Sept. 19, 1950 J. M. ANDERSON 2,522,769

NAIL-EXTRACTING MACHINE

Filed Nov. 1, 1946 2 Sheets-Sheet 1

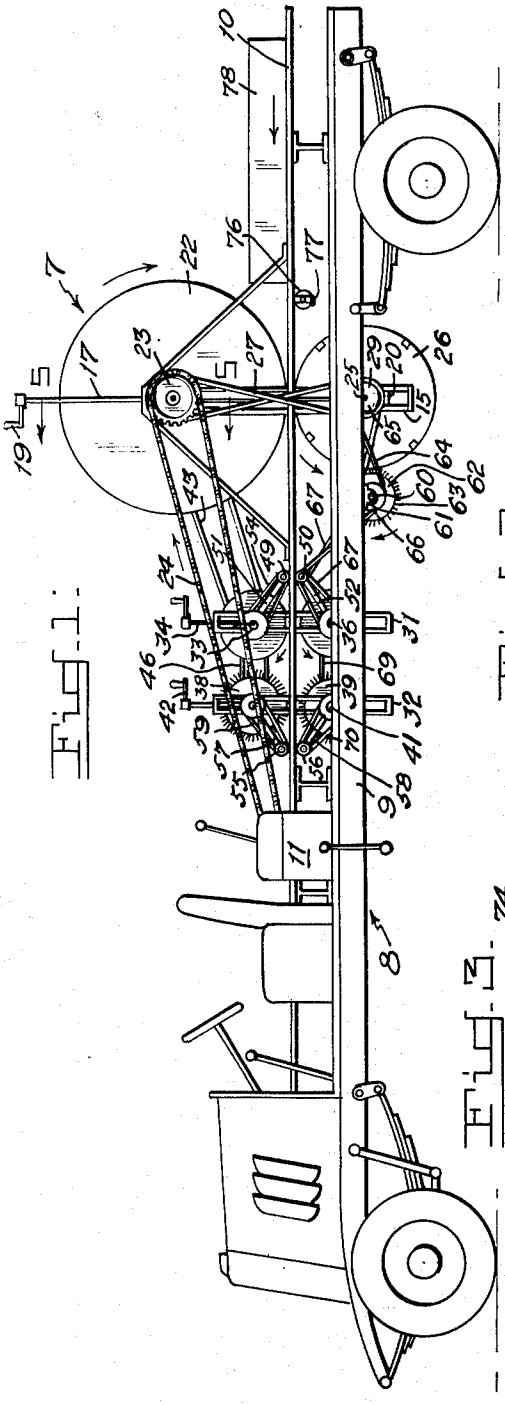


Fig. 1.

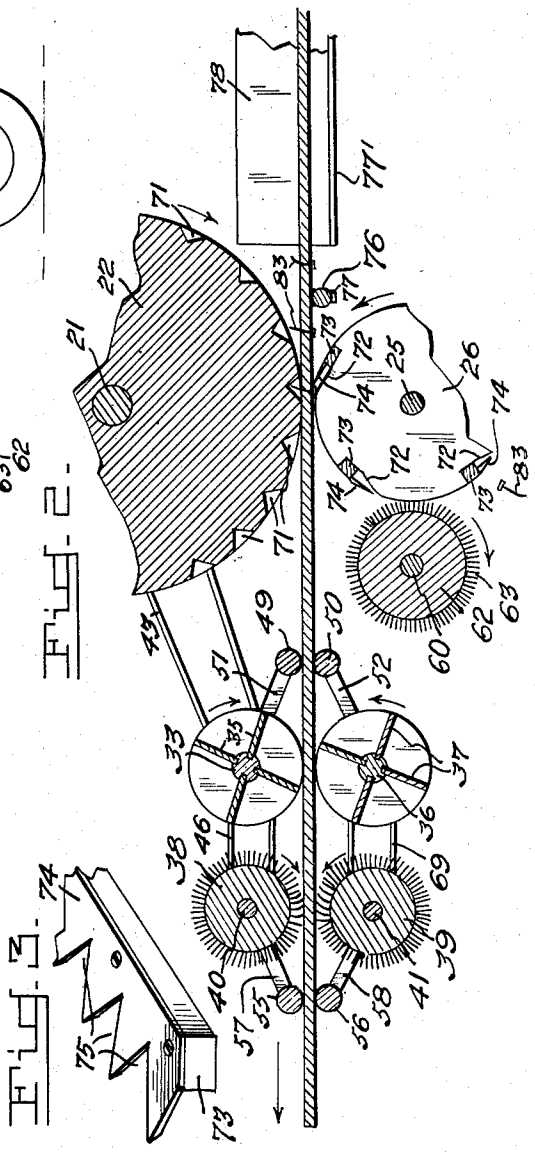


Fig. 2.

Fig. 3.

Inventor

John M. Anderson

By Randolph & Beavers

Attorneys

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Fig. 4.

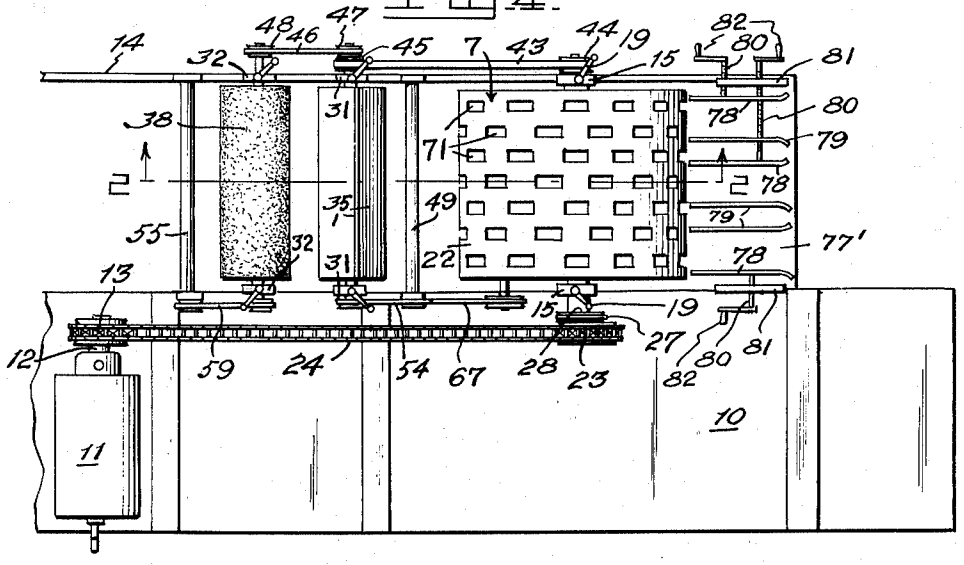


Fig. 5.

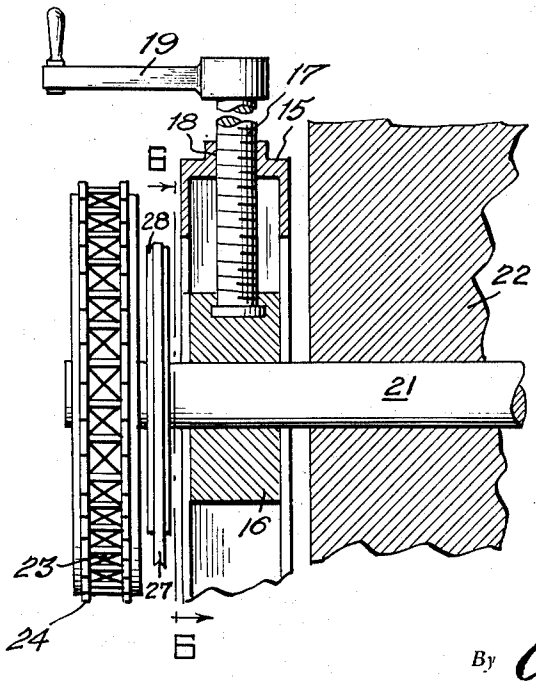
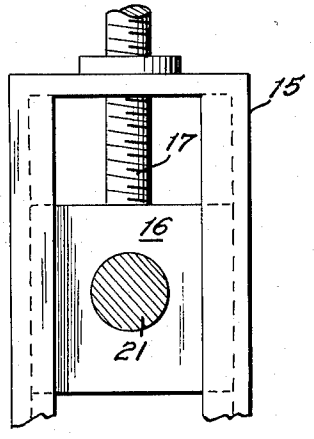


Fig. 6.



Inventor

John M. Anderson

By Randolph & Beavers

Attorneys

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NAIL EXTRACTING MACHINE

John M. Anderson, Washburn, N. Dak.

Application November 1, 1946, Serial No. 707,306

8 Claims. (Cl. 254—18)

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This invention relates to a machine for extracting nails from and for cleaning the surfaces of old lumber, for reconditioning the lumber for reuse.

It is a primary object of the present invention to provide a machine capable of much more rapidly and more efficiently removing nails from and cleaning the surfaces of lumber than it is possible to accomplish the same operation by hand, and by means of which lumber can be reconditioned readily for reuse.

More particularly, it is an object of the invention to provide a machine through which used lumber is adapted to be fed and having novel means for initially extracting nails from the lumber and means for subsequently scraping and thereafter brushing most surfaces of the lumber for removing therefrom cement or other foreign matter, which may be adhered thereto.

Still a further object of the invention is to provide a machine having novel means for partially ejecting nails from one side of a piece of lumber and means cooperating therewith for completely extracting the nails from the opposite side thereof.

Various other objects and advantages of the invention will hereinafter become more fully apparent from the following description of the drawings, illustrating a preferred embodiment thereof, and wherein:

Figure 1 is a side elevational view of a preferred embodiment of the nail extracting and lumber cleaning machine;

Figure 2 is an enlarged fragmentary longitudinal sectional view thereof, taken substantially along a plane as indicated by the line 2—2 of Figure 4;

Figure 3 is a fragmentary perspective view of a portion of one of the nail extracting bars;

Figure 4 is a fragmentary top plan view of the machine;

Figure 5 is an enlarged transverse vertical sectional view, taken substantially along a plane as indicated by the line 5—5 of Figure 1, and

Figure 6 is a vertical sectional view taken substantially along a plane as indicated by the line 6—6 of Figure 5.

Referring more specifically to the drawings, the numeral 7 designates generally a preferred embodiment of the nail extracting and lumber cleaning machine, and the numeral 8 designates generally a truck, on the rear of which the machine 7 is mounted, and by means of which such machine is rendered mobile. The rear portion of the chassis 9 of the truck 8 is provided along one

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longitudinal side thereof, with a platform 10 and adjacent the forward end of said platform a prime mover 11 is secured to the truck chassis 9 and preferably transversely thereof. The prime mover 11 may be embodied in the form of an internal combustion engine having a drive shaft 12 projecting from the inner end thereof and to which a sprocket wheel 13 is keyed, as best seen in Figure 4.

The truck 8 is provided with a longitudinal side rail 14 along its opposite longitudinal side, which is laterally spaced from the inner edge of the platform 10.

The machine 7 includes a pair of transversely aligned upright posts 15, one of which is secured to the inner edge of the platform 10, and the other of which is secured to the rail 14. As best seen in Figure 5, the posts 15 are provided with vertically disposed, inwardly opening channels, each adapted to slidably receive a journal box 16 which is disposed for vertical sliding movement therein and in which a feed screw 17 is swivelly mounted. The feed screws 17 extend upwardly through threaded openings 18 in the upper ends of the standards 15 and are provided on their upper ends with cranks 19. A second pair of journal boxes or bearings 20 are preferably disposed fixedly in the standards 15, adjacent the lower ends thereof. The journal boxes 16 provide bearings for portions of a shaft 21, which extends through and is keyed to a drum 22 for rotatably mounting said drum between the upper portions of the standards 15. One end of the shaft 21 has a sprocket wheel 23 keyed thereto and which is connected to the sprocket wheel 13 by an endless chain 24 which is trained over the two sprocket wheels. A shaft 25 extends through and is keyed to a drum 26 and has portions journaled in the journals 20 for rotatably supporting the drum 26 between the lower portions of the standards 15 and beneath the drum 22. A belt 27 is trained over a pulley 28, keyed to the shaft 21 and a smaller pulley 29 keyed to the shaft 25; said belt being crossed between the pulleys, so that the drums 22 and 26 will be revolved in oppostie directions, for a purpose which will hereinafter become apparent.

Forwardly of the standards 15, two pairs of smaller standards 31 and 32 are mounted in a like manner to the standards 15 and with the standards 32 disposed forwardly of the standards 31 and with the two standards 32 disposed in transverse alignment. A shaft 33 is journaled by vertically slidable journal boxes, not shown, dis-

posed in the standards 31 and said journal boxes are adjustably supported by feed screws 34 equipped with cranks and which function in the same manner and for the same purpose as the feed screws 17. The shaft 33 is provided with a plurality of blades 35, which extend longitudinally thereof and which are secured therein and project radially therefrom, as best illustrated in Figure 2. A similar shaft 36, equipped with blades 37 is journaled in the lower portions of the standards 31. A pair of drums 38 and 39 are rotatably mounted between the standards 32 and are keyed to shafts 40 and 41, respectively, which are journaled in bearings, not shown, mounted in the standards 32. The upper pair of bearings which journal the shaft 40 are adjustably supported by a feed screw and crank 42 for raising and lowering the drum 38 in the same manner that the drum 22 is mounted for vertical adjustment, and as previously described. The bearings of the shaft 41 are preferably fixedly disposed in the lower portions of the standards 32. The drum 22 is rotatably connected to the shaft 33 by a belt 43, which is trained over pulleys 44 and 45 which are keyed to the shafts 21 and 33, respectively, and the shaft 40 is connected to the shaft 33 by a belt 46 which is trained over pulleys 47 and 48 on the shafts 33 and 40, respectively, so that the shafts 33 and 40 will be driven by the shaft 21 and in the same direction.

Two feed rollers 49 and 50 are disposed in vertically spaced relationship between the standards 15 and 31. The upper feed roller 49 is supported by arms 51 which project from the journals of the shaft 33 and the lower feed roller 50 is similarly supported by arms 52 which project from the journals of the shaft 36. The feed roller 49 is driven in the same direction as the shaft 33 by an endless belt 54 which is trained over pulleys, not shown, keyed to said parts. A similar pair of feed rollers 55 and 56 are disposed forwardly of the standard 32 and are similarly supported by arms 57 and 58, respectively, which are mounted on the journals of the shafts 40 and 41 and the upper feed roller 55 is rotatably connected to the shaft 40 and driven in the same direction as said shaft, by a belt 59.

A shaft 60 is disposed forwardly of the drum 26 and is journaled in bearings 61 which depend from portions of the chassis 9 and has a drum 62 keyed thereto, and which is provided with bristles 63 disposed for wiping engagement with the periphery of the drum 26, for a purpose which will hereinafter be described. A belt 64 is trained over pulleys 65 and 66 keyed to the shafts 25 and 60, respectively, and said belt is crossed intermediate of its ends, so that the drum 62 will be revolved in the opposite direction to the drum 26. The lower feed roller 60 is connected by a belt 67 to the shaft 60, and said belt is likewise crossed for driving the feed roller 50 in a counterclockwise direction as seen in Figures 1 and 2. The feed roller 50 drives the shaft 36 in a counterclockwise direction by means of a belt 68 and the shaft 41 is driven in the same direction from the shaft 36 by a belt 69. The lower feed roller 56 is likewise driven in a counterclockwise direction from the shaft 41 by a belt 70.

As best seen in Figure 2, the drum 22 is provided with a plurality of circumferentially spaced, longitudinally extending notches 71 in the periphery thereof, which are provided with radial shoulders facing in the direction of rotation of said drum and inclined surfaces facing in the opposite direction, for a purpose which will hereinafter become apparent. The drum 26 is provided with circumferentially spaced, longitudinally extending recesses 72 in the periphery thereof, in each of which a bar 73 is fixedly disposed. A toothed bar 74 is fixedly secured to each bar 73 along the rear edge thereof and said bars 74 and each provided with a forwardly extending edge portion, disposed in a part of one of the recesses 72 and which is provided with V-shaped notches 75 which are beveled on the inner sides of the bars 74.

A supporting roller 76 is journaled in brackets 77 of the platform 10 and the rail 14 and is disposed to the right or rearwardly of the upper portion of the cylinder 26, as seen in Figures 1 and 2.

As best seen in Figure 4, the space between the inner edge of the platform 10 and the rail 14, in which the drum shafts, previously described, are disposed, is opened except for a narrow platform or floor 77' which is disposed behind the upper portion of the drum 26 or to the right thereof, as seen in Figures 2 and 4, and which is secured to the platform 10 and rail 14. A plurality of pairs of upright disposed guide walls 78, 79 are disposed over the platform or floor 77' and longitudinally of the machine 7 and said walls 78 and 79 are flared at their rear or right-hand ends, as seen in Figure 4. The walls 79 are fixedly positioned, and the walls 78 are each connected to a rod 80 which is disposed substantially flush with the floor 77' and which is provided with a threaded portion, not shown, which extends through and threadedly engages an upright 81, secured either to the platform 10 or rail 14. The rods 80 at their outer ends are provided with cranks 82 by means of which said rods may be rotated for individually moving the guide walls 78, either toward or away from their associated walls 79.

The chain 24 is driven in the direction as indicated by the arrows in Figure 1, by the sprocket 13 and shaft 12 of the motor 11 for revolving the drum 22 in the direction as indicated by the arrows in Figures 1 and 2. The drum 22 by the belts, previously described, drives the drum 26 in the opposite direction and the brush cylinders 62 in the opposite direction to the drum 26, as indicated by the arrows in Figure 1. Likewise, the shafts 33, 36, 40 and 41 are driven either directly or indirectly from the drum 22, with the shafts 40 being revolved in the same direction as the drum 22, when the shafts 36 and 41 being revolved in the opposite direction. The upper feed rollers 49 and 55 are driven in the same direction as the drum 22, and the lower feed rollers 50 and 56 are driven in the opposite direction by the belt connections, previously described.

Accordingly, a board 82 can be fed into the space between the drums 22 and 26, over the floor 77 and the idler roller 76, while being guided by and disposed between a wall 78 and a wall 79. In advancing between the drums 22 and 26 and with the board positioned so that the heads of any nails extending therethrough, are disposed on the underside thereof, the pointed ends of the nails 83 will be engaged by the notches 71 and thus prevented from riding over the periphery of the drum 22. The notches 71 as they engage the pointed end of a nail and move toward the board 82 will force the nail 83 downwardly through the board, sufficiently so that the shank of the nail, adjacent its head, will be engaged in a V-shaped notch 75 on one of the bars 74 supported by the

more rapidly rotating drum **26**. As the nails are thus extracted from the board **82**, they will be carried in a counterclockwise direction with the drum **26** and past the brush cylinder **62**, which is revolving more rapidly than the drum **26** and which will therefore brush the nails **83** out of the notches **75** to cause the nails to drop from between the cylinders **26** and **62**, as seen in Figure 2. As the board **82** continues its advance from right to left of Figures 1 and 2 or toward the forward end of the vehicle **8**, it will be engaged by the forward pair of feed rollers **49** and **50**, which will feed the board at a predetermined speed to the rear scraping wheels **35** and **37** which will engage the upper and lower surfaces, respectively of said board, for scraping any accumulated foreign matter therefrom, such as pieces of cement. Beyond the scraping wheels **35** and **37**, the board **82** will be engaged between the brush drums **38** and **39**, which will engage the top and bottom surfaces thereof, for effectively brushing any remaining loose foreign matter therefrom. The board **82** will pass outwardly from the machine **7** through the forward feed rollers **55** and **56** in a thoroughly cleaned condition, and with all nails extracted therefrom. It will be readily apparent that the feed rollers will also function as retarding rollers, to prevent the board from moving through the machine **7** at an excessive speed, so that all portions of both surfaces of the board will be subjected to the nail extracting, scraping and brushing operations.

It will be readily apparent that by manipulation of the cranks connected to the feed screws **17**, **34** and **42**, that the drum **22**, wheel **35** and drum **38** may be raised sufficiently to properly accommodate boards **82** of different thicknesses and that the feed rollers **49** and **55** will be elevated with the shafts **33** and **40**, respectively, on which they are supported. The board guide walls **78** and **79** are especially provided for relatively short boards and are disposed relatively close to the drum **22** and are preferably inclined slightly toward their upper edges, so that when properly adjusted, as previously described, the rear ends of short boards will be prevented from tipping upwardly, while the nails are being depressed from the forward end thereof. The chain **24** and the belts of the upper drums and feed rollers are provided with sufficient slack to permit the slight vertical adjustment required for accommodating boards of various thicknesses.

Various modifications and changes are contemplated and may obviously be resorted to, without departing from the spirit and scope of the invention as hereinafter defined by the appended claims.

I claim:

1. A machine of the character described comprising a pair of drums, disposed with the peripheries thereof in slightly spaced relationship and between which a board is adapted to be fed, means on one of said drums for engaging the pointed ends of nails extending through said board for partially ejecting the nails from the side of the board, remote to said first mentioned drum, and means on the other drum for engaging the shanks and heads of the nails for fully extracting the nails from the board.

2. A machine of the character described comprising a pair of driven rotatable drums between which a board is adapted to be passed, means on one of said drums for forcing nails partially through the board and in a direction toward the other drum, and means on the other drum for engaging and extracting the nails from the board.

3. A machine as in claim 2, and a rotatable brush cylinder disposed adjacent the last mentioned nail extracting drum and in engagement with the periphery thereof, said brush cylinder being revolved in the opposite direction to the nail extracting drum for engaging and dislodging the nails carried thereby.

4. A machine as in claim 2, and adjustable guide means through which the board is movable and by which the board is guided in its initial movement into the machine.

5. A machine as in claim 2, and means for vertically adjusting the first mentioned drum for adjusting the machine to boards of different thicknesses.

6. A machine as in claim 2, said drums being revolved in opposite directions.

7. A machine as in claim 2, and a common power source for revolving the drums in opposite directions.

8. A machine as in claim 2, said first mentioned means comprising recesses formed in the periphery of the first mentioned drum for receiving the pointed ends of the nails and having inclined surfaces to be engaged by the nails.

JOHN M. ANDERSON.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
1,194,617	Goss	Aug. 15, 1916
1,461,712	Ellis	July 10, 1923
1,599,713	Perlman	Sept. 14, 1926
2,266,490	Endebrock	Dec. 16, 1941
2,446,741	Chidakel	Aug. 10, 1948