Oct. 12, 1926. 1,602,401

E. B. ELLICOTT

APPARATUS FOR IMPREGNATING POLES

Filed Oct. 16, 1925 3 Sheets-Sheet 1

Fig. 1.

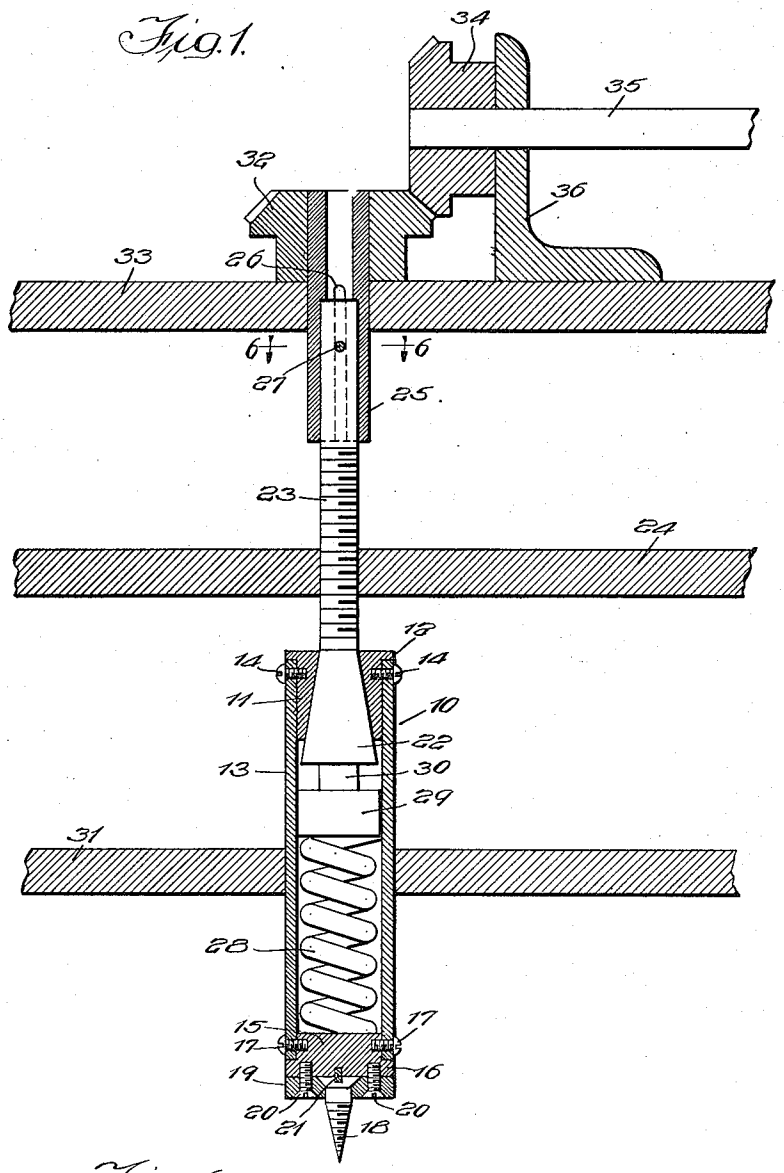
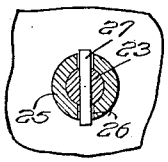


Fig. 6.



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Fig. 2.

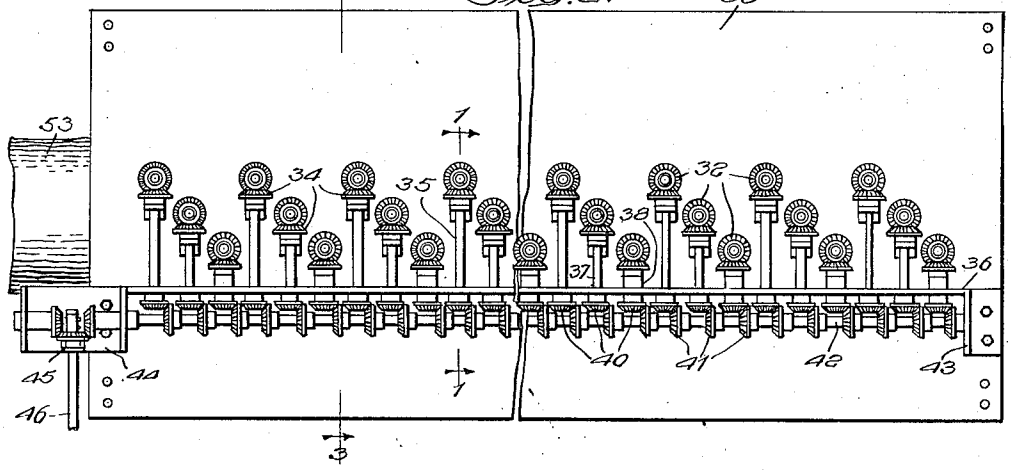
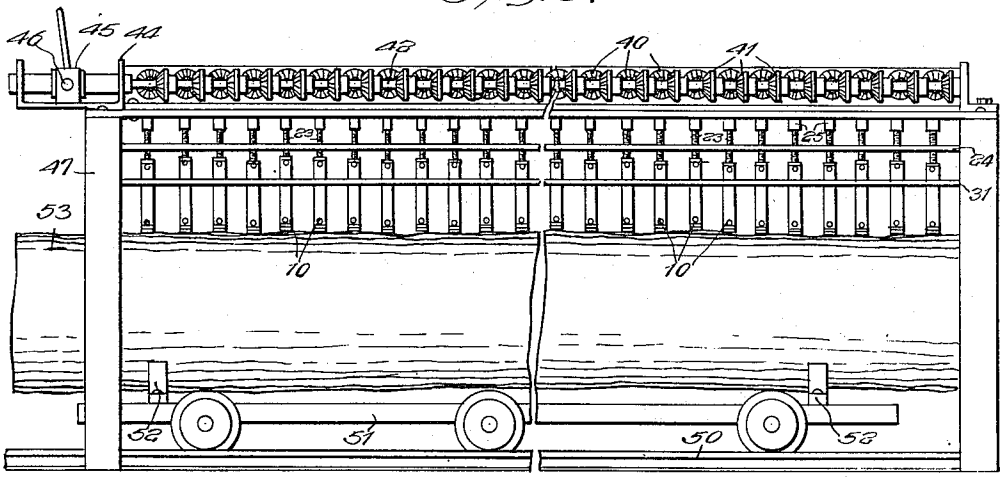


Fig. 3.



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Fig. 4.

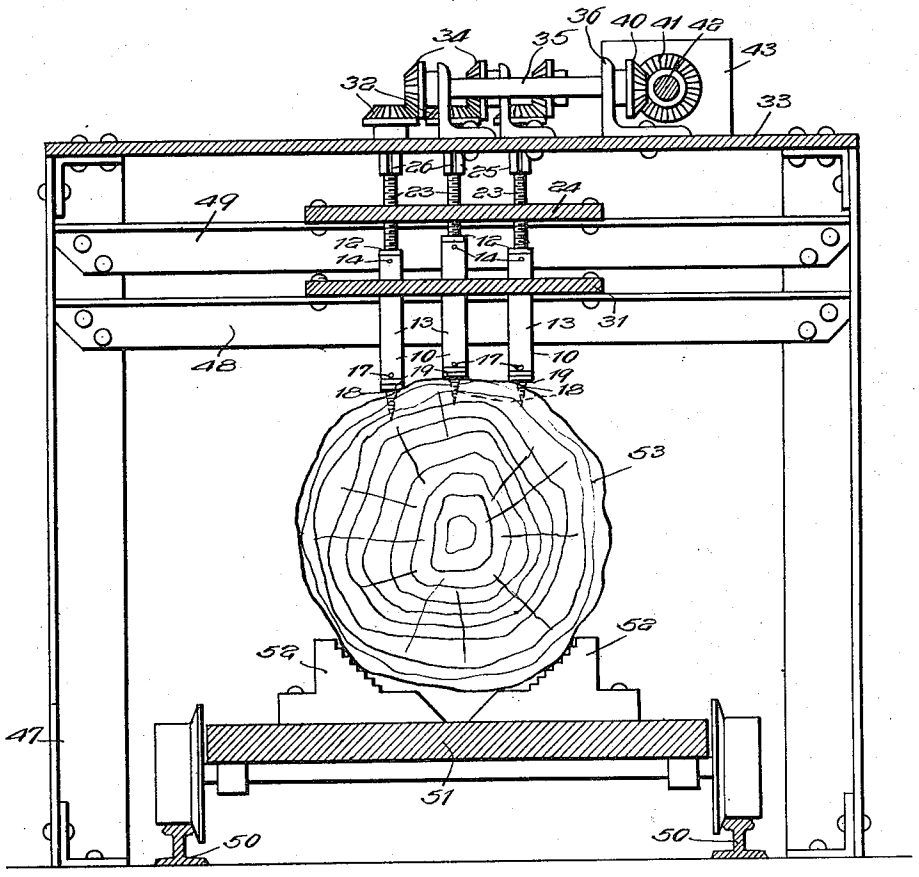
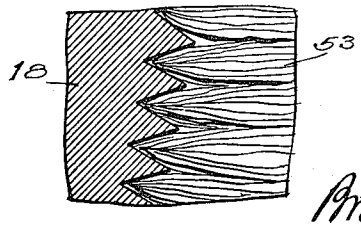


Fig. 5.



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UNITED STATES PATENT OFFICE.

EDWARD B. ELLICOTT, OF CHICAGO, ILLINOIS.

APPARATUS FOR IMPREGNATING POLES.

Application filed October 16, 1925. Serial No. 62,822.

This invention relates to a novel apparatus for forming screw holes in the sapwood of a piece of timber or pole which is to be treated with preservative compound.

In order to treat a piece of timber or pole with a preservative compound, it is first necessary to puncture that portion which is to be so treated with a large number of holes. This must be done so as to reduce the time required for treatment in order to make such treatment commercially successful. In doing so, it is necessary that these holes puncture what is known as the sap wood of the pole; for if the sap wood is properly impregnated with preservative compound through these holes or openings, the useful life of the pole will be materially increased.

The method now employed for puncturing the sapwood, is to use a prong or tool somewhat of the shape of an ordinary skew chisel. This method, however, is unsatisfactory, for, in driving the chisel into the wood, the chisel tends to compress the wood fibers together as it forms the opening. In doing so it virtually defeats the purpose for which the opening is made; for, in order to get the preservative compound to penetrate into the fibers of the wood, it is necessary that the fibers be spread or parted so that there are spaces between them into which the preservative compound may flow.

I have found that this difficulty may be obviated by using an ordinary wood screw to form the hole in the sap wood. When a screw of this type is forced into the wood, the threads thereof force the fibers apart, thereby making it possible for the preservative compound which enters through the openings, to readily work itself into the fibers of the wood.

To successfully treat a piece of timber, however, it is necessary that a large number of such holes be made in that portion which is to be treated. These holes must be about one and one quarter inches apart and in rows which are spaced about three quarters of an inch from each other. To do this, I provide a plurality of screw operating devices which may be simultaneously rotated and driven into the sap wood of the pole. The screw operating devices are preferably arranged in groups of three and have their centers on a line which runs diagonally through them. By means of this diagonal formation of each group of screw operating devices, I am able to get the openings in the pole to form a spiral path about it. I have found that this spiral formation of the holes helps materially in reducing the time required for treating the poles with preservative compound.

Another feature of the present invention is the provision of means whereby poles which have irregular surfaces will have openings formed in the low portions which are equal in depth to those formed at the higher portions. This is accomplished by the use of a suitable friction clutch arrangement in connection with each one of the separate screw operating devices which disconnects the source of power to the screw member when the proper depth has been reached.

In order to apprise those skilled in the art with the method and manner of making and using my invention, I will now proceed to describe in detail its construction and operation, reference being had to the accompanying drawings which form a part of this specification.

In the drawings:—

Fig. 1 is an enlarged sectional view of one of the separate screw operating devices and is taken on line 1—1 of Fig. 2;

Fig. 2 is a top plan view of the apparatus used for forming openings in a pole which is to be treated with a preservative compound, by means of wood screws;

Fig. 3 is a side elevational view of the apparatus showing the manner in which the pole is subjected to the individual screw operating devices;

Fig. 4 is an end sectional view taken on line 3—3 of Fig. 2;

Fig. 5 is an enlarged sectional view of a piece of the timber into which a screw is being forced, and illustrates the manner in which the fibers of the timber are forced apart by the threads of the screw; and

Fig. 6 is a sectional view taken on line 6—6 of Fig. 1.

Referring to Fig. 1, it will be noted that the numeral 10 designates one of the screw operating devices in its entirety. The device comprises essentially a conical clutch member 11 having an abutment or shoulder 12 which fits over the upper end of a sleeve 13. The clutch member 11 is secured to the sleeve by screws 14 which pass through apertures in the sleeve 13 into threaded openings in the clutch member 11. The lower end of the sleeve 13 is closed by means of a cap

15 which has a shoulder 16 adapted for abutment against the end of the sleeve. The cap 15 is secured to the sleeve by means of screws 17 which fit through suitable openings in the sleeve and thread into the cap. A wood screw 18, which is used in making holes in poles which are to be subjected to treatment with preservative compound, is securely held against the cap 15 by means of a clamping plate 19, the clamping plate itself being fastened to the cap 15 by means of the screw 20. Rotation of the screw 18 in the clamping plate is prevented by means of a key member 21 which fits snugly into the slot into the head of the screw 18 and a similar slot in the bottom side of the cap member 15.

Adapted for engagement with the clutch member 11, is a slidable conical clutch member 22 which merges, at its upper end, into a threaded neck portion 23. The threads on the neck portion 23 are of the same pitch as those of the screw 18 and extend along the neck for about two-thirds of its distance. This threaded neck portion cooperates with a threaded opening in a guide plate 24. The remainder of the neck portion 23 is smooth and is adapted for reciprocatory motion in the bearing member 25, which is provided with a pair of diametrically disposed slots 26. A pin 27 which is secured to the smooth portion of the neck 23 protrudes therefrom and cooperates with the slots 26 so as to constrain the motion of the neck 23 in the direction of the slots.

A coiled expansion spring 28 serves to maintain the clutch members 22 and 11 in engagement with each other. The lower end of this spring rests upon the upper surface of the cap 15, while the upper end bears against the lower surface of a guide block 29. The guide block 29 serves to properly guide the slidable clutch member 22 into engagement with the clutch member 11 and is secured thereto by means of the neck 30 which may be fastened to the clutch or made integral with it. A plate 31 is provided with suitable openings therein for guiding the sleeve member 13 of the separate screw devices.

The screw 18 obtains its driving power through a gear 32 which is secured to the upper end of the bearing member 25. This bearing member is adapted for rotation in a suitable opening provided for it in the bearing plate 33, which plate also serves as a bearing surface for the lower end of the gear 32. The gear 32 meshes with a gear 34 which is connected to the driving shaft 35, which shaft is journaled at one end in the standard 36 adjacent the gear 34. While the drawings illustrate beveled gears, it is understood that any other type of gears may be used for driving the screw operating device 10.

So far, the description has been solely confined to a single screw operating device and driving means therefor. In practice, however, it is necessary that a large number of these screw operating devices be used in order to save time and labor in puncturing the pole with the required number of holes. By referring to Fig. 2, it will be seen that these devices are preferably mounted in groups of three along diagonal lines which are parallel relative each other and the mounting plates 33. Each group is provided with driving shafts 35, 37 and 38 which are journaled in separate standard members 36, and in a standard member which is common to all of them, 39. Each of the drive shafts 35, 37 and 38 is driven by a gear 14 which meshes with a suitable gear 41 secured to the common drive shaft 42. One end of the common drive shaft 42 is journaled in the bearing member 43 secured to the mounting plate 33 by suitable bolt means, and the opposite end of this shaft extends through a suitable mounting member 44 and cooperates with a reversing clutch mechanism 45. The reversing clutch mechanism 45 is provided with a drive shaft 46 which may be connected, either directly or by suitable pulley and belt means, to a source of driving power.

The mounting plate 33, together with the screw operating devices and driving means therefor, may be mounted to a suitable frame or support means 47. The guide plate 31 and the screw guide plate 24 are also secured to this frame by means of the angle bars 48 and 49 which, in turn, are fastened to the framework 47 which is generally rectangular in form, by suitable rivets.

Within the frame 47 are mounted the rails 50 on which the wheels of a pole carrying member or carriage 51 are adapted to travel. Substantially adjacent both ends of the pole carrying apparatus 51 are jaws 52, on which a pole 53, which is to be subjected to the treatment of each of the separate screw operating devices 10, may be mounted so as to prevent its rotation when holes are being made in it. To rotate the pole 53 on the jaws 52, so that different portions of it may be subjected to the screw operating devices, a grab hook may be employed. However, I do not intend to limit myself to this method of changing the position of the pole 53 on the jaws 52. It is obvious that any other method may be employed which will automatically shift the pole any predetermined amount.

The apparatus operates as follows:—

The log or pole which is to be subjected to each of the separate screw operating devices 10, is placed on the carrying member 51 and then pushed into the frame member 47 so that it is directly beneath the screw operating devices. The power is next turned on so as to permit each separate screw oper-

ating device to work its way into the wood. When the screw 18 has gone into the wood so that the plate 19 comes in contact with the surface of the pole, it will stop turning. This is due to the fact that the driving relation between the slidable friction clutch member 22 and the clutch member 11 has been destroyed, for this driving relation can only be maintained when there is no reacting force against the plate 19. When the sleeve members of each of the screw operating devices cease to rotate, the operator will know that each of the separate screws has gone into the wood the required depth. He then reverses the clutch mechanism which is connected to the drive shaft, and thereby gets the screws 18 out of their respective holes. However, it is obvious that means for automatically reversing the clutch mechanism may be employed for this purpose. The pole is then rotated by means of a grab hook or by some mechanical means so that the adjacent untouched portion is exposed to the screw operating devices. This is kept up until the entire surface of the pole has been punctured with the required number of openings.

Fig. 5 shows the manner in which the screw 18 spreads out the fibers of that portion of the log 53 into which it is being forced. It will be observed that each of the separate threads of the screw act somewhat like small chisels in prying apart the fibers of the wood. It will be appreciated that in so doing, it permits the preservative compound when the pole is treated in apparatus described in my copending application, Serial No. 28,867 filed May 8, 1925, to enter into the cracks or fissures made by the separate screw threads, and thus permeate the wood faster and more thoroughly than is otherwise possible.

I do not wish to be limited to the details shown or described.

I claim:—

1. In an apparatus for forming openings in a pole to be treated with preservative compound, in combination, a pole, a wood screw, and means for driving said screw into and out of said pole, said means including a reciprocal mount rigidly connected to said screw for movement therewith in either direction.

2. In an apparatus for forming openings in a pole to be treated with a preservative compound, in combination, a pole, a wood screw, and means for driving said screw into said pole including an automatic clutch for disconnecting said drive after the screw has attained a predetermined depth, said clutch having one of the elements thereof supportingly connected with said screw for longitudinal movement therewith in either direction.

3. In an apparatus for forming openings in a pole to be treated with a preservative compound, in combination, a pole, a wood screw, means for driving said screw into and out of said pole, said means comprising a sleeve, said screw being mounted on the end of said sleeve, a clutch member secured to one end of said sleeve, and a second clutch member adapted for cooperation with said first clutch member for rotating said sleeve.

4. In an apparatus for forming openings in a pole to be treated with a preservative compound, a wood screw, a sleeve, means for mounting said screw on one end of said sleeve, means for rotating said sleeve, and means for guiding said sleeve and said rotating means.

5. In an apparatus for forming openings in a pole to be treated with a preservative compound, a wood screw secured to one end of said sleeve, a conical clutch member fastened at the opposite end of said sleeve, a clutch member within said sleeve adapted to cooperate with said first clutch member, said second clutch member having a neck portion which is integral therewith, a bearing member having a pair of diametrically disposed slots, a pin extending through said neck portion and cooperating with said slots, said slots serving to constrain the movement of said neck portion of the second clutch member to a reciprocatory motion in said bearing member.

6. In an apparatus for forming openings in a pole to be treated with a preservative compound, a sleeve, a wood screw mounted on one end of said sleeve, a clutch member secured at the opposite end of said sleeve, a second clutch member, and resilient means for maintaining said second clutch member in driving relationship with said first clutch member.

In witness whereof, I hereunto subscribe my name this 12th day of Oct., 1925.

EDWARD B. ELLICOTT.