C. E. GIERDING.

POWER TRANSMISSION MECHANISM.

APPLICATION FILED MAR. 2, 1914.

1,210,458.

Patented Jan. 2, 1917.

4 SHEETS—SHEET 1.

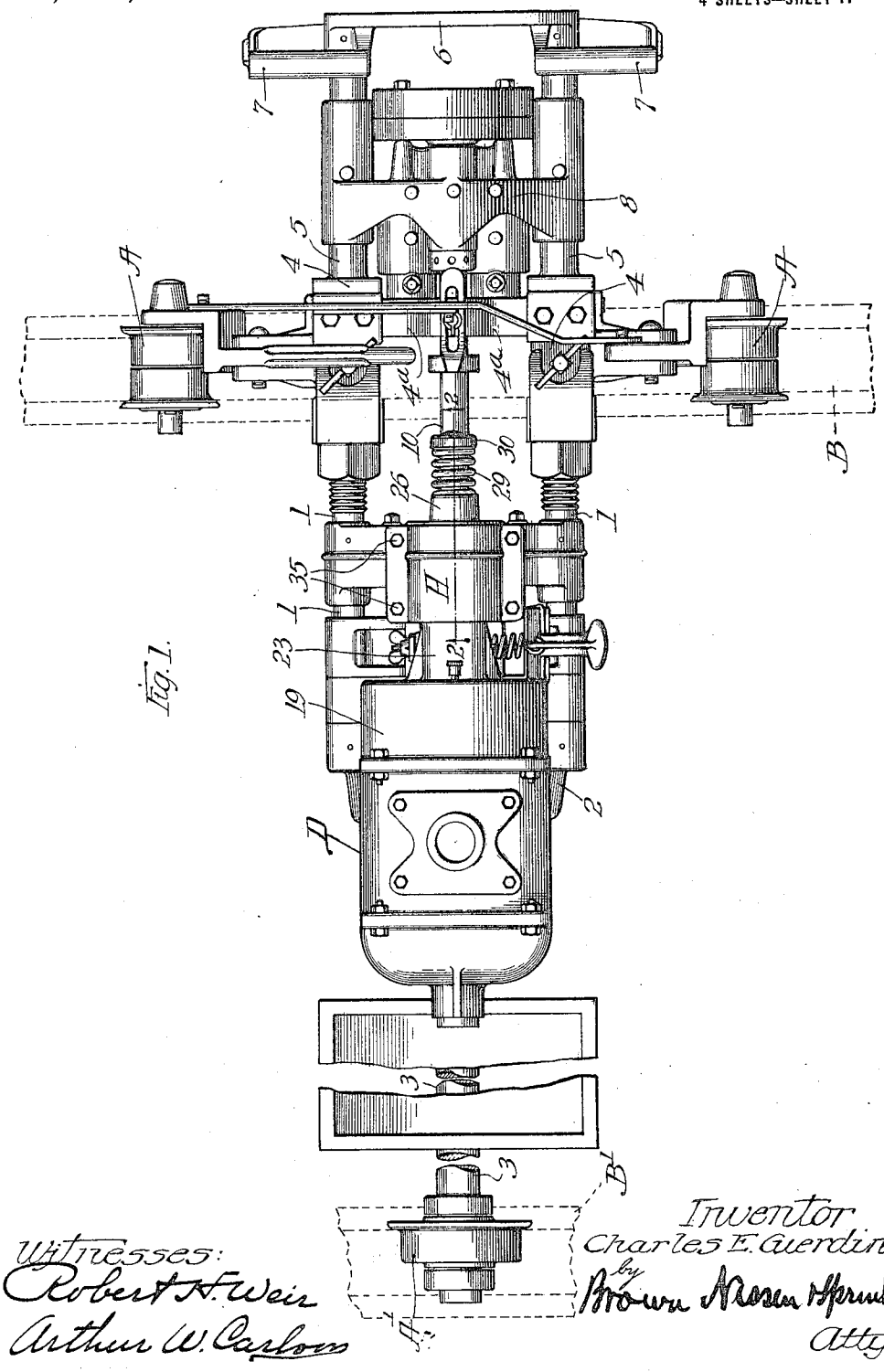


Fig. 1.

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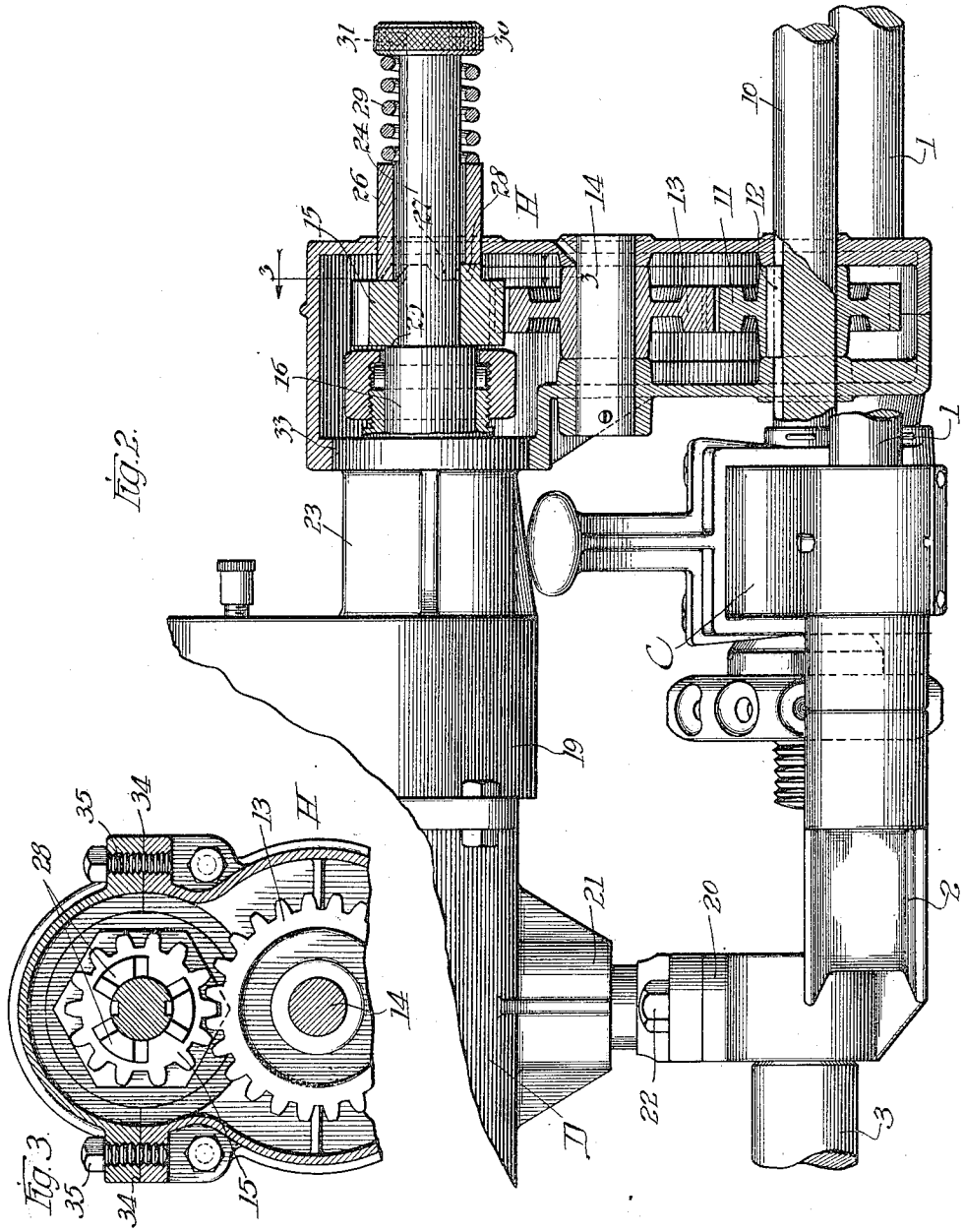


Fig. 2.

Fig. 3.

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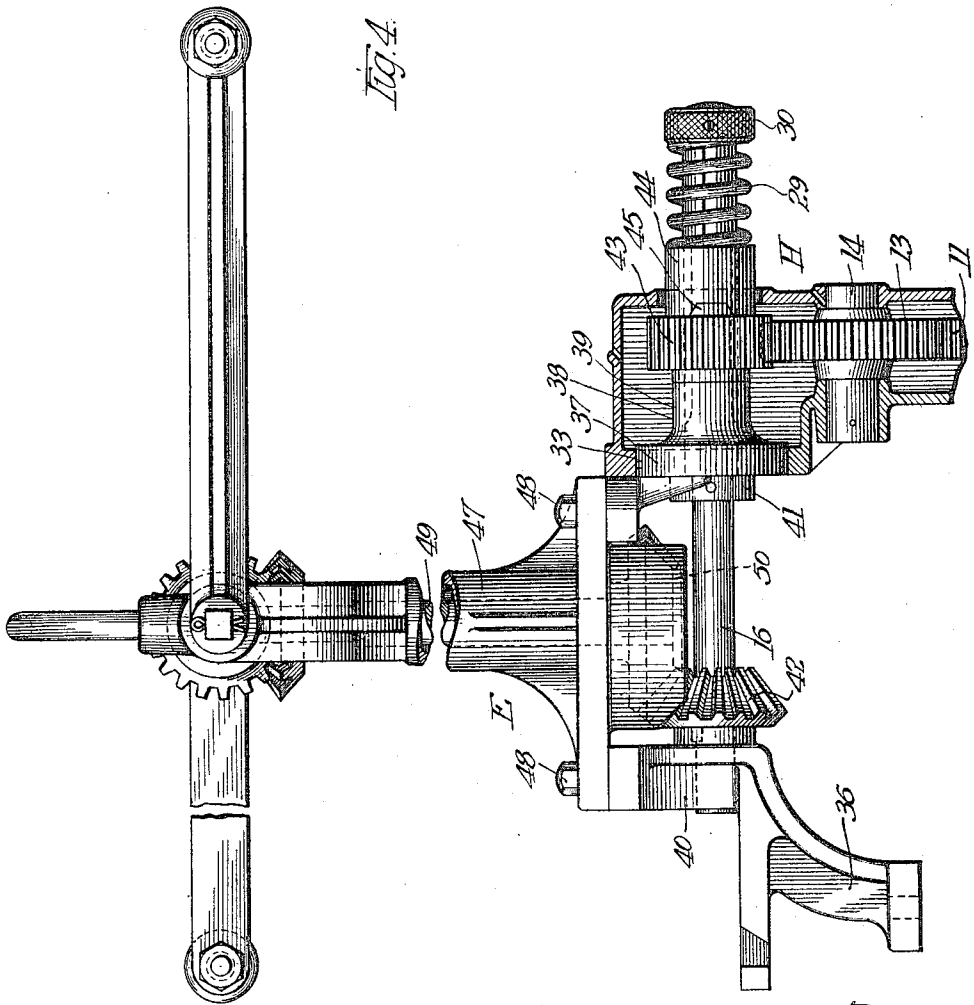
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Patented Jan. 2, 1917.

4 SHEETS—SHEET 3.

Fig. 4.



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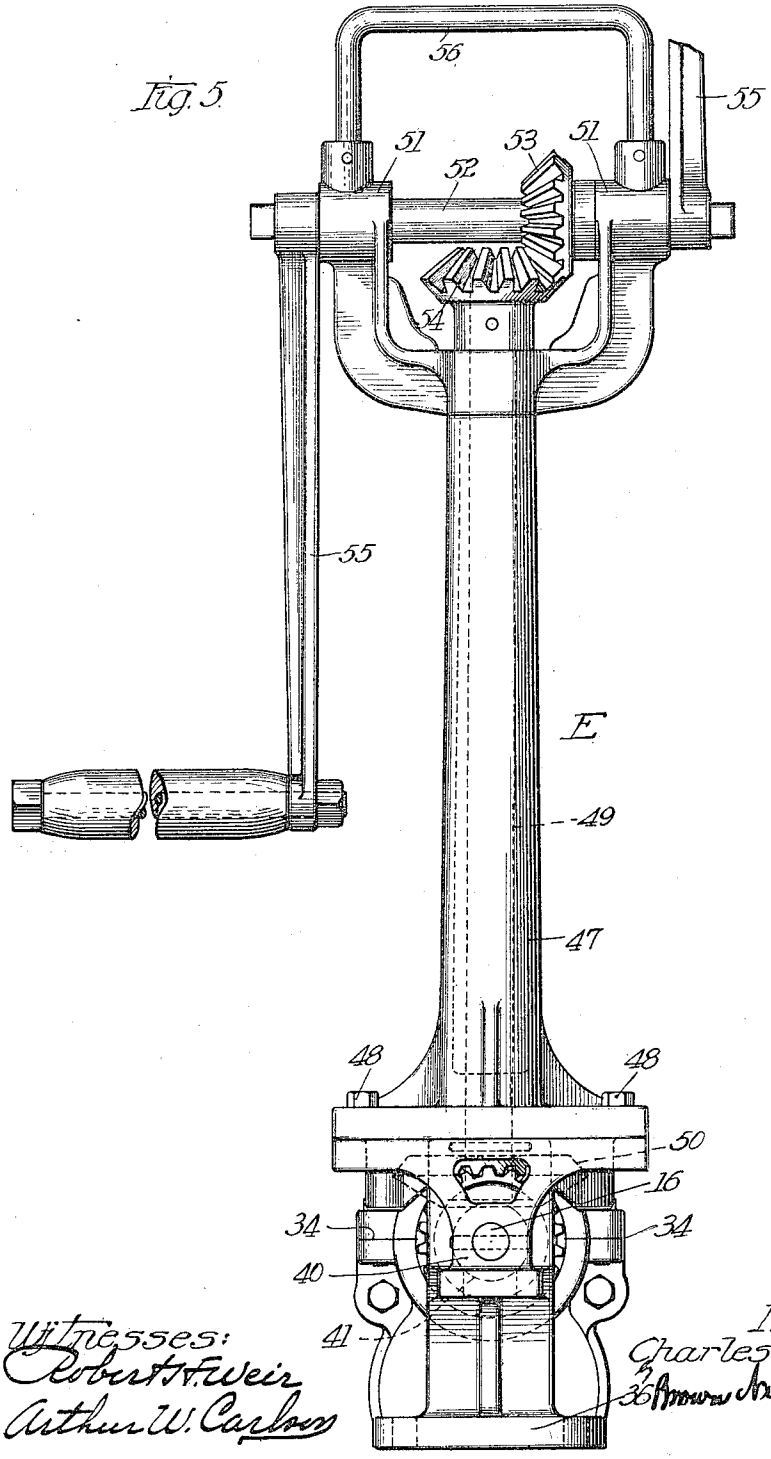
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4 SHEETS—SHEET 4.

Fig. 5



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UNITED STATES PATENT OFFICE.

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POWER-TRANSMISSION MECHANISM.

1,210,458. Specification of Letters Patent. Patented Jan. 2, 1917.

Application filed March 2, 1914. Serial No. 821,854.

To all whom it may concern:

Be it known that I, CHARLES E. GIERDING, a citizen of the United States, residing at Mansfield, in the county of Richland and State of Ohio, have invented certain new and useful Improvements in Power-Transmission Mechanisms, of which the following is a specification.

My invention relates to improvements in power transmission mechanism.

One of the objects of the invention is to provide an improved mechanism of this character which will be simple, durable and reliable in construction and effective and efficient in operation. Other objects of my invention will appear hereinafter.

Referring to the accompanying drawings, Figure 1 is a plan view of a track drilling machine embodying my invention. Fig. 2 is an enlarged vertical section substantially on the line 2—2 of Fig 1. Fig. 3 is a transverse vertical sectional view on the line 3—3 of Fig. 2. Fig. 4 is a view in elevation, partly in section, of a modified driving mechanism used in connection with the track drilling machine shown in Fig. 1, and Fig. 5 is another view in elevation of said mechanism taken substantially at right angles to the view shown in Fig. 4.

While it will be obvious to one skilled in the art after having obtained an understanding of my invention from the disclosures herein made that my invention may be used in various ways and for various purposes, I have shown and will describe my improved mechanism in connection with a track drilling machine.

The machine in connection with which I am explaining my invention is designed for drilling bond holes in railroad rails. It is constructed so that it will travel along the rails of the track to be bonded. The machine is provided with a frame which spans the two rails of the track, which frame has suitable rollers or wheels A and A^1 fitting the rails and constituting suitable supports for the machine. The pair of rails B and B^1 which constitute the track are illustrated in dotted lines in Fig. 1 and the machine shown is positioned thereon. This machine is designed to drill bond holes in the rail B, constituting one side of the railroad track. In the structure shown more particularly in Figs. 1 and 2, the main portion of the frame is in the form of two parallel bars or members 1 disposed substantially horizontally and connected at their inner ends by a yoke 2. From the central portion of this yoke extends a single horizontally disposed bar or member 3, which carries at its outer end the supporting wheel A^1. The other ends of the frame members 1 terminate in blocks or members 4 which are preferably integral with said members 1. A stiffening yoke or member 4^a bridges the blocks or members 4. The frame members 4 and yoke 4^a are disposed substantially above the rail B. Through the medium of raising and lowering mechanism, which needs no particular description, the frame is supported by wheels or rollers A which ride upon the rail B. The frame also has a horizontal extension in the form of two parallel members or bars 5 extending beyond the rail B. These bars or members 5 are spaced apart substantially the distance of the main frame members 1 and extend from the blocks or members 4, with which they are preferably integral. Their outer ends are bridged by a yoke or bridge member 6, which has suitable handles 7 by which the machine may be conveniently lifted on or off the rails. This extension of the frame has a reciprocating sub-frame 8, which moves toward and from the rail B on the bars 5 of said frame extension and which carries the drilling mechanism, (not shown). It is sufficient for the purpose of this application to say that this drilling mechanism and the sub-frame 8 which carries it are actuated by a main shaft 10, which is disposed horizontally between the members 1 of the frame. This shaft has two functions: It is rotated to drive the drilling mechanism, and it is also reciprocated longitudinally for the purpose of shifting the sub-frame 8 and drilling mechanism toward and from the rail B to feed and withdraw the drilling mechanism. The main shaft 10 is reciprocated longitudinally by means of drill feeding mechanism, referred to generally by the reference character C. The detailed construction and operation of these mechanisms are shown, described and claimed in the above mentioned co-pending application, to which reference may be had.

The main shaft 10 may be driven by any suitable source of power such, for instance, as an electric motor, referred to generally in Figs. 1 and 2 by the reference character D, or by manually operated mechanism such

as referred to by the reference character E in Figs. 4 and 5. The main shaft 10 serves as an exemplification of a driven element or mechanism in connection with my invention. In the drawings I have shown a gear 11, which is splined to the shaft by means of the key 12 and through the medium of which said shaft is rotated at the same time permitting its longitudinal movement. This gear meshes with and is driven by another gear 13 carried by a shaft 14. The shaft 14 and gears are all preferably contained within a suitable housing H, which incloses and protects them against damage and also protects the operator of the machine, the bearings for the shafts 14 and 10 being preferably formed in the walls of the housing. The gear 13 meshes with and is driven by or from a gear or pinion 15. In the structure shown in Figs. 1 and 2 I have illustrated generally, as a source of power, an electric motor D which may be of any suitable construction and which need not be particularly described. Suffice to say that this motor drives a spindle or shaft 16, which projects beyond an extension 23 of the motor casing, and which has a journal bearing in said extension. In this construction the motor D is mounted upon a short pedestal or standard 20 rising centrally from the frame bridge or yoke 2. This motor has a suitable base 21, which is removably clamped to the pedestal 20 by means of clamping bolts 22, so that the motor may be readily removed or replaced. The shaft or spindle 16 extends through and beyond the upper end portion of the gear housing H and carries the gear 15 on a reduced portion 24 thereof. This gear 15 is held against longitudinal movement in one direction on the shaft by means of a shoulder 25 formed by the reduced portion 24 of the shaft. The gear 15 is loosely mounted to rotate relatively to the shaft. It is, however, yieldingly connected with the shaft by means of a sleeve 26 which is splined to rotate with said shaft but to move longitudinally thereof. This sleeve has tapered teeth 27 (Figs. 2 and 3) on its end which mesh with correspondingly tapered teeth 28 on the gear 15. The sleeve 26 is yieldingly pressed or held in engagement with the gear 15 by means of a coiled spring 29, one end of which bears against one end of the sleeve and the other end of which bears against a collar 30 carried at the outer end of the shaft reduced portion 24. The collar may be shifted along said reduced shaft portion 24 to vary or adjust the compressive force of the spring upon the sleeve 26 and it may be held in adjusted position in any suitable manner such as by means of a set-screw 31. The corresponding teeth on the gear 15 and the sleeve 26 are preferably so formed that if the load on the pinion 15 becomes too great they will slip and permit the shaft or spindle 16 to rotate relatively to said gear 15. This point at which the gear and sleeve slip relatively to each other may be predetermined or adjusted by means of the variable compressive force which the spring 29 may be made to exert by the adjustment of the collar 30. Thus it will be seen that by reason of this structure the driven mechanism, which in this case is the drilling mechanism, will automatically become disconnected from the driving shaft or element 16 in accordance with the load on said driven mechanism. It is also to be noted that when the load on the driven mechanism becomes reduced below the point at which the disconnection was automatically effected, the shaft 16 and gear 15 will again be automatically connected. In this manner it will be seen that the apparatus is automatically protected against damage when the load on the driven mechanism becomes abnormal. The reasons for these abnormal conditions are obvious. For instance, the drills may stick or strike hard spots in the rail.

In Figs. 4 and 5 I have illustrated a manual driving mechanism which may be substituted for the motor D, as heretofore intimated. It often happens that a source of electric current is not available for operating the electric motor D, and I therefore provide the manual mechanism so that it may be substituted for the motor. I prefer to construct these two mechanisms, therefore, so that they will be interchangeable, and for this reason I prefer to construct the automatic safety mechanism so that it may be removed with the driving element as a unit. The extension 23 of the motor casing is arranged at its outer end to removably fit a large opening 33 in the upper portion of the gear housing H, and an opening is also provided in the opposite wall of said gear housing H through which the sleeve 26 passes. It will be noted that the collar 30 and other parts mounted upon the shaft reduced portion 24 are of a diameter sufficient to pass through this opening. In order to facilitate the removal of the shaft and the mechanism carried thereon the upper portion of the gear housing H is divided on a horizontal line 34 so that the upper end of said housing will serve as a removable cap, this being held in place by the clamping bolts 35 (see Fig. 1). The manual driving mechanism illustrated in Figs. 4 and 5 is therefore constructed so that it may be mounted on the frame in driving relation to the gears in the housing H in place of the motor D. The frame of said driving mechanism has a suitable base or leg 36, which may be clamped upon the pedestal or standard 20 of the main frame, and at its forward end 37, said frame is carefully machined to fit the opening 33 in the gear housing H. This frame portion 37 also forms a bearing 39 for the

driving element or spindle 16, the spindle 16 having another bearing 40 in the frame. The shaft is held against longitudinal movement in one direction by the collar 41 and in the other direction by a miter or bevel gear 42 keyed to the shaft. This shaft also carries a gear 43, which corresponds to the gear 15 of Fig. 2, this gear being connected or disconnected from said shaft 39 by means of the spring-pressed sleeve 44 and the corresponding bevel teeth 45 on said gear and sleeve.

I so proportion the parts of the mechanism that either the manual driving mechanism with its shaft 49 and automatic clutch mechanism, or the motor D with its shaft 16 and automatic clutch mechanism may be interchangeably used without the necessity of changing the gears in the housing H or disturbing the other parts. In other words, to substitute the manual driving mechanism for the motor driving mechanism or vice versa, it is necessary simply to remove the cap or upper portion of the housing H and fasten the motor mechanism or the manual mechanism, as the case may be, in position.

The frame of the manual driving mechanism has an uprising hollow standard 47, which may be removably clamped to the frame by means of the bolts 48. This standard carries a vertically disposed shaft 49, the lower end of which carries a miter or bevel gear 50, meshing with and driving the miter gear 42 on the shaft 16. At its upper end this standard 47 is forked or bifurcated to form bearings 51 for a horizontally disposed shaft 52. This shaft carries a bevel or miter gear 53, which meshes with and drives a corresponding gear 54 on the upper end of the vertical shaft 49. On each outer end of the shaft 52 there is mounted a crank 55, the two cranks being disposed 180 degrees apart so that an operator may conveniently drive the mechanism. The forked upper end of the standard 47 carries a loop 56, which may serve as a convenient handle for carrying the mechanism.

I claim:

1. The combination of a frame, driven mechanism supported thereby, a sub-frame removably supported by said frame, a driving shaft, an automatic clutch interposed between said shaft and said driven mechanism for rendering said shaft effective to drive said driven mechanism in accordance with the load on said driven mechanism and removable with said sub-frame, and manually operated means for driving said shaft.

2. The combination of a main frame, a driven shaft supported thereby, gears for transmitting power to said driven shaft, a housing inclosing said gears, and an interchangeable self-contained driving unit removably supported by said frame and housing and embodying a horizontal driving shaft, an independent pinion carried by said driving shaft and connected with said gears, automatic means carried by said driving shaft for connecting and disconnecting said pinion with said driving shaft according to the load on said driven shaft, a vertically disposed shaft and intermediate gears connecting said vertical and driving shafts in driving relation, and a crank for actuating said vertical shaft.

In testimony whereof I have signed my name to this specification, in the presence of two subscribing witnesses, on this 13 day of February, A. D. 1914.

CHARLES E. GIERDING.

Witnesses:
W. C. STARKEY,
P. S. COREY.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents Washington, D. C."