Nov. 22, 1932. L. H. GEDDES ET AL 1,888,664

POLE GAINING AND BORING MACHINE

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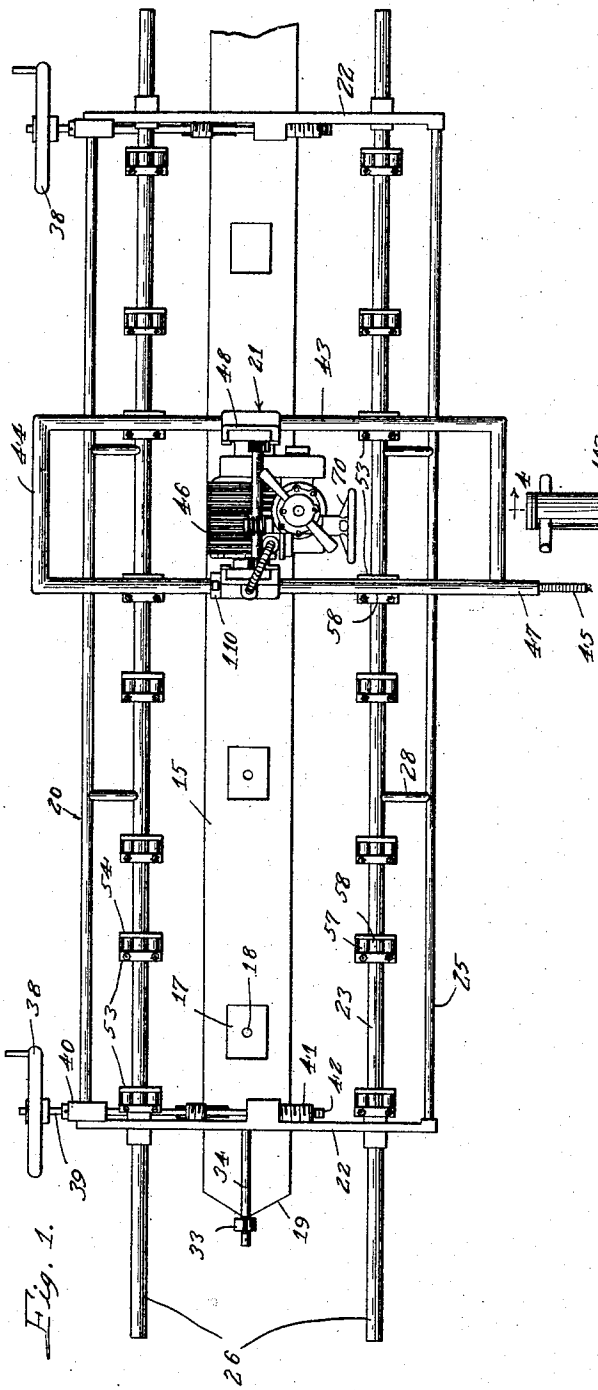


Fig. 1.

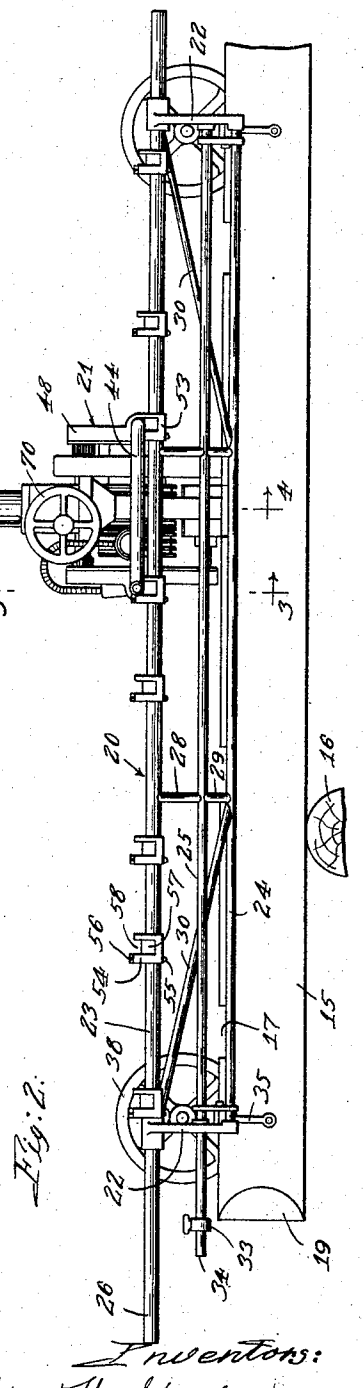


Fig. 2.

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Nov. 22, 1932. L. H. GEDDES ET AL 1,888,664

POLE GAINING AND BORING MACHINE

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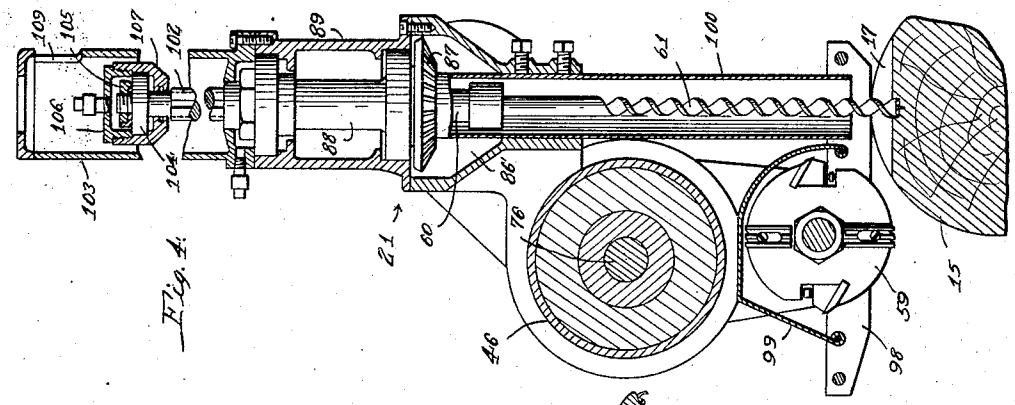


Fig. 4.

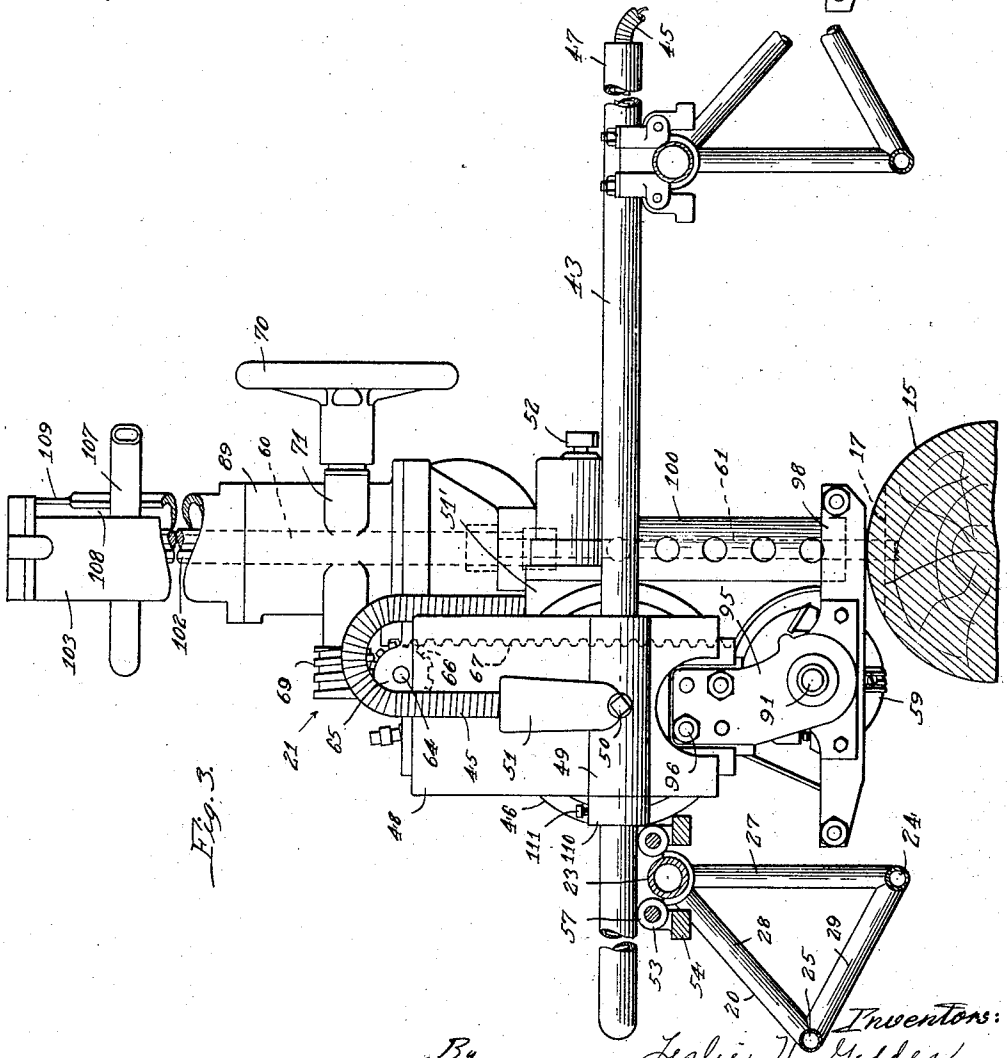


Fig. 3.

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Nov. 22, 1932. L. H. GEDDES ET AL 1,888,664

POLE GAINING AND BORING MACHINE

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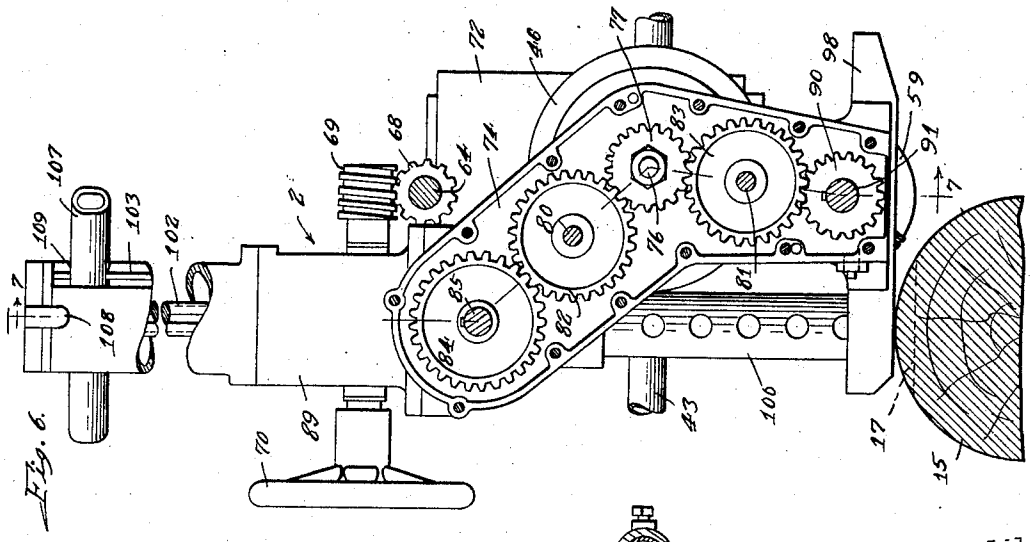


Fig. 6.

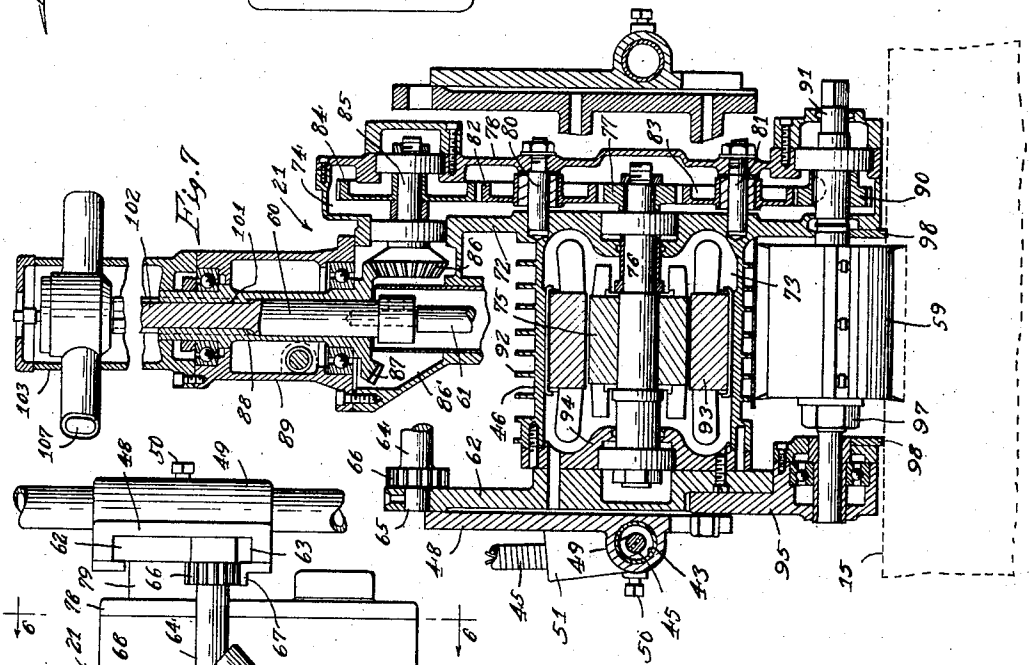


Fig. 7

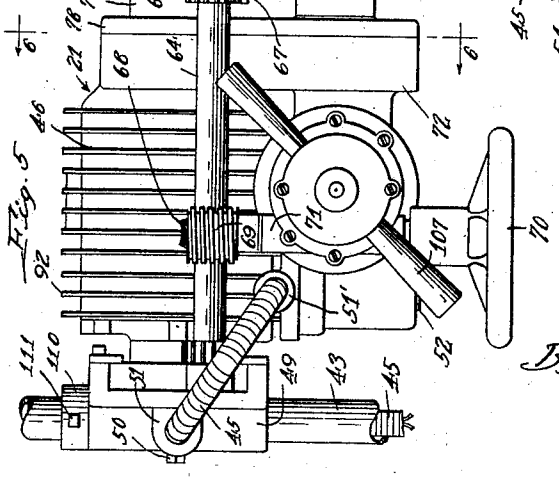


Fig. 5

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POLE GAINING AND BORING MACHINE

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Fig. 8

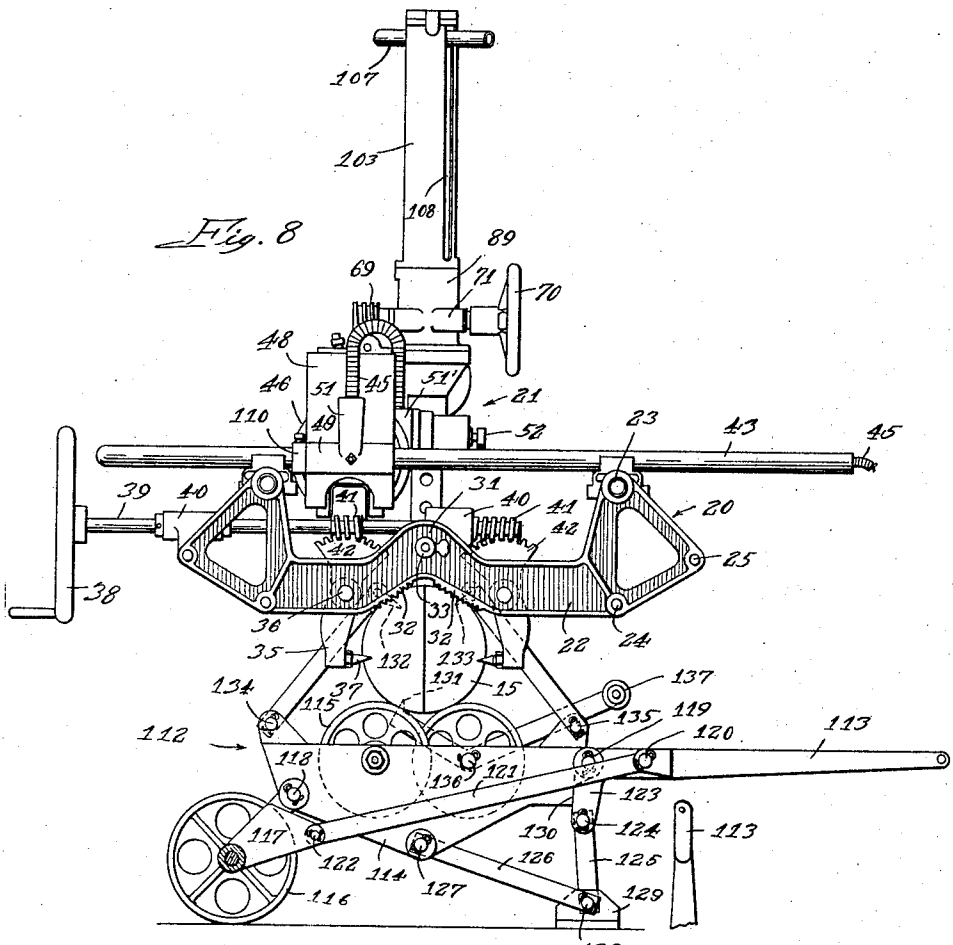


Fig. 9

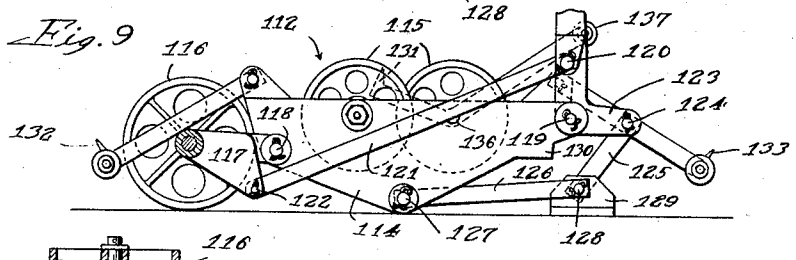
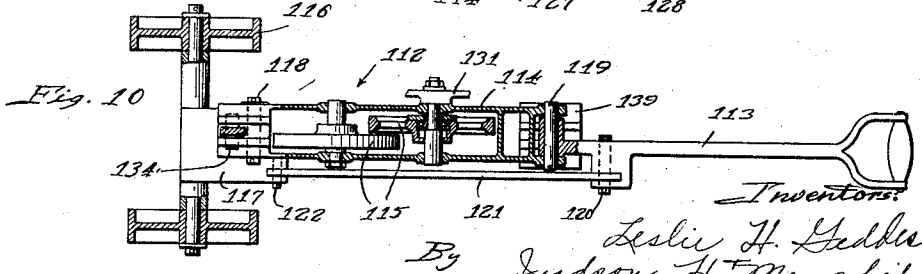


Fig. 10



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Nov. 22, 1932. L. H. GEDDES ET AL 1,888,664

POLE GAINING AND BORING MACHINE

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Fig. 11

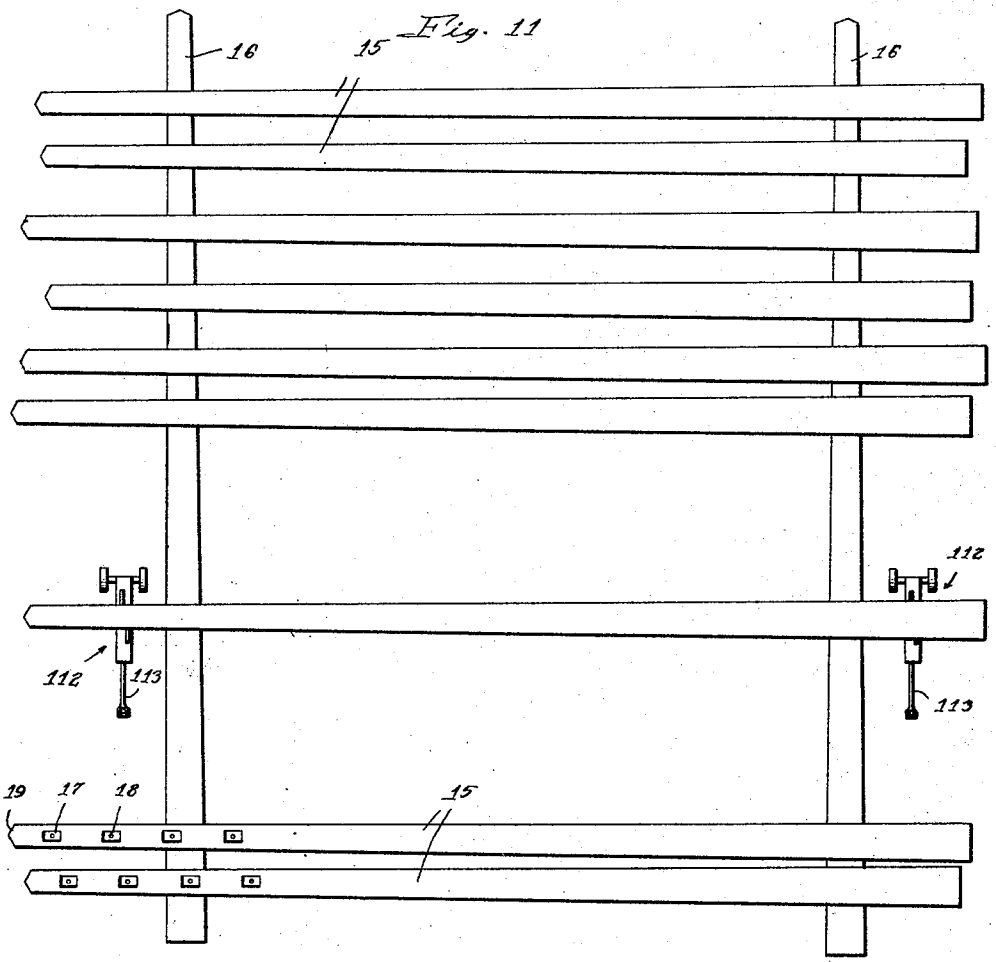


Fig. 12

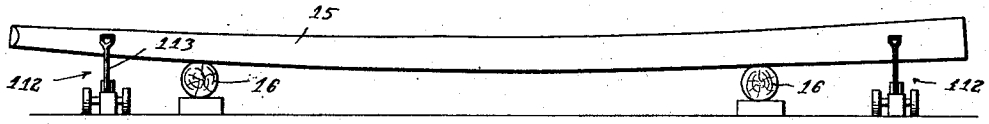
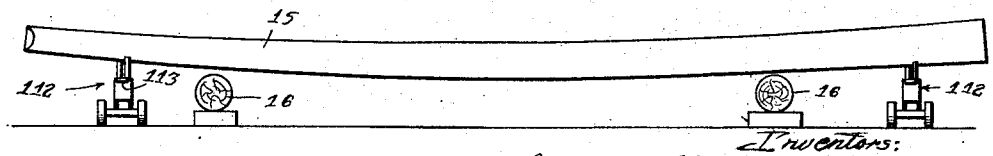


Fig. 13



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Patented Nov. 22, 1932 1,888,664

UNITED STATES PATENT OFFICE

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POLE GAINING AND BORING MACHINE

Application filed March 23, 1931. Serial No. 524,472.

This invention relates to machines for gaining and boring, and is particularly concerned with a combination gaining and boring machine especially designed and adapted for doing such work on poles to prepare them for the mounting of cross arms thereon.

Pole framing, as this work is called, is now done entirely by hand, and involves a high labor cost, besides being too slow and giving results not as uniform as desired. It is, therefore, the main object of our invention to provide a machine of a practical form to do this work substantially entirely with power so as to cut down the labor cost to a minimum and enable a much larger output of work in a shorter time, and also enable doing the work with absolute uniformity.

The machine of our invention embodies numerous features of novelty, among the more important of which may be enumerated the following:

(1) The provision of a main frame for the machine adapted when clamped or otherwise suitably secured on the pole to center the machine as a whole with respect to the capped end of the pole where the gaining and boring operations are to be performed, and a portable unit carrying the boring bit and cutter head arranged to be placed in different predetermined positions on the frame to gain and bore the pole at predetermined points spaced lengthwise thereof.

(2) The provision of guides on the frame adjustable thereon to different positions for slidable reception of the portable unit for movement transversely of the pole in different positions spaced in a predetermined manner lengthwise of the pole, whereby to insure not only accurate spacing of the gains and holes, but also insure absolute parallelism.

(3) The provision of a vertically adjustable slide for the support of the cutter head on the unit, and a gauge bar on the lower end of the slide and at a predetermined elevation with respect to the cutter head to engage the side of the pole and slide transversely thereof to gauge the depth of the gain made by the cutter head. The slide is preferably adjustable by means of a hand wheel through a worm and gear connection with a rack on the frame of the unit, so that the setting of the cutter head can be attended to quickly and easily in each position of the unit on the main frame, and the parts are positively held in any adjusted condition by the intermeshing worm and gear.

(4) The provision in the one portable unit of the boring spindle and cutter head, along with the power means for operating the same, whether it be an air or electric motor, the spindle being disposed in such relation to the cutter head that the boring bit may be extended downwardly alongside the cutter head; also the provision of means for releasably holding the boring bit in a raised retracted position. With this arrangement the cutter head may be used independently of and unhampered by the boring bit, and when the boring bit is being used, the cutter head is in an out-of-the-way position alongside the pole.

(5) The provision on the frame of the portable unit of a stop collar for engagement with the guides on the main frame and adjustable so that upon engagement, the boring bit will be exactly on the center line of the pole, whereby to insure accurate location of the bit for each boring of a hole.

(6) The provision of anti-friction pole supports on which the poles are arranged to be supported so as to be free to take their own position belly-down before the same is clamped in position on the supports and the machine mounted on the capped end thereof for the gaining and boring operations.

The invention embodies these and other features, all of which will be better understood in the course of the following detailed description, in which reference is made to the accompanying drawings, wherein—

Figures 1 and 2 are plan and side views of a machine made in accordance with our invention shown mounted on a pole in the course of the pole framing operations;

Figs. 3 and 4 are cross-sections in vertical planes taken on the lines 3—3 and 4—4 of Fig. 2 looking in the direction indicated by the arrows;

Fig. 5 is a plan view of the main part of

Fig. 3 and amounts to an enlargement of a portion of Figure 1;

Fig. 6 is a cross-section in a vertical plane on the line 6—6 of Fig. 5;

Fig. 7 is a longitudinal section in the plane of the broken line 7—7 of Fig. 6;

Fig. 8 is an end view of the machine showing the pole on which the same is mounted resting on an anti-friction support made according to our invention;

Fig. 9 is a side view of the support of Fig. 8 with the parts thereof in altered positions;

Fig. 10 is a plan view of the support of Fig. 8 with certain portions shown in horizontal section, and

Figs. 11–13 are views in plan and side elevation of poles in a pole yard showing how the supports are arranged to be used.

The same reference numerals are applied to corresponding parts throughout the views.

Referring for a moment to Figs. 11–13, we have shown how the poles are handled in a pole yard where the "framing" is done. It is common practice to have the poles, shown at 15, supported eight inches to a foot off the ground near their ends on old timbers or poles disposed crosswise with respect thereto, as indicated at 16. This is with a view to allowing the poles to turn until they are belly-down and the framing will be done on the proper side, so that when the poles are later set in a row they will all be bellied in the same direction, and in sighting along such a row, the poles will be found to fall in pretty nearly a straight line. The framing of a pole consists in providing the notches 17, hereinafter referred to as gains, and holes 18 at the capped end 19 for the reception of the usual cross arms. To fully appreciate the advantages derived in the use of the machine of our invention for doing this work with power, one should have an explanation of the tedious operations that have to be gone through in doing the work by hand, as it is now done. In framing a pole by hand using a hand saw, chisel and hammer, brace and bit, the notches 17 have to be laid out measuring from the capped end 19, then marked off with saw cuts, and then chiseled out all to approximately the same depth and reasonably smooth. Then, too, the notches have to be checked to see that they are all in parallel planes. This takes considerable time since the work is necessarily a cut and try proposition. After that, the places for the bolt holes 18 have to be located and the holes bored as accurately as it is possible without having anything to serve as a guide. It should be evident that pole framing done in this way means a high labor cost and the output is limited and the work not nearly as uniform as could be desired. The machine of our invention, which will now be described, has been designed with a view to being a practical solution for the problem of doing this work practically entirely with power so as to cut down labor cost and enable larger output in less time and, what is more important, to produce work of an absolutely uniform character. The machine of our invention has demonstrated in actual use that four men working with a machine can easily do the work of ten doing the work by hand.

Referring now to Figures 1 and 2, the machine of our invention comprises a main frame 20 arranged to be suitably secured on the pole 15 at the capped end thereof to support a unit 21 thereon in as many different positions as there are gains and holes to be cut and bored, in the present case four, the unit 21 being a power-operated combination gaining and boring device to cut the gain 17 in one operation and bore the hole 18 in another. The unit 21 will soon be described in detail. The frame 20 comprises a pair of opposed cast end members 22 joined at either side thereof by three longitudinal frame members 23, 24 and 25. The members 23—25 are all tubular so as to make for lightness, and it will be noticed that the members 23 project beyond the ends 22 of the frame to provide a pair of laterally spaced handles 26 at each end of the frame by means of which the same is arranged to be raised by two workmen off one pole and placed on the next. The frame is rendered quite rigid by having the members 23 and 24 disposed in the same vertical plane above one another and by bracing the same at intervals with struts 27 reaching vertically from the member 24 up to the member 23 and with other struts 28 and 29 provided between the members 23 and 25 and 24 and 25, respectively, and by the use of trusses 30 reaching from the top of the ends 22 of the frame out to the junction of the struts 27 and 29 with the frame member 24. The principal strength with this structural form of the frame work is in a vertical plane to keep the same from buckling under the weight of the unit 21, and there is enough rigidity otherwise for the frame to assume whatever slight side thrust may be imposed thereon in the operation of the unit 21, as will soon appear. Now, the ends 22 of the frame are formed with a V portion 31 at the middle thereof, as shown in Fig. 8, so as to provide diverging jaws 32 on the bottom thereof to engage and center themselves on the side of the pole when the ends of the frame are placed thereon by the workmen. The jaws 32 are also suitably toothed, as shown in Fig. 8, to grip the pole, and in setting the frame on the pole, the workmen will bear down on the handles 26 to make the teeth bite in and take a good hold, and thereby make the frame more or less rigid with the pole by that means alone. In setting the frame on the pole, the workman at the capped end 19 sights downwardly to make sure that a gauge collar 33 suitably clamped on a rod

34 projecting from the one end 22 of the frame is in line with the end of the pole. The object is thus gauging the placing of the frame 20 on the pole will appear later. After the frame has been placed as just described, it is arranged to be clamped securely by the closing of a pair of jaws 35 pivoted as at 36 on each of the ends 22 to either side of the jaws 32. The jaws 35 have long teeth 37 mounted thereon to dig into the pole in the closing of the jaws. Each pair of jaws is operable from one side of the frame by means of a hand wheel 38 mounted on a shaft 39 received in bearings 40 on the end of the frame and having right and left hand worms 41 thereon meshing with gear sectors 42 formed on the jaws 35. When the wheels 38 are turned clockwise, the jaws 35 are arranged to close to grip the pole and thereby clamp the frame 20 in place, and, of course, when the wheels are turned in the opposite direction, the jaws are arranged to open to permit removal of the frame. It takes very little time to set the frame on a pole and clamp the same in place.

The frame 43 of the unit 21 is made of elongated rectangular form, as appears in Fig. 1, and the ends 44 are arranged to serve as handles by means of which the unit may be lifted off the frame 20 by two workmen standing at opposite sides of the machine, and moved from one operating position to another. These handles are also used in communicating movement to the unit 21 transversely with respect to the pole in the gaining operation, as will soon appear. The frame 42 is preferably of tubular construction to make for lightness, four pieces of tubing being suitably welded together at the corners of the frame. The tubular construction also permits extension of a flexible conduit 45 through one side of the frame to lead in wires to the electric motor 46 constituting the power means of the unit. The piece of tubing through which the conduit 44 is extended is left open at the end and allowed to project slightly from the end of the frame, as appears at 47. The unit 21 is supported on the frame 43 by side plates 48 which have elongated hollow bosses 49 cast integral therewith slidably received on the sides of the frame and fastened in place by means of set screws 50. A branch 51 projects upwardly from the boss 49 for the conduit 45 to be extended through a hole in the side piece of the frame upwardly and out for connection with the motor 46, as at 51'. A manually operable switch 52 for controlling the operation of the motor 46 is provided adjacent the point 51', so that it is convenient to make connections with the switch on the one hand and the motor on the other. There is a sufficient length of conduit 45 between the bosses 51 and 51' to allow for a predetermined range of movement of the motor 46 up or down for a purpose which will soon appear. It should be evident that while an electric motor is herein disclosed we might use an air motor or one operated in some other way, in which event a conduit corresponding to the conduit 45 would constitute a means for delivering compressed air to the motor.

The unit 21 is arranged to be supported on the frame 20 with the frame 43 of the unit placed in either one of a plurality of sets of guides 53. Four sets are shown in Fig. 1, there being that many gains to be cut and holes to be bored in the pole. The guides 53 are mounted on the longitudinal frame members 23 of the frame 20 and it will be observed that in each set there are four guides, one pair on each of the frame members 23, so as to have two guides receiving each side piece of the frame 43 near opposite ends thereof, as appears in Fig. 1, to hold the unit in a predetermined position transversely with respect to the pole and guide it for endwise movement in that position. The guides may be of any suitable or preferred construction. Those herein shown comprise blocks 54 fitting over the top of the frame members 23 and suitably clamped thereon, as by means of U-bolts 55 extended upwardly through the blocks from beneath the frame members and receiving nuts 56 on the projecting ends thereof, the tightening of which serve to clamp the guides in adjusted position. A pair of rollers 57 are mounted in each block in a guide channel 58 to either side of the frame member 23 and parallel with it, and the frame 43 rests on these rollers for easy movement. It is, therefore, apparent that the placing of the different sets of guides 53 determines the spacing of the gains 17 and that the guides also serve as anti-friction roller supports on which the frame 43 of the unit 21 is arranged to be given movement transversely with respect to the pole for the cutting of the gain. Now, it should appear, that the object in providing the gauge collar 33 on the frame 20 is to insure location of the uppermost gain 17 at a predetermined distance down from the capped end 19 of the pole. In other words, the adjustment of the guides 53 on the frame 20 determines the spacing of the gains in the series and the adjustment of the collar 33 determines the spacing of the endmost gain of the series in a predetermined relation to the capped end of the pole.

Referring now to Figs. 3–7 for an understanding of the details of construction of the combination gaining and boring unit 21, it will, first of all, be seen that we have embodied in one unit a cutter head 59 to cut the gains and a boring spindle 60 and bit 61 to drill the holes. The head 59 and spindle 60 are both driven by the motor 46 as will now be described. The motor, together with the head and spindle, forms a unitary as-

sembly supported on slides 62 vertically slidable in guideways 63 provided in the side plates 48. A cross-shaft 64 received in bearings 65 in the slides 62 has pinions 66 on opposite ends thereof next to the slides meshing with racks 67 fixed to the side plates 48, whereby to communicate movement to the slides by turning the shaft. A worm gear 68 is provided on the shaft 64 at an intermediate point and has a worm 69 meshing with it arranged to be turned by means of a hand wheel 70 mounted on the same shaft with the worm, suitably received in a bearing 71 rigid with respect to the side plates 62, as will presently appear. The hand wheel 70 is preferably disposed on the same side of the unit 21 as the switch 52, both being easily accessible for the workman stationed at one of the handles 44 of the unit 21. A main casting 72 provides a housing 73 for the motor 46, as shown in Fig. 7, closed at one end and open at the other. On the opposite side of the wall at the closed end of the housing 73 is formed another housing 74 for the gearing providing driving connections between the motor 46 and the head 59 and spindle 60. Thus, the armature 75 for the motor is carried on an armature shaft 76 which extends into the housing 74 and carries a gear 77 on the end thereof. A cover plate 78 formed integral with the adjacent slide 62, as indicated by the webs 79 in Fig. 5, forms a closure for the housing 74 and is suitably secured in place by means of screws, as shown. Two posts 80 and 81 are mounted on the plate 78 and provide mountings for gears 82 and 83 meshing with the gear 77. The gear 82 drives a gear 84 keyed on a shaft 85 which drives a bevel pinion 86 disposed in a housing 86′ formed in the upper end of the casting 72. The pinion 86 meshes with a bevel gear 87 formed on the lower end of a vertically disposed, internally splined sleeve 88 mounted in the bearings provided in the upper and lower ends of a housing 89, fastened on top of the casting 72 so as to constitute a closure for the housing 86′. The sleeve 88 constitutes a driving head for the spindle 60, which is splined thereon, for a sliding driving connection, as will soon appear. So much for the spindle drive, at least for the present. The gear 83 meshes with a pinion 90 keyed on the end of a shaft 91 on which the cutter head 59 is mounted. From this it is apparent how the cutter head 59 is continuously driven along with the spindle 60. In passing, it will be observed that the walls of the housing 73 for the motor 46 are annularly ribbed, as shown at 92, for cooling purposes. The field coils 93 are suitably mounted inside the housing, and a plate 94 serves as a closure for the open end of the housing and as a mounting for one of the armature shaft bearings. The adjacent slide 62 is fastened to the plate 94. A bracket 95 for supporting the other end of the shaft 91 carrying the cutter head 59, is fastened to the outside of the slide 62 at the lower end thereof, as appears at 96 in Fig. 3, for quick and easy removal, whereby to permit access to the cutter head whenever it is desired to replace the same or remove blades therefrom for sharpening or replacement. The nut 97, threading on the shaft 91, serves to hold the cutter head 59 in place.

Gauge bars 98 are suitably secured, one on the lower end of the casting 72 on one side of the head 59 and the other on the lower end of the bracket 95 on the opposite side of the head, and these extend horizontally and preferably in parallelism, with the lower edges thereof disposed in the same horizontal plane at a predetermined elevation with respect to the periphery of the cutter head. The bars provide a convenient place for mounting a sheet metal shield 99 extending over slightly more than the upper half of the head so as to afford protection for the workmen on both sides thereof, without interfering with the operation of the cutter head on the work. In operation, in cutting each gain one of the workmen will turn the hand wheel 70 so as to lower the unit 21 just enough to bring the gauge bars 98 to rest on the side of the pole. That will insure the proper elevation of the cutter head 59 with respect to the pole and, of course, the fact that the vertical adjustment embodies an intermeshing worm and gear at 68—69 avoids any likelihood of the unit losing the adjustment after it is made. Then the gain can be cut by simply moving the unit by means of the handles 44 crosswise with respect to the pole to feed the cutter head through the work. In the gaining operation, it is obvious that the bit 61 must be kept in a retracted, raised position. We shall now describe the means for accomplishing that purpose.

It is evident in Figs. 3, 4 and 6 that the motor 46 and cutter head 59 are disposed substantially in vertical alignment and that the spindle 60 is offset in relation to the motor and cutter head so that the bit 61 extends downwardly alongside the motor and cutter head to be fed into the pole when the unit is disposed with the cutter head alongside the pole. A tubular guard 100 reaches down from the housing 86′ and encloses the bit 61 enough to avoid any danger of a workman catching his sleeve or other part of his clothing thereon in operation. The bit 61 in its retracted position is withdrawn upwardly so as to be housed entirely within the guard. The spindle 60, as previously indicated, is splined in the sleeve 88. This splined connection clearly appears at 101 in Fig. 7 and it is also apparent in that figure how the splined portion 102 extends upwardly inside a hollow column 103 mounted on the top of

the housing 89. The height of the column 103 with relation to the rest of the unit 21 is clearly shown in Figs. 2 and 8, and the splined portion 102 of the spindle 60 is of equivalent length so as to reach almost to the top of the column in the retracted position of the spindle. Since the splined portion is of sufficient length it must also appear that the spindle is arranged to be fed downwardly a proportionate distance, more than enough to feed the bit 61 through the pole in which the hole is to be bored. The upper end of the splined portion has the inner race of an anti-friction thrust bearing 104 fastened thereto as at 105, the outer race of said bearing being clamped, as appears at 106, in a cross-head 107 adapted to serve as a suspension mounting for the spindle and its attached bit. The ends of the cross-head 107 constitute handles which project through longitudinal bayonet slots 108 provided in the walls of the column 103. When the spindle is to be retracted the handles, forming a part of the cross-head 107, are grasped and raised to the upper ends of the slots 108 and are swung sidewise to enter the same in the offset ends 109 of said slots, thereby securely locking the spindle in retracted position, leaving nothing of the bit 61 exposed. When a hole is to be bored the handles forming a part of the cross-head are simply retracted from the offset ends 109 of the bayonet slots 108 and the spindle 60 is lowered until the bit 61 encounters the pole, whereupon the boring of the hole naturally commences. In the boring operation it is evident that the appreciable weight of the spindle 60, owing to the elongation of its splined portion 102 and the fact that the weight of the cross-head 107 is also imposed thereon, is enough to insure sufficient thrust on the bit to take care of the feeding of the bit through the pole by gravity. In passing, attention is called to the collar 110 slidably received on at least one of the side pieces of the frame 43 and arranged to be clamped by means of a set screw 111 in any desired position of adjustment. The collar 110 is adjusted and set in such a position that when it comes into engagement with the rollers 57 on the guides 53 in each of the four positions of the unit the bit 61 is exactly in register with the center line of the hole. Ordinarily this collar can be provided of a predetermined width so that when the same is in abutment with the boss 49 on the one side plate 48 of the unit 21 it provides for the location of the bit 61 on the center line of the pole when the frame 43 is moved to one side of the frame 20 enough to bring the collar into engagement with the inside roller 57 of whichever guide 53 is being used. That is to say, there will be no need for adjusting the collar 110; it will remain in the position in which the same has been assembled on the machine.

It is believed the foregoing description conveys a fairly good understanding of the operation of the machine. It should be evident that once the guides 53 have been properly adjusted on the frame 20 for the proper spacing of the gains 17 and holes 18, and the gauge collar 33 has been properly adjusted to provide for a predetermined spacing of the uppermost gain 17 with respect to the capped end 19 of the pole, the workmen can place the frame on one after another of a series of poles with perfect assurance of geting the gains 17 and holes 18 at precisely the proper points on all of the poles. Ordinarily, each of the gains is cut before the hole therefor is bored and for that reason the cross-head 107 will be placed in the offset upper ends 109 of the bayonet slots 108 before the first gain is cut. In the cutting of each gain the workmen place the unit 21 in a set of guides 53 and the hand wheel 70 is adjusted to elevate or lower the head 59 enough to allow the gauge bars 98 to slide across the side of the pole and thus insure the cutting of the gain to the precise depth desired or as close thereto as practicable. The handles 44 are then used to push or pull the unit crosswise with respect to the pole to cause the head 59 to cut the gain. After each gain is cut the bolt hole therefor can be bored in the same setting by simply moving the frame 43 sidewise until the collar 110 strikes the roller 57 of the guide 53, whereupon the spindle 60 is arranged to be released to permit the bit 61 to be fed through the pole for the boring operation. As soon as the hole is completed, as indicated by the dropping of the cross-head 107 to the lower end of the slots 108, the bit will be retracted by means of the cross-head 107 and the unit 21 can then be moved to the next position for the cutting of another gain and the boring of another hole in like manner. Obviously, the one operation of setting the frame 20 on the pole and the clamping of the pole in place thereon, which takes but a few seconds, takes the place of a long series of operations that would have to be gone through in the laying out of the work by hand, as should be self-evident. Then, in each setting of the unit 21 for the cutting of a gain and the boring of a hole it is obvious that the gain will be cut to precisely the same width and depth as well as to exact parallelism with each of the other gains, and, of course, such uniformity was never obtainable where the work was done by hand, and the saving in time and the consequent saving in cost derived as a result of doing the work with power instead of by hand are other apparent advantages. Owing to the efficiency of operation of this machine, it has been demonstrated by actual experience, as stated before, that four men working with such a machine

can easily do the work of ten doing the work by hand.

Referring to Figs. 8–13, attention is called to the anti-friction pole supports 112 which it is preferred to use in connection with the machine above described, in order to make it certain that the poles are properly disposed, belly-down, when the frame 20 of the machine is set thereon and clamped in place, as well as to hold the pole against turning during the course of the gaining and boring operations. In other words, the supports 112 are so constructed that when placed under opposite ends of a pole for support of the pole the same is more certain of gravitating to the belly-down position than would be the case if the pole were simply supported on other poles or timbers laid crosswise beneath the opposite ends thereof, and the supports are, furthermore, so constructed as to permit fastening the pole rigidly in its belly-down position once it has assumed such position, thereby insuring proper location of the gains and holes and making it easier to work with the machine than would be the case if the pole were simply resting on uncertain supports apt to allow the same to roll in one direction or the other. The supports 112 are arranged to be rolled in position in the lowered condition shown in Fig. 9 and are then arranged to be operated by means of their handles 113 to move the same to the elevated position shown in Fig. 8, whereby to raise the pole from the position shown in Fig. 12 to that shown in Fig. 13, removing the weight of the pole from its supports 16 and placing the weight thereof on the supports 112. The supports 112 each comprise a frame or body 114 in which two rollers 115 are mounted preferably on anti-friction bearings for the anti-friction support of the pole on the body so that the pole has perfect freedom to turn when resting on the rollers, whereby to gravitate to the belly-down position. A pair of wheels 116 are mounted on a yoke 117 pivoted, as at 118, to the body 114 for oscillation from the position shown in Fig. 9 to that shown in Fig. 8. The handle 113 is pivoted at 119 to the body 114 and at a point 120, at a predetermined radius with respect to the point 119, has pivotal connection with a link 121 which in turn is pivotally connected at a point 122 with the yoke 117, which point is disposed at a predetermined radius with respect to the pivot point 118 of the yoke. With this arrangement, when the handle 113 is moved from the vertical position shown in Fig. 9 through approximately 90° to the horizontal position shown in Fig. 8 the yoke 117 is moved in a counterclockwise direction about its pivot 118, thereby raising the body 114 to bring the rollers 115 into engagement with the bottom side of the pole to raise the pole off its support 16. The pivoted end of the lever 113 is of bell-crank form having a right angle projection 123, the free end of which is pivoted, as at 124, to a link 125. Another link 126 is pivoted at one end to the body 114, as at 127, and the other end of this link is pivoted with the link 125 at 128 to a shoe 129 arranged to serve as a third point of support for the two wheeled body 114. When the lever 113 is moved from the position of Fig. 9 to that of Fig. 8 its movement is limited by engagement of the projection 123 with a shoulder 130 provided on the body 114 in such a position of the lever where the pivots 120 and 122 are past a dead center line running through the pivots 122 and 119 and where the pivots 119 and 124 are past a dead center line running through the pivots 119 and 128. For that reason, there is no need for providing any locking means to hold the lever 113 in the position of Fig. 8, that being well assured by the fact that the parts have been brought past dead center conditions. In the movement of the lever 113 to the position of Fig. 8 it is evident that the body 114 is elevated by the toggle action of the projection 123 and link 125, as well as by the counterclockwise movement of the yoke 117. After the pole has been raised off the supports 16 and has gravitated to the belly-down position the same is arranged to be fastened in such position by means of three jaws 131, 132 and 133. The jaws 132 and 133 are pivoted to the body 114 at 134 and 135, respectively, and are arranged to be closed on the pole and the teeth made to bite into the pole by hammering or by hand or foot pressure thereon. These jaws grip the pole from above on either side of the center and thereafter the jaw 131, which is pivoted to the body 114 at 136, is arranged to be engaged with the pole from the under side thereof by means of the handle 137 by hand or foot pressure, as desired. When the pole has been thus secured against turning out of position, it is obvious that it is much handier to work thereon with the machine, there being no likelihood of the pole turning when the frame 20 of the machine is placed thereon and the gaining and boring operations are subsequently performed. In practice, it is customary for four workmen to work in two teams. While two of the workmen are engaged in the work of gaining and boring a pole supported on two of these pole supports 112 the other two workmen can busy themselves in the work of removing another pair of supports from the pole previously gained and bored and get the next pole in readiness for the gaining and boring machine to be placed thereon. In that way, there is no time wasted and the maximum output is secured.

It is believed the foregoing description conveys a good understanding of all of the objects and advantages of our invention. While reference has been made to the various

specific details of construction it should be understood that the machine is capable of a certain amount of changes without seriously departing from the spirit and scope of the invention. The appended claims have accordingly been drawn with a view to covering all legitimate modifications and adaptations.

We claim:

1. A machine of the class described comprising an elongated frame having portions formed to fit the side of a pole to line up the frame with the pole lengthwise thereof, and a gaining device arranged to be supported on the frame in different positions spaced lengthwise thereof for cutting a corresponding number of gains in the side of the pole.

2. A machine of the class described comprising an elongated frame having portions formed to fit the side of a pole to line up the frame with the pole lengthwise thereof, a gaining device for cutting gains in the side of the pole, and a plurality of adjustable guides on the frame spaced lengthwise thereof for supporting said device in different operating positions on the frame determined by the adjustment of said guides and guiding the same in each position for movement transversely with respect to the pole to cut the gains.

3. A machine of the class described comprising an elongated frame having portions formed to fit the side of a pole to line up the frame with the pole lengthwise thereof, and a combination gaining and boring device arranged to be supported on the frame in different positions spaced lengthwise thereof for cutting a corresponding number of gains and boring a corresponding number of holes in the pole, the said device being arranged in each operating position to cut a gain and bore a hole.

4. A machine of the class described comprising an elongated frame having portions formed to fit the side of a pole to line up the frame with the pole lengthwise thereof, a plurality of adjustable guides on the frame spaced lengthwise thereof and arranged to be placed in predetermined desired positions according to the locations of gains and holes to be made in the pole, and a combination gaining and boring device arranged to be supported on said guides in different operating positions on the frame determined by the adjustment of said guides, the said guides serving to guide the device for movement transversely with respect to the pole to cut a gain in each operating position of the device, the said guides also serving to locate the device properly with respect to the pole for the boring of a hole in each operating position of the device.

5. A machine of the class described comprising an elongated frame having portions formed to fit the side of a pole to line up the frame with the pole lengthwise thereof, a combination gaining and boring device comprising an auxiliary frame, a gaining cutter head supported thereon in a horizontal position and a boring spindle supported thereon in a vertical position, and power means for driving the cutter head and spindle also carried therewith on the auxiliary frame, and a plurality of guides on the main frame spaced lengthwise thereof for supporting the auxiliary frame of said device in different operating positions and guiding the same for movement transversely with respect to the pole for the cutter head to cut the gains, the said auxiliary frame being arranged in each of its operating positions to be moved to a position with the boring spindle in a predetermined relation to the pole for boring the latter.

6. In a machine of the class described, the combination of an elongated frame comprising end members formed substantially at the middle thereof to fit the side of a pole whereby to line up the frame lengthwise with the pole, and side members for the frame joining the ends of the end members and arranged to be disposed on opposite sides of the pole for supporting purposes, there being means preferably for detachably securing the end members of the frame to the pole, and a portable power operated gaining device arranged to be supported on the side members of the frame in any one of a plurality of positions spaced lengthwise of the pole, the said device being supported so as to have movement on the frame transversely with respect to the pole for the cutting of a gain therein.

7. In a machine of the class described comprising a portable power operated gaining and/or boring device for operation on the side of a pole at a plurality of positions spaced lengthwise of the pole, an elongated frame arranged to be placed on the pole in a certain position to support said device in the plurality of predetermined desired positions, said frame comprising end members formed substantially at the middle thereof to fit the side of a pole to line up the frame lengthwise with the pole, side members for the frame joining the ends of the end members and arranged to be disposed on opposite sides of the pole for support of the aforesaid device, secondary side members for the frame connecting the ends of the end members, the same being disposed below and substantially parallel with the first mentioned side members, vertical struts at one or more intermediate positions on the frame spacing the primary and secondary side members, and trusses extending from the end members toward each other from opposite ends of the frame and inclined between the primary and secondary side members.

8. In a machine of the class described comprising a portable power operated gaining and/or boring device for operation on the

side of a pole at a plurality of positions spaced lengthwise of the pole, an elongated frame arranged to be placed on the pole in a certain position to support said device in the plurality of predetermined desired positions, said frame comprising end members formed substantially at the middle thereof to fit the side of a pole to line up the frame lengthwise with the pole, side members for the frame joining the ends of the end members and arranged to be disposed on opposite sides of the pole for support of the aforesaid device, secondary side members for the frame connecting the ends of the end members, the same being disposed below and substantially parallel with the first mentioned side members, vertical struts at one or more intermediate positions on the frame spacing the primary and secondary side members, and trusses extending from the end members toward each other from opposite ends of the frame and inclined between the primary and secondary side members, third side members connecting the ends of the end members in laterally spaced relation to the primary and secondary side members, and transverse struts connecting the third side members with the other side members.

9. In a machine of the class described, the combination of an elongated frame comprising end members formed substantially at the middle thereof to fit the side of a pole whereby to line up the frame lengthwise with the pole, and side members for the frame joining the ends of the end members and arranged to be disposed on opposite sides of the pole for supporting purposes, there being means preferably for detachably securing the end members of the frame to the pole, and a portable power operated gaining and/or boring unit or the like arranged to be supported on the frame in different positions spaced lengthwise of the pole, the said unit comprising a horizontal secondary frame arranged to rest crosswise of the main frame on the side members thereof, the said secondary frame providing places on the ends thereof serving as handles for manually lifting and placing the secondary frame in different positions on the main frame, a power operable tool carried on the secondary frame and projecting downwardly therefrom for operation on the pole, and power means also carried on said secondary frame for operating said tool.

10. In a machine of the class described, the combination of an elongated frame arranged to be mounted on a pole in endwise alignment therewith, a plurality of guides disposed in a predetermined spaced relation on said frame to determine a series of positions of a unit to be placed on said frame, a power operated unit for gaining and/or boring the pole adapted to be supported on said frame held in said guides in the different predetermined positions whereby to determine the accurate spacing of the gains or holes on the pole, and means for gauging the location of the frame endwise of the pole in spaced relation to the capped end thereof.

11. In a machine of the class described comprising a power operated unit for gaining and/or boring poles, an elongated frame for supporting said unit on a pole arranged to fit on the side of a pole and span a given length thereof wherein the gains and/or holes are to be made, said frame comprising end members arranged to be disposed crosswise of the pole, each of said end members having substantially V-shaped portions for reception therein of the side of the pole whereby to line up the frame endwise with respect to the pole, and means for detachably securing the frame to the pole.

12. In a machine of the class described comprising a power operated unit for gaining and/or boring poles, an elongated frame for supporting said unit on a pole arranged to fit on the side of a pole and span a given length thereof wherein the gains and/or holes are to be made, said frame comprising end members arranged to be disposed crosswise of the pole, each of said end members having substantially V-shaped portions for reception therein of the side of the pole whereby to line up the frame endwise with respect to the pole, and means for detachably securing the frame to the pole, said means comprising a pair of jaws pivotally mounted on each of the end members of the frame on opposite sides of the V-portions thereof and arranged to grip the pole from opposite sides, and manually operable means for closing and opening the jaws.

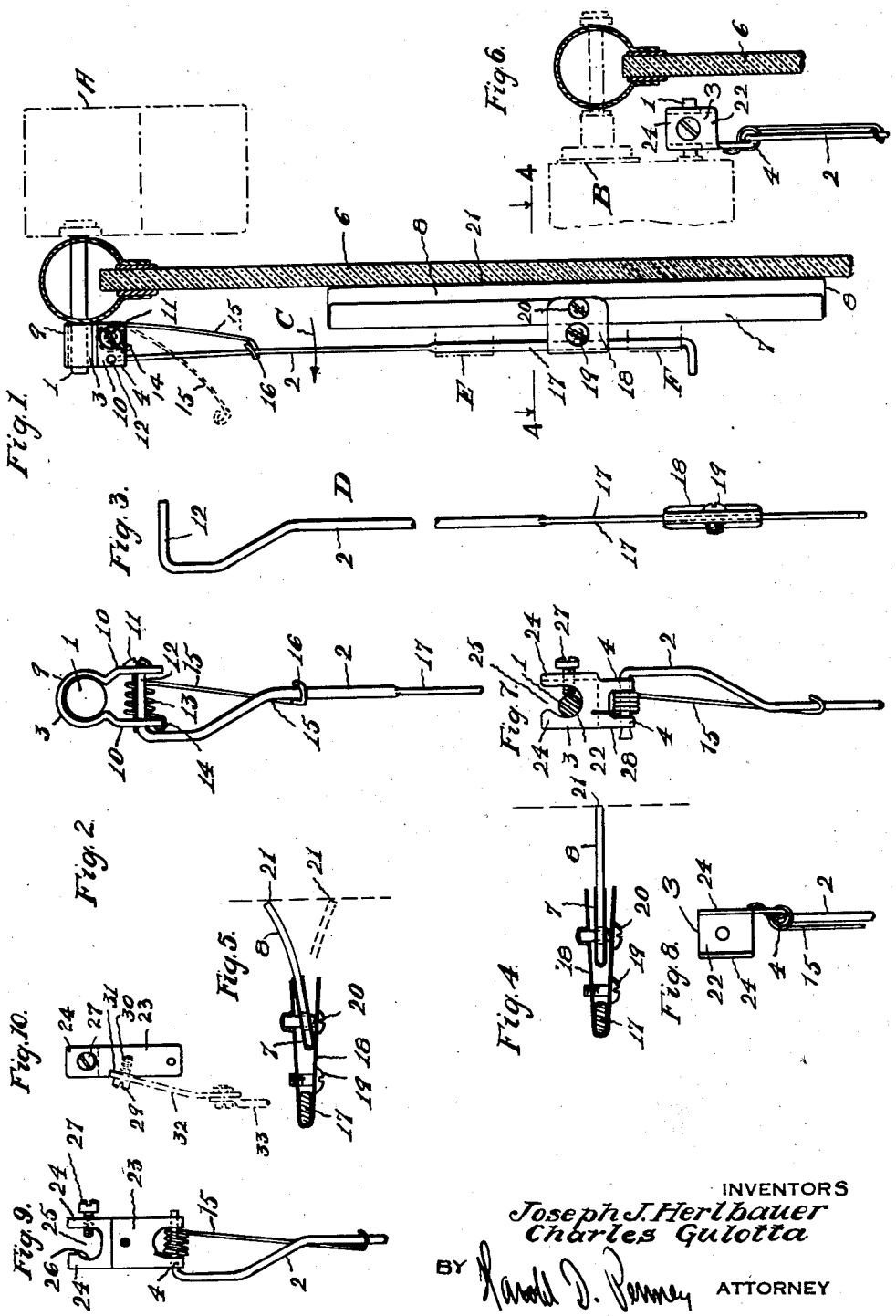
13. In a machine of the class described, the combination of an elongated frame arranged to be placed on the side of a pole spanning a given length thereof in which a series of gains and holes are to be made, said frame being constructed to provide longitudinally extending supports on opposite sides of the pole, a portable auxiliary frame arranged to be placed on said supports crosswise with respect to the pole and arranged to have movement on said supports transversely relative to the pole, a power operated cutter head adapted for cutting gains in the pole, means for supporting the cutter head on said auxiliary frame for vertical adjustment, and one or more gauge bars adjustable vertically with the cutter head and disposed horizontally at a predetermined elevation with respect to the under side of the head, said bar being arranged to determine the setting of the head by engagement with the side of the pole and thereby to determine the depth of the cut made by the head in the pole, the said bar being slidable transversely of the pole in the operation of the cutter head thereon.

14. In a machine of the class described, the combination of an elongated frame arranged

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WINDSHIELD WIPER

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