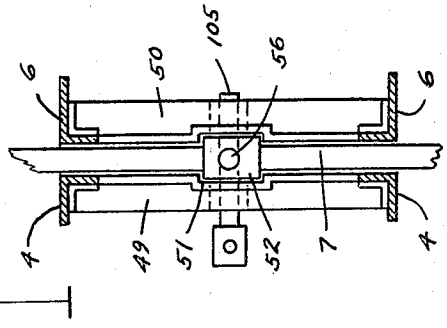


FIG. 8

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FIG. 9

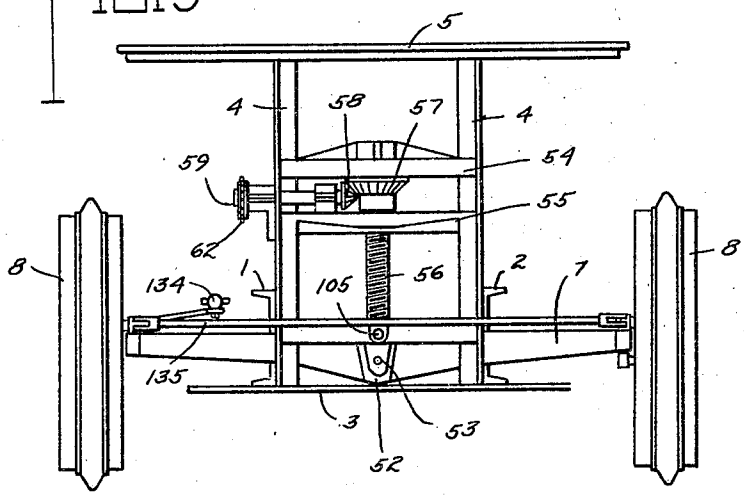
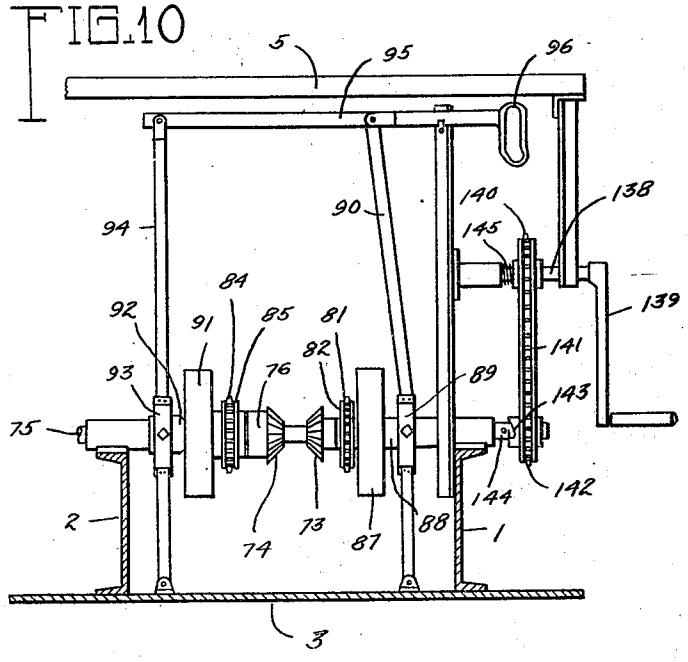


FIG. 10



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Patented Nov. 13, 1928. 1,691,732

UNITED STATES PATENT OFFICE.

JAMES NICKELS, OF SILVIS, ILLINOIS.

PORTABLE-MACHINE FRAME.

Application filed February 3, 1927. Serial No. 165,517.

My invention has reference to a universal wood-working machine of a portable type, and has for its chief purpose to make it possible to form all of the framing lumber for a building, do all the mill-work, and provide all of the finish material in or near the structure that is being erected. It is provided with a rafter framing mechanism of the type set out in a former application of myself for Letters Patent of the United States, filed January 21, 1927, Serial No. 162,483, and in addition thereto is fitted with a number of other wood-working mechanisms, such as a cross-cut saw, jointer, emery wheel, band-saw, and others. It is also equipped with a generator, by means of which the machine can be illuminated and operated at night. The various devices shown and described herein are for the purpose of illustration largely, it being possible to add other mechanisms thereto, or substitute others therefor.

One feature of the machine consists in having it supported on a set of carrying wheels in such a manner that upon arriving at its destination it can be lowered and set firmly on the ground or floor of a building, so that the mechanisms thereof can be successfully operated. The machine is of such a character that it can be run in on the ground floor of a building under construction, or hoisted to the higher floors of a large structure, and used in the preparation of all of the woodwork used in the construction of such building, doing away with the necessity of having such work prepared at points remote from the building, and transported thereto.

In transporting the machine from one point to another it is found to be advisable to have the wheels equipped with tractor treads, but as such wheels would be injurious to the floor of a building, an outer removable rim is provided for such treads, upon the removal of which a smooth rim is disclosed for use on the floors.

The machine is also self-propelled, by means of a motor carried thereon, which motor is also employed for raising and lowering the machine.

The particular construction, arrangement, and operation of the various parts of the machine will more fully appear from the following specification, reference being had to the accompanying drawings, in which;

Fig. 1 shows the rear fragmentary portion of the machine, in side elevation, with one of the carrying wheels removed, and the machine in raised position.

Fig. 2 is an enlarged detail of one of the racks 10 and appurtenant parts.

Fig. 3 is a detail of the seat supporting devices, partly broken away.

Fig. 4 is an enlarged detail of the steering device transmission.

Fig. 5 shows the forward fragmentary portion of the machine, in side elevation, with one of the carying wheels removed.

Fig. 6 is a plan view of the rear fragmentary part of the machine.

Fig. 7 is a similar view of the front fragmentary portion thereof.

Fig. 8 is a detail of the cross-pieces 49 and 50.

Fig. 9 is a front view of the machine.

Fig. 10 is a cross-section on the broken line 10—10 of Fig. 6.

The frame of the machine is formed of a pair of longitudinal channel plates 1 and 2, to the lower flanges of which is attached a sheet steel floor 3. Supported on the upper flanges of said channel plates is a frame formed of pairs of posts 4, supporting a table 5, which is the main work table of the machine. The most forward pair of posts 4, has connected therewith a pair of standards 6, spaced apart therefrom, and passing thru the lower end of such space is an axle 7, pivoted to the ends of which are the spindles of the forward carrying wheels 8.

At the rear end of the machine is supported a pair of racks 10, passing thru the lower ends of which is an axle 11, on the ends of which is mounted a pair of carrying wheels 12, so as to rotate thereon, said wheels being provided on their peripheries with cleats 13, for better traction operation. Said racks are connected with the main frame by plates 14, integral therewith, and secured to the plates 1 and 2 by bolts 15, passing thru openings in the channel-plates and slots 16 in the plates 14. By loosening the nuts on said bolts the positions of the plates 14 can be adjusted longitudinally of the plates 1 and 2, for the purpose hereinafter specified.

The axle 11 is supported in the rear ends of a pair of arms 17, the forward ends of which have a pivotal bearing on the outer ends of a pair of shafts 19 and 20, the inner ends of which are connected with a differential gear mechanism in a casing 21, supported centrally of the machine. The arms 17 have

telescoping sections 22, which can be held in adjustable positions with the other sections of said arms by bolts 23, held in said last-named sections and passing thru slots 24 in the parts 22. The adjustment can be made by means of a turnbuckle device 25, connecting one of the arm sections with the other.

Fixed to the axle 11 is a pair of flanged guides 27, movable vertically in the lower ends of the racks 10. Pivoted to the upper faces of said guides is a pair of threaded shafts 28, the upper ends of which move freely in openings in a pair of blocks 29, fixed in the racks midway their ends. Just below each of said blocks is a miter gear wheel 30, having a threaded engagement with the shaft 28, said miter gears being in mesh with similar gear wheels 31 on the ends of a shaft 32, journalled in bearings on the ends of a frame 33, uniting the racks 10. The lower ends of said racks are of arcuate form, and as the guides 27 travel along said lower portions the shafts 32 are given a slight rocking movement which would tend to cause them to bind in the wheels 30, but which tendency is overcome by permitting a rocking action to said wheels. This is done by means of hemispherical bearings 34 on the upper faces of said wheels bearing in similarly shaped sockets in the blocks 29. Rotation is imparted to the shaft 27 in a manner hereinafter set forth, such rotation being communicated to the wheels 30, causing an upward or downward movement of the racks 10, and consequent lowering or elevating of the rear part of the frame.

Supported in the machine near the rear end thereof is a motor 35, from which a jack-shaft 36 projects rearwardly, said shaft being connected with the differential gearing in the casing 21, and capable of imparting rotation to the shafts 19 and 20, in a forward direction or the reverse. Fixed on said shafts are sprocket-gear wheels 37, connected by chains 38 with relatively large sprocket-wheels 39, rotatably mounted on the ends of the axle 11, and connected with the hubs of the wheels 12, so as to cause the rotation thereof. Power is thus applied to said wheels to move the machine forwardly or rearwardly, as desired. Said wheels are also provided with an emergency brake mechanism, as follows;—Rockingly mounted on the rear end of the plates 1 and 2 is a shaft 40, to the ends of which are fixed arms 41, connected by rods 42 with levers 43, which are in turn connected with the bands of conventional brake mechanisms 44 on the hubs of the wheels 12. The shaft 40 may be rocked by means of a hand-lever 45 attached thereto, and provided with a locking rod 46 and latch controlled thereby for operation with a notched quadrant 47 fixed to the plate 1. The brake mechanism just described is of a well-known construction.

Any slack in the drive-chains 38 can be removed by loosening the bolts in the arms 17 and in the plates 14 and making such adjustments thereof as may be necessary. It will be observed also that the movement of the axle 11 is controlled by the arms 17, which establish the radius of movement of said axle with relation to the frame, and that the arc of the lower parts of the racks 10 must conform to such radius.

At the forward end of the machine is a pair of spaced cross-pieces 49 and 50, (Fig. 8) uniting the posts 4 and standards 6, respectively. At a central point therein said cross-pieces are provided with a rectangular opening 51, to accommodate a forked bearing 52, in the lower part of which is pivoted the axle 7, by means of a king-bolt 53 passing thru the forks of said bearing and said axle. The standards 6 and posts 4 are further united by a cross-head 54 and cross-plate 55 just below the same, and spaced apart from said cross-head. The cross-head and cross-plate are provided with openings permitting the free vertical movement therein of a threaded shaft 56, which is rigidly connected with the upper part of the fork 52. Between the cross-head and cross-plate is held a bevel-gear wheel 57, having a threaded connection with the shaft 56, and engaged by a bevel-gear pinion 58 on a shaft 59 journalled in one side of the frame. By the rotation of said shaft the wheel 57 is turned to cause an upward or downward movement of said wheel on the shaft 56, and consequent raising or lowering of the front end of the frame. On account of the limited space between the parts 54 and 55 the pinion 58 is made relatively smaller than the wheel 57, the ratio of diameters thereof being as two of the wheel to one of the pinion, but this is compensated for by doubling the pitch of the thread on the shaft 56, causing the movement of the wheel 57 to be proportionately increased, and be the same as that of the gear-wheels 30 on the shafts 28.

To the outer end of the shaft 59 is fixed a sprocket-wheel 61, connected by a chain 62 with a sprocket-wheel 63 on a shaft 64, journalled in bearings 64ª supported from one of the pairs of posts 4. Fixed on one end of the shaft 64 is a relatively large sprocket wheel 65, (dotted lines), connected by a sprocket-chain 66 with a sprocket-wheel 67 on a cross-shaft 68 journalled in the frame at a point below the shaft 64. Movement is imparted to the last-named shaft to rotate it in one direction or the other by the following means;—Projected forwardly from the motor 35 is a main engine shaft 70, on which is rotatably supported a sleeve 71, carrying on its forward end a bevel-gear wheel 72, in mesh with a pair of similar wheels 73 and 74, one of which is fixed to the transverse engine shaft 75, and the other to a sleeve 76 rotating

loosely on said shaft. The sleeve 71 is normally out of movement, but may be caused to rotate by means of a clutch-disk 77 connected therewith, and engageable by a clutch member 78 on the shaft 70, and operable by a lever 79 fulcrumed above the same. The movement of the sleeve 71 is imparted to the shaft 75 to cause a constant rotation thereof, and the power of said shaft is employed at such times as the machine is stationary for the purpose of operating the various wood-working devices thereof. At such times as the frame is being raised or lowered these devices are disconnected from said shaft.

Rotating freely on the shaft 75 is a sprocket-wheel 81, connected by a sprocket-chain 82 with a relatively large sprocket-wheel 83 on the shaft 68. A sprocket-wheel 84 is attached to the sleeve 76, and is connected by a sprocket-chain 85 with a relatively large sprocket-wheel 86 fixed on the shaft 68. Both of said sprocket devices are normally idle, both when the machine is in transportation and when any of the wood-working mechanisms are being used, but either of said devices is capable of being set in operation independently of the other as follows;—Connected with the sprocket-wheel 81 is a clutch-disk 87, (Fig. 10) engageable by a clutch member 88 slidable on the shaft 75 and rotatable therewith. Said member is provided with a collar 89, engaged by a lever 90 fulcrumed on the floor 3. The sprocket-wheel 84 is similarly connected with a clutch-disk 91, engageable by a clutch-member 92 on the shaft 75, provided with a collar 93, actuated by a lever 94, also fulcrumed on the floor 3. The levers 90 and 94 are united at their upper ends by an operator's rod 95, provided with a handle 96 under one edge of the table 5. By moving said rod in one direction the wheel 81 is set in motion, and by moving it in the opposite direction the wheel 84 is rotated. Movement is thus imparted to the shaft 68 and from it to the shaft 64, to move the chain 62 in one direction or the other, as desired. Said chain is further supported by idler sprocket-wheels supported on the frame. The rod 95 is also provided with a notch 95^a, for engagement with a pin in a support 1^a, fixed to the plate 1. Said rod may thereby be held with the levers 90 and 94 both in a neutral position, with neither of the wheels 81 and 84 in motion.

The shaft 64 is also provided with a sprocket-wheel 99, connected by a sprocket-chain 100 with a sprocket-wheel 101 on one end of the shaft 32 at the rear end of the machine. The shafts 28 are thereby rotated simultaneously with the shaft 56, so that the front and rear ends of the machine can be lowered or raised at the same time, and maintain the level position of the table 5. The shafts 28 are rotated in opposite directions, making it necessary to use a right hand thread on one thereof and a left hand thread on the other. The chain 100 is also supported midway its ends by idler gears 102, the studs 103 of which are arranged for vertical adjustment in their supports in order to take out any slack in the chain.

When the machine is supported in elevated position for transportation the weight of the frame comes chiefly upon a pair of bars 104 at the rear end of the machine, and a pin 105 at the front end thereof. Said pin passes thru openings in the cross-pieces 49 and 50, and thru an opening in the fork 52 at a point above the axle 7, which is carried downwardly in its central part. Connected with the inner end of the pin 105 is a lever 106, fulcrumed on a support 107, the outer end of said lever being connected by a rod 108 with the short end of a hand-lever 109^a fixed on a shaft 109 rockingly mounted in the plates 1 and 2. Said hand-lever is provided with a latch 110 engageable with the notches of a quadrant 111, and operable by a rod 112 on said lever, and provided with a handle 113. The short end of the hand-lever 109^a is also connected by a rod 114 with one of the bars 104, and a similar rod 114 connects the other bar 104 with an arm 109^b on the opposite end of the shaft 109 from the hand-lever. The bars 104 are slidable in guides 115 on the racks 10 and similar guides 116 on the plates 14. Said bars project just above the guides 27, and sustain the weight of the rear end of the machine. When it is desired to lower the frame to the ground, it is first raised a little, by operation of the chains 62 and 100 and parts driven thereby, to relieve the bars 104 and pin 105 from the weight of the frame, whereupon the lever 109 is actuated to withdraw said bars and pin. The frame is then lowered until the floor 3 rests upon the ground or floor of a building. When the machine is raised for the purpose of being transported, after attaining a suitable height the bars 104 and pin 105 are returned to their respective lodgments, and the frame again supported thereon. A portion of the weight of the front part of the machine also comes on the king-bolt 53.

Mounted on the rear part of the machine is a seat 118 mounted on a spring support 119, the lower end of which is provided with a frame 120, slidable on a pin 121 supported in a bearing 122 fixed on the extension of the differential casing. The frame 120 bears against said bearing and holds the seat in its proper position for use, but by pulling the seat and its support upwardly, the frame 120 is permitted to tip rearwardly, so that the seat and support can be lowered to a point where they will not interfere with operations being carried on on the table of the machine.

In front of said seat is a steering-post 124, provided with a wheel 125 at its upper end and at its lower end with a worm 126, rotatable in a housing 127, having a pivotal con-

nection with a plate 128, fixed to the inner face of the channel-plate 2. The worm is in mesh with a worm-gear segment 129, fixed on a shaft 130, rockingly supported in the plates 1 and 2. Upon the upper end of the steering post being lowered the worm 126 is disengaged from the segment 129. This is prevented under operative conditions by means of a clamp 131, on a pivot on the part 128, and embracing the housing. The clamp is held in place by a thumb-screw 132, operating in the clamp and bearing against the housing. By releasing the thumb-screw and turning the clamp downwardly the housing is freed, permitting the lowering of the steering post and wheel. This is also done when the work-table is in use, so that there will be no interference by said post with material that is being used on the table. The housing 127 is constructed so as to protect the worm 126 and segment 129 from the elements when the machine is in an exposed place.

Fixed to the end of the shaft 130 is an arm 133, which is connected by a rod 134 with the steering frame 135 at the front end of the machine. At a point midway its ends the rod 134 has a squared section 136, passing thru a similarly shaped bearing, to hold said shaft from rotating or getting out of place. By the movement of said rod the wheels 8 are turned to one side or the other in the usual manner of automobile wheels.

Supported beneath the edge of the table 5 is a short shaft 138, in line with the shaft 75. On the shaft 138 is a sprocket-wheel 140, connected by a chain 141 with a similar wheel 142 on the shaft 75. The hub of the wheel 142 has a notch 143 for engagement with a pin 144 in said shaft. On the end of the shaft 138 is a crank 139, by the operation of which the shaft is rotated, such movement being imparted to the shaft 75 and back to the engine shaft to start the motor. The crank 139 has a clutch connection with the hub of the wheel 140, and is held normally out of engagement therewith by a coiled spring 145 on said shaft. The action is similar to the usual crank action of an automobile, except that the crank is supported at a convenient height above the transverse engine shaft, instead of directly on said shaft. When the crank is turned in a clock-wise direction the wheel 142 engages with the pin in the shaft 75, and at other times the pin disconnects and passes the notch in the hub of such wheel upon each revolution.

At 146 is shown a special work-table or dial, similar to that set forth in said former application, said dial being provided with a saw-slot 148, just beneath which is a circular saw 149, on a shaft 150, to which movement is imparted from a shaft 151, which is rotated from a counter-shaft 152 by means of gearing 153—154. The shaft 151 is mounted so as to be capable of a limited amount of longitudinal movement, so as to permit the wheel 153 to be disengaged from the wheel 154. This may be effected by means of a hand-lever 156 pivoted on the saw frame, and connected by a rod 157 with a collar on that end of the shaft 151 opposite to the wheel 153. By turning the lever 156 upwardly the wheel 153 is moved away from the wheel 154, and by turning the lever downwardly again the wheels are re-engaged. By this means the saw mechanism may be placed out of operation when it is not desired to use the same, as when the frame is being raised or lowered. Gages designed for use on the dial 146 have not been shown in the drawings herein.

Beneath the forward end of the table 5 is journalled a shaft 160, on which is a rip-saw 161 projecting thru a slot in the table 5. Said shaft derives its movement from the counter-shaft 152 by means of a wheel 161^a on said latter shaft, connected by a belt 161^b with a pulley (not shown) on the shaft 160. At the opposite side of the table is a band-saw 164, the frame 165 of which is hinged to the table as at *h*, so that it can be folded downwardly upon the table 5 when the machine is being transported from one point to another. The saw runs round wheels 166 and 167, the latter of which is fixed on a shaft 168. Said shaft is fitted with a pair of pulleys 169 and 170, one of which is tight on the shaft and the other loose, said pulleys being adapted for alternative connection with a pulley 171 on the shaft 152, by means of a belt 172, shown in broken lines.

On the same side of the machine as the band-saw is also shown a mortising apparatus 173, also hinged to the table 5, so that it can be folded outwardly and downwardly, for the purpose of transportation, or to clear the table for other work.

At 175 is shown a generator on a shaft 176, on which is a pulley 177 connected by a belt 178 with a pulley 179 on the shaft 152. This may be used for providing lights for lighting the machine under conditions of darkness, or for operating an electric motor in the same locality. An emery wheel 180 is also provided, fixed on a shaft 181 to which movement is imparted from a wheel 182 on the shaft 168. A clutch mechanism is also indicated at 183 by means of which the wheel 161^a can be thrown into or out of motion.

The wheels 12 are preferably constructed with an inner rim 184 and an outer rim or band 185 provided with the cleats 13. The ends 186 of the band 185 are provided with means for receiving bolts 187, by means of which the band can be clamped tightly in place on the rim 184, such means as shown consisting of outwardly turned flanges 186. Other bolts 188 secure the outer band to the rim. The front wheels have a removable rib 189, also formed so as to be clamped on the wheel, and removed when desired.

The lowering of the front end of the frame changes the position of the steering rod 134 from a horizontal to an inclined one, tending to move the rear end of said rod forwardly a little, but this is allowed for by disengaging the gears in the housing 127, in the manner hereinbefore described, the steering apparatus not being in use at this time. Upon the frame being elevated again the rod and parts connected therewith resume their former position, suitable for reengaging the gearing.

As before mentioned, the showing of various mechanisms on the forward part of the machine is in order to show some of the work that can be done on the machine, in connection with the dial 146 near the rear end of the table, which dial and appurtenant parts are designed to be used in connection with any and all other tools with which the machine may be provided. For the first named mechanisms others may be substituted, or others added thereto, the purpose being to have the machine comprise, so far as possible, a complete portable work-shop for the builder's art. The dial referred to, when properly equipped with gages, does away with the need for use of miter-boxes or similar mechanisms for making angular cuts on a piece of timber.

What I claim, and desire to secure by Letters Patent, is:

1. In a machine of the class described, a frame and superstructure mounted thereon, running gear at the ends thereof, connections between said frame and running gear permitting a vertical movement of the frame, gearing for raising or lowering the forward end of said frame, gearing for raising or lowering the rear end of said frame, a motor supported in said frame and transverse engine shaft driven thereby, a secondary shaft rotatably mounted in said frame, means connecting said engine shaft with said secondary shaft to rotate the same in a given direction, means connecting said engine shaft with said secondary shaft to rotate the same in a reverse direction, both of said means being normally out of play, clutch devices for actuating one or other of said means, as desired, a third shaft rotatably supported, and means connecting the same with said secondary shaft to impart the movement thereof to said third shaft at a reduced rate of speed, and mechanism connecting said third shaft, with the raising and lowering gearing at both ends of the machine, to simultaneously operate the same.

2. In a machine of the class described, a frame and superstructure supported thereon, a cross-frame at the forward end of the machine and axle rockingly mounted therein, carrying-wheels on the ends of said axle, gearing mounted in said cross-frame and central screw-threaded shaft supported by said axle and operatively connected with said gearing to raise or lower said frame, a pair of racks connected with the rear end of said frame, an axle movable vertically thereof, carrying wheels on the ends of said axle, and means for driving the same, gearing and screw mechanism in each of said racks, operatively connected, for the raising and lowering of the rear end of said frame, a motor supported in said frame, and transverse engine shaft driven thereby, gearing connecting said engine shaft with said gearing at the front end of the frame, and gearing connecting said engine shaft with the gearing at the rear end of the frame, for operating the same simultaneously.

In testimony whereof I affix my signature.

JAMES NICKELS.