

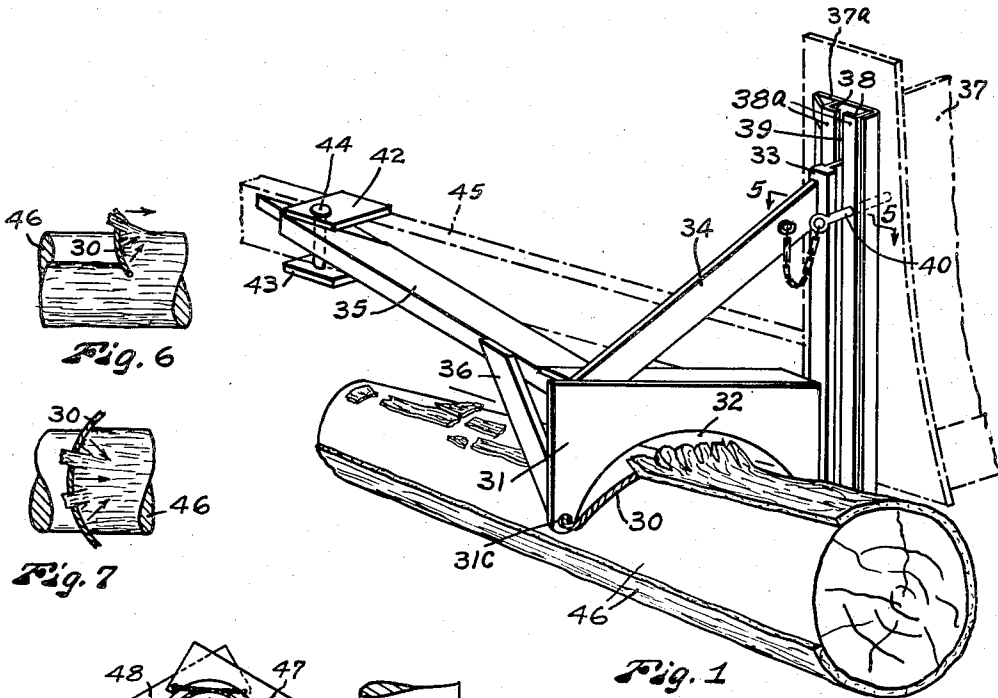
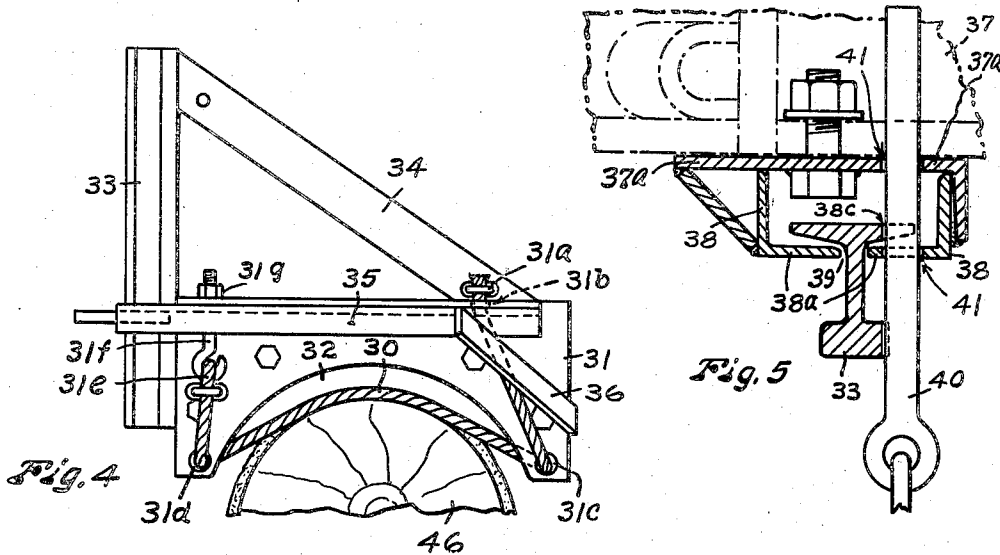
Nov. 20, 1951

E. A. LAULAINEN
APPARATUS FOR PRESSING BARK-REMOVING
CABLES AGAINST A PILE, POLE OR LOG

2,575,422

Filed Sept. 24, 1945

3 Sheets-Sheet 1



INVENTOR.
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Arnold and Mattus
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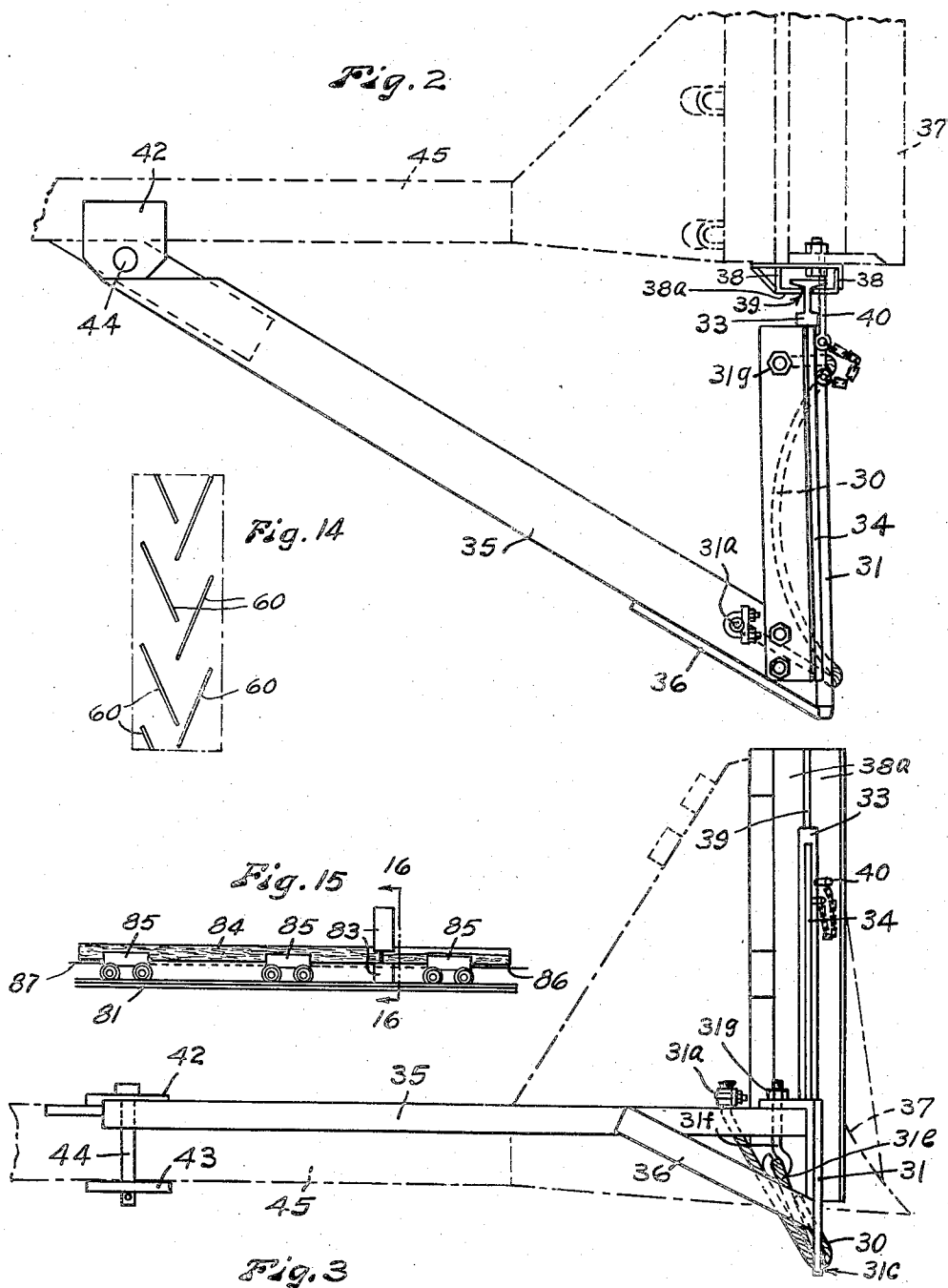
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3 Sheets-Sheet 3

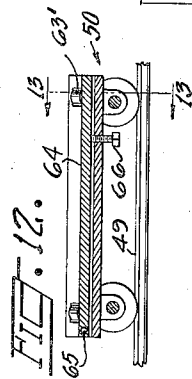
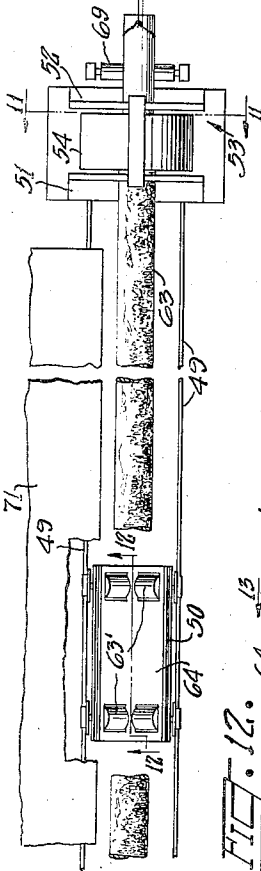
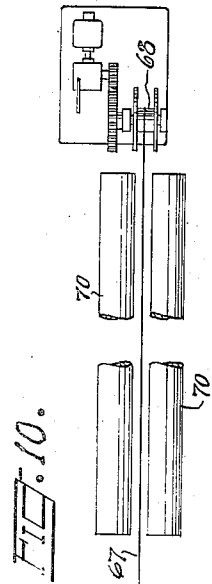


FIG. 16.

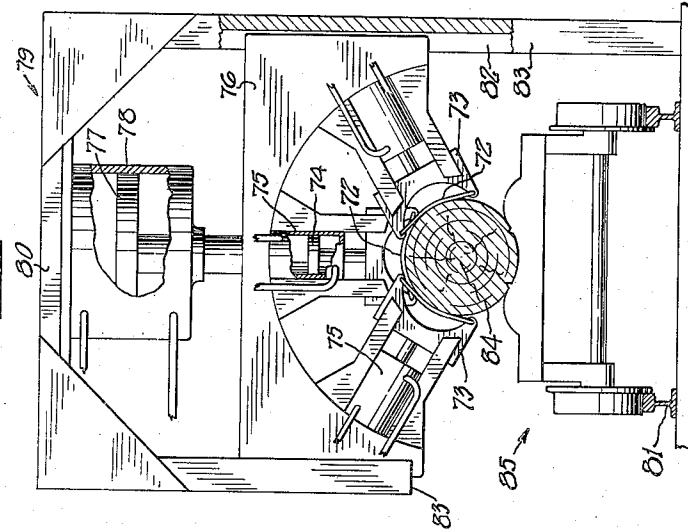


FIG. 11.

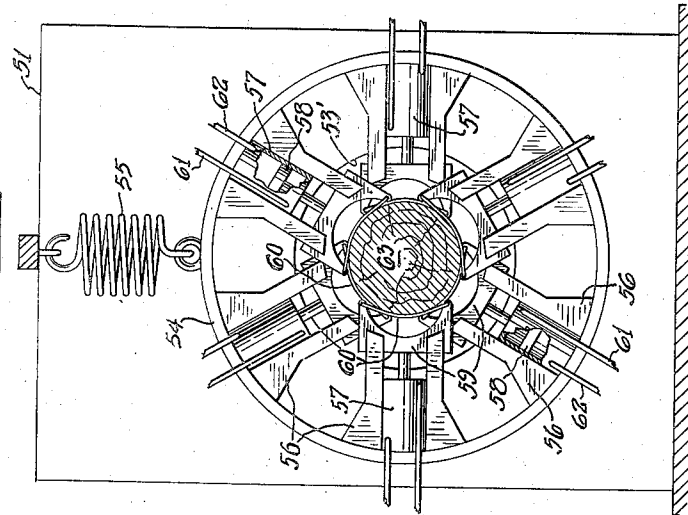
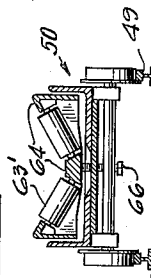


FIG. 13.



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2,575,422

APPARATUS FOR PRESSING BARK-REMOVING CABLES AGAINST A PILE, POLE, OR LOG

Einer A. Laulainen, Longview, Wash.

Application September 24, 1945, Serial No. 618,195

8 Claims. (Cl. 144—208)

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My invention relates to a method of mechanically removing the bark from a pile, pole or log and apparatus therefor.

More particularly, my invention relates to the art of mechanically removing the bark from a pile, pole or log and apparatus therefor and achieving this by the removal of not only the outer bark but also the under or growing portion of cambium bark and finally this without injury to the wood part. The bark is usually some one-quarter to three-quarters of an inch or more in thickness.

Wherever herein the term "pile" or "pole" or "log" is used, it will be understood that the other or others in general may be substituted. My invention is useful in peeling logs for pulp and saw mill purposes. In short, my invention is applicable to removing the bark in preparing piles, poles and logs. The operation of removing the bark from a pile, pole, or log is commonly referred to as "peeling."

The tapering character of a pile presents a complex problem in providing a method of, and a mechanism for, removing the bark from the pile. An eighty foot pile has a butt varying between thirteen and eighteen inches in diameter and a top varying between six to eight inches in diameter—lesser lengths of piles have butts and tops proportionately less in diameter. The bark removing means or implement which directly engages the bark must be of a character to continuously automatically conform and be adjustable to the varying contours incident to the tapering of the pile so that it may closely embrace the pile for efficient operation. Not only must such bark removing means be characterized by so adjusting and conforming in general to the tapering character of the pile and to piles of varying rate of tapering due to their different lengths but it must be capable of so adjusting and conforming to the unique variations of individual piles. It is well known that trees do not grow cross sectionally in the form of true circles. Some trees grow much more elliptical than circular. Hence the bark removing means must be of a character to continuously and automatically adjust and conform itself to variations in curvature existing between different segments circumferentially of the same pole. Thus it is apparent that these requirements in contour variations are infinite in number and so present a most complex problem in providing a method and means for removing the bark and this without injury to the wood. The difficulties involved may in part account for the failure to date of an adequate mechanical solution with the result

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that the peeling or bark removing task is done manually. It is a primary purpose of my discovery and invention to provide a method and apparatus for removing bark from piles which will meet fully these requirements and conditions.

Serious objection obtains to using a plate or knife as the peeling instrument, since experience teaches that such means results in nicking or cutting the wood beneath the bark. Such nicking or cutting is particularly objectionable when the pile or pole is to be chemically treated. The chemicals take effect primarily if not wholly in the sap wood portion and therefore the life of the product depends in large measure upon not having the sap wood ring reduced or punctured.

I have discovered a most efficient method and means to remove the bark from piles. In providing piles, the bark must be removed. The common practice in the Pacific Northwest, from whence comes the largest per cent of the piles, is to remove the bark by hand, the operator using a short crow bar like tool with a blade at the end. It takes a skilled operator about three hours to peel an eighty foot pile, whereas by employing my invention, the job may be accomplished in a matter of six minutes or less with the powered apparatus of said invention. A great many machines have been designed for removing the bark, most of which are complex and of great cost. Their failure to solve the problem is evidenced by the resort to hand operated tools. Mechanically actuated cutting tools and rigid blades are objectionable because of their likelihood of injurious action to the solid wood portion. My discovery briefly stated, involves the removal of the bark by pushing or crowding it loose.

It will be understood that next to the wood structure proper there is the cambium layer and then growing outwardly there is the phloem or bast layer and next the bark or outer bark, cambium. The cambium zone may be considered as a single row of cells. However, it has small cells next to the wood that are procumbent or radially directed. The cells of the cambium layer primarily are longitudinally directed. On the side next to the bark the cambium zone has a layer of small cells also radially directed. The bark forms in lunes, that is, longitudinally directed areas. This provides for the various cracks in the bark. I have discovered how to apply a plurality of differently directed but convergent forces which operate to remove the bark without injury to the wood.

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For a great many years the attempt has been made to provide a suitable and economically operating bark removing device. However, some of these are of a very intricate structure involving great cost in manufacture. In contrast, my invention is characterized by its simplicity and economy of manufacture. Trees suitable for piles or poles which may run from forty to eighty feet, are not found in large numbers in a given area but are scattered over a wide area. Accordingly they must be obtained by what is called selective logging. A great percentage of piling is secured from farmers who employ the winter months for cutting down and preparing of the piles, as a winter occupation, taking these in relatively small numbers from isolated sections. It is difficult to remove these from the woods with the bark upon the pile. Accordingly, it is highly desirable that the bark be removed before the removal of the piles from the woods where they are grown. Accordingly, it is an advantage that the invention in its simpler form be adaptable to use in the woods.

By reason of the above and other considerations, a large percentage of all piles are hand peeled. No suitable mechanism has been found sufficiently successful to warrant its use even at times, as at the present, when the manpower shortage due to war is a most serious matter. As a result, the cost of removing the bark by hand operated bar with a sharp edge, is exceedingly high. I have discovered an economical and simple method of removing the bark and this without injury to the wood structure of the pile, pole or log.

I have discovered that a flexible member in the form of a wire cable is particularly suited and adapted for peeling the bark of a tree in preparing it for a pile. More particularly, I have discovered that I am enabled by means of a cable to bring to bear upon a given portion of bark a plurality of converging forces which are particularly effective in removing the bark from a pile. Preferably such forces are directed also in general longitudinally of the pile. By such a means I am enabled to remove a relatively wide (circumferentially of the pile) section in a single passing of the device.

A primary purpose of my invention is to provide a bark removing mechanism which, in its simplest form, is constructed as a unit mountable and demountable upon a bulldozer machine as a power plant.

A further primary purpose of my invention is to provide a simple and relatively inexpensively constructed mechanism to provide relative movement between the pile to be peeled and the mechanism embodying my invention which may be located at a given place and the logs floated, or otherwise transported, to the same.

The above mentioned general objects of my invention, together with others inherent in the same, are attained by the mechanism illustrated in the following drawings, the same being preferred exemplary forms of embodiment of my invention, throughout which drawings like reference numerals indicate like parts:

Figure 1 is a view in perspective of the mechanism embodying my invention operatively mounted upon the end portion of the scraper member of a bulldozer;

Fig. 2 is a plan view of the mechanism embodying my invention and the mounting parts of a bulldozer;

Fig. 3 is a view in side elevation of the same;

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Fig. 4 is a fragmentary view in rear elevation of my invention applied to a log;

Fig. 5 is an enlarged view in cross section on line 5—5 of Fig. 1;

Fig. 6 is a diagrammatic view in side elevation of a pole illustrating the converging forces developed;

Fig. 7 is a diagrammatic top view illustrating the converging forces developed;

Fig. 8 is a view of a modified form of my invention showing the application at an angle, of two flexible connectors of my invention applied to a pole;

Fig. 9 is a plan view showing the angular disposition of the flexible connectors of said modified form of Fig. 8;

Fig. 10 is a plan view with parts broken away of another modified form of my invention showing the peeling mechanism disposed relatively stationary and means for moving the pole with respect to said peeling mechanism;

Fig. 11 is a view in cross section on line 11—11 of Fig. 10;

Fig. 12 is a view on line 12—12 of Fig. 10;

Fig. 13 is a view in cross section on line 13—13 of Fig. 12;

Fig. 14 is a developed plan view of the relative positions of the flexible peeling members of Fig. 11 when engaging the pile to be peeled;

Fig. 15 is a view in elevation of still another modified form of my invention; and

Fig. 16 is an enlarged view in cross section on line 16—16 of Fig. 15.

The first form of a device employing my invention to be set forth herein will be that which is attachable to a power actuated means, such as a bulldozer, and detachable therefrom when desired. The bulldozer parts are shown in dotted line in the drawings. A flexible member or cable 30, Fig. 1, is secured on a cable mounting plate 31, having an opening as 32. I find a wire cable of $\frac{5}{8}$ " diameter satisfactory, but this may vary according to conditions as to thickness of bark or diameter of pile. On the larger sizes of piles, a greater diameter of cable may be used. A flexible member triangular mounting frame is formed as follows: On the vertical side is an I-shaped member 33 (a railroad iron as illustrated herein) welded to the end of a cable mounting plate 31, which plate forms the horizontal side of the triangle. The diagonal brace 34 constitutes the diagonal side.

This triangular mounting frame for the flexible member has mounting braces 35 and 36. Cable 30 is adjustably mounted as follows: One end portion of the cable 30 may be provided with a clamp at 31a and the cable then is reeved through a hole 31b and next through holes 31c and 31d in plate 31. The cable is formed with an eye or loop 31e to engage hook 31f secured by a nut 31g, which permits adjusting the cable 30, with the desired degree of slackness.

All the parts above described constitute the detachable peeling mechanism of my invention—"detachable" as being removably mounted on a bulldozer scraper or blade assembly as follows: On the end of the bulldozer blade 37 a plate 37a is welded and to this a hollow mounting member 38, Fig. 5, is secured having outer wall 38a with a slot 39. In member 38 the base part of I-shaped member 33 is slidably mounted, the stem part of the "I" member occupying the slot 39. After the base of the "I" member 33 is inserted in the top of the mounting member 38, it drops to the bottom of said member and to prevent its vertical

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displacement, a locking pin 40 is passed through holes 41 in the walls 38a, 37a, and a notch 38c in member 33.

Arm brace 35 is detachably connected to plates 42 and 43 by bolt 44. Plates 42 and 43 are fixedly secured as by welding to channeled shaped arm 45, which arm is vertically swingingly mounted and hence scraper blade 37 may be raised and lowered by fluid pressure, that is by air or hydraulically, or both combined. It will be understood that this is the standard construction of a bulldozer to have the bulldozer blade pivotally mounted on arm 45 so that said scraper may be raised and lowered as the operation of the bulldozer may require. Advantage is taken of this construction of the bulldozer as a mounting means and as a means for supplying power in the operation of the device of my invention.

The mode of operation of the simple "bulldozer" form of my invention is as follows: The log or pile 46, the bark of which is to be removed or peeled, is preferably disposed on a relatively level strip of ground in the woods and the bulldozer moves to a position at one end of the pile. Then the scraper blade is lowered by the usual mechanism of such machine until the flexible member 30 is arched over the pile close to its end. That is, the flexible member 30 is caused to assume a position with its end portions down the sides of the pile due to its slackness. The opening 32 of the cable mounting plate 31 is of such proportion as to freely permit the flexible member 30 to assume such position and loop up, across and down on the other side of the pile 46. The flexible member 30 of my invention, particularly when in the specific form of a wire cable, is characterized by its readiness to adjust itself fully to the contour and circumference of the pile and thereby it engages the bark with utmost completeness and efficiency. Such portion of the weight of the scraper blade is allowed to press down on the flexible member 30 as is necessary to cause the cable to engage firmly and cut through the bark as the cable 30 is forced longitudinally of the pole 46. If necessary extra downward pressure is secured by utilizing the fluid pressure means of the bulldozer to force downwardly the scraper means, but the weight of the scraper is ordinarily sufficient. The operator readily determines the amount of pressure by trial. In Fig. 1, it clearly appears that one passing of the flexible member 30 has been made and a second passing is about to be completed. Thus, by repeating the passages all of the bark is removed from the log, the log being turned between the different passages in order to present the bark on the upper surface or top side of the pile 46.

As the cable mounting plate 31 is moved forwardly over the pile, the central portion of flexible member 30, that is the portion of the flexible member 30 on top of the pile, also assumes a lagging position as respects its depending end portion, i. e., depending about the pile. This disposing of the flexible member 30 about the pole provides for developing upwardly and longitudinally yet generally convergingly directed forces, see Figs. 6 and 7. On top, see Fig. 7, the forces are likewise longitudinally yet generally convergingly directed. The flexible member 30 is preferably formed of a wire cable, as illustrated, for the optimum results of my invention. A flexible member in the form of a chain of small links, such as those used in the tread portion

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of non-skid chains for automobile tires, give fairly good results but for optimum results the wire cable should be used.

While the exact operation or theory of operation of the specific form of the flexible member of my invention in the form of a wire cable is not fully understood by me, I set forth the following as a possible explanation: Somehow the body of the cable as a whole seems to push or crowd the bark ahead of it until it raises and breaks in segments with strips of the cambium holding it together, often in strips several feet long. Such portion of the cambium as may remain left clinging to the firm wood portion of the pile is gripped by the multiplicity of the wire strands which seem to function as a multitude of teeth to grip even such clinging portion of the cambium. At the same time the strands do not present such an unyielding surface as to constitute a cutting edge to nick or damage the wood portion. The flexibility of the cable or flexible member 30, due to its slackness apparently enables it to bring to bear upon the bark and the cambium layer just such a combination of temporarily yielding forces applied in such a manner as not to nick, cut, or damage the wood. Of course, it is to be understood, that in the meantime only such pressure is being employed as is necessary to hold the cable down upon the pile in firm engagement. The phrase "temporarily yielding" is employed to designate that at some point or portion of the length of the cable in engagement with the pole an obstinate part of the bark may cling more firmly than another. When such occurs, the flexibility of the cable will allow this detained part of the cable to momentarily hang back and as the adjacent portion of the cable moves forward such portion receives a concentration of forces in a more or less enveloping grip which relatively quickly overcomes the resistance of the bark. The cable 30 may revolve against or roll upon such segment of lagging bark and so apply a downwardly directed or crushing force which serves to release the clinging portion of bark. In any event whatever may be the explanation as to the theory of operation of my invention, when a wire cable is employed as the flexible member of my invention both the bark and cambium layer are removed in an exceptionally efficient manner.

In the modified form, Figs. 8 and 9, two flexible members 47 and 48 are employed disposed at an angle to the diameter of the pile instead of at right angles to the longitudinal axis of the pile. This has the advantage of providing a shearing action for the flexible cable in engaging the bark. Having the members 47 and 48 in pairs and disposed oppositely angularly, there is no tendency for the log to be revolved—any such tendency on the part of one member to turn the pile being countered by the operation of the other.

In the modified forms illustrated, Figs. 10 to 16, the flexible member, with its mounting mechanism is located at a fixed station and the pile is moved through such station. A trackway 49 is provided for a pile, pole or log carrying car 50. Over this trackway 49 is disposed a frame comprising two spaced apart abutment members 51 and 52, having space 53 therebetween and circular opening 53' (Fig. 11). The character of the abutment members permits the piles to pass there-through. In the space 53 an annular frame 54, Fig. 11, is suspended by spring 55. In general,

this annular frame serves as a mounting for fixed pressure producing means for flexible members as will appear from the following: Each such means comprises a frame 56 in which is secured a cylinder 57. In cylinder 57 a piston 58 is disposed mounting a flexible member mounting plate 59 with its flexible member 60. Tubes 61 and 62 connected to a suitable source of controlled fluid pressure means admit fluid pressure to the top and bottom of piston 58 so that flexible member 60 may be resiliently urged upon a pile 63, the fixed flexible members overlapping in their engagement with the pile and operating as an iris like mechanism so that they remove all bark and cleanly peel the pile in one passage through the annular frame 54. The developed position of these flexible members is shown in plan in Fig. 14.

The pile is supported and moved on car 50 to the flexible members 60 of annular frame 54. The car 50 is provided with inclined rollers 63' in a frame 64 pivotally mounted at 65. An adjusting screw 66 serves to tilt the frame so that the rollers may be suitably aligned with the slope of the pile or log. Cable 67 is secured to the end of the pile and by means of power driven drum 68 the pile may be pulled through the assembly of flexible members in frame 54. Roller 69 supports the pile as it first emerges from the annular frame 54 and parallel logs 70 serve as a supporting skid means as the pile continues on its course through the annular frame 54. Piles, i. e., poles or logs, are rolled upon car 50 from platform 71.

The mode of operation of the above modified form is largely evident from the above description of its construction. The flexible members 60 operate fundamentally as those first described herein. They are mounted on controlled fluid pressure means 58 and 59 whereby obviously they can be caused to engage the pile 63 with the desired degree of pressure. Since the annular frame 54 is resiliently suspended between the abutment members 51 and 52, that is, is suspended in space 53 and also since the flexible members 60 operate under fluid pressure, the pole 63 is properly centered for efficient operation of the bark peeling elements.

In the modified form of my invention illustrated in Figs. 15 and 16, the mechanism is shown whereby the pile may be reciprocated so that the bark may be peeled in sections during a plurality of passes beneath the flexible member peeling means. In case a strip of the pile 84 is not cleanly peeled the pile may be readily repassed to remove such strip. The flexible members 72, three in number, have mounting plates 73. These are all alike. The flexible members 72, in combination, are disposed to peel slightly more than 120° of the uppermost part of the pile 84. Each flexible member mounting plate 73 is secured to a piston 74 operatively disposed in a cylinder 75 which may be mounted in semi-annular frame 76. This frame 76 may be mounted upon a fluid pressure means comprising a piston 77 operating in cylinder 78 so that said semi-annular frame may be controllably held in the desired position. Said semi-annular frame may be slidably mounted in an upright means 79 having arm 80 extending over the trackway 81. This trackway extends from both sides of the central station where the semi-annular frame 76 is mounted so that reciprocation of the pile beneath the peeling means is possible. In slide ways 82 of upwardly extending arms 83, semi-annular frame 75 is mounted. The pile 84 may be transportably supported on

cars 85. The cars 85 may be reciprocated by suitable means, as cables 86 and 87.

The mode of operation of the modified form of my invention illustrated in Figs. 15 and 16 is given and is apparent for the most part from the description set forth of its construction. It is obvious that the pile 84 may be readily reciprocated in engagement with the flexible members 72, as many times as may be desired, the operator having clear view as to whether the bark is clean peeled since said flexible members are mounted to operate only upon the uppermost part of the pile 84. It will be understood that the pile 84 is turned to expose unpeeled portions after the part operated upon is completely removed or peeled. Such mechanism amply provides for any particularly difficult or obstinately clinging bark which may be encountered in connection with some piles. It will be understood that at different times of the year, the logs or piles or poles peel much easier than at others, and also the bark of some species of trees is more readily removed than others. Experience has proven that for the most part, both the inner and outer bark are removed by a single passing of the pile in engagement of the flexible member of my invention.

My discovery and the device of my invention provides a "clean peel," i. e., both the outer and inner bark is removed without injury to the wood portion of the pile, pole or log. So far as known to applicant, said invention is the only one which provides for achieving this result.

Obviously, changes may be made in the forms, dimensions and arrangement of the parts of my invention, without departing from the principle thereof, the above setting forth only preferred forms of embodiment.

I claim:

1. A pile bark-removing mechanism comprising a wire cable bark-removing member formed of strands of wire spirally disposed, cable mounting means positional during bark-removal operation transversely of a longitudinal axis of a pile and in spaced relation to an adjacent arc of the surface of said pile, said cable mounting means having cable end securing means, said cable during bark-removal operation contacting the surface of said pile adjacent said arc, the distance between said securing means being less than the length of said cable, said cable assuming an arcuate-like form while engaging the surface of a pile and said cable while in bark-removal operation lying in a plane disposed at an angle to a plane normal to the longitudinal axis of the pile and said cable momentarily rolling on its axis when engaging strongly resisting portions of the bark, and mechanical means providing relative longitudinal movement between said cable member and pile.

2. A pile bark-removing mechanism specific to claim 1 and comprising a pile supporting and conveying means, a frame disposed with relation to said support, a plurality of said cables having their ends anchored on said frame in diagonal relation to the pole axis, and said mechanical means moving a pole along said conveyor.

3. In a device generically described in claim 1, the combination of a conveyor for moving a pole along its axis, a plurality of said cables mounted diagonally across the surface of the pole and covering its entire circumference and means for yieldably compressing said cables against a pole as it moves along said conveyor.

4. A pile bark-removing mechanism specific to claim 1 comprising a trackway; a pile supporting means; a frame mounted above said trackway

and carrying a plurality of said cable mounting means; a plurality of said cable bark-removing members extending transversely of a pile and secured to the cable mounting means on said frame; fluid pressure means connected to said cable mounting means to move the cable members in a direction to engage a pile; and said mechanical means providing relative movement between said cable members and a pile on said pile supporting means.

5. A pile bark-removing mechanism specific to claim 1 comprising a trackway; a pile supporting means; a frame mounting means disposed above said trackway; a frame resiliently supported on said frame mounting means; a plurality of said cable mounting means carried by said frame, a plurality of said cable bark-removing members secured to said cable mounting means and extending transversely of a pile; fluid pressure means connected to each of said cable mounting means to move the cable members in a direction to engage a pile; and said mechanical means providing relative movement between said cable members and a pile on said pile supporting means.

6. A pile bark-removing mechanism specific to claim 1, in which said cable bark-removing member is positioned transversely and at an angle to the longitudinal axis of a pile; said spaced means for securing the end portions of said cable member being positioned laterally on each side of a pile and offset in a direction longitudinally of a pile, whereby the cable member will assume a position diagonally and transversely of a pile; and said mechanical means providing relative longitudinal movement between said cable member and a pile.

7. A pile bark-removing mechanism specific to claim 1, in which said cable mounting means are also offset in a direction longitudinally of pile, whereby the cable member will assume a position diagonally and transversely of a pile; another cable bark-removing member extending transversely of the pile; spaced supporting means for the end portions of said other cable member spaced in a direction transversely of a pile and offset in a direction longitudinally of a pile and opposite to that of the offset of the first men-

tioned cable member; and said mechanical means providing relative longitudinal movement between both said cable members and a pile.

8. A pile bark-removing mechanism specific to claim 1 and comprising a frame mounting means; a frame resiliently supported on said frame mounting means; a plurality of said cable mounting means carried by said frame, a plurality of said cable bark-removing members secured to said cable mounting means; fluid pressure means connected to each of said cable mounting means to move said cable members separately in a direction to engage a pile; and said mechanical means providing relative movement between said cable members and a pile.

EINER A. LAULAINEN.

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