April 12, 1949. F. D. REYNOLDS 2,466,740

METHOD AND APPARATUS FOR SPACING HAIR FASTENERS

Filed July 24, 1944

3 Sheets-Sheet 1

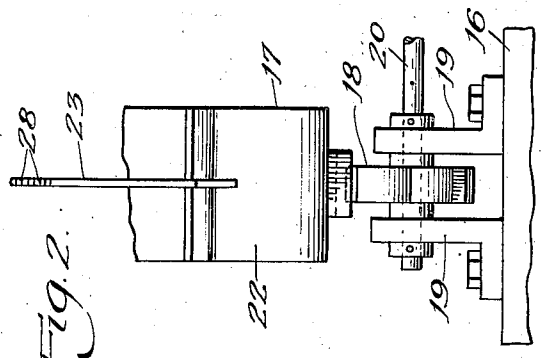


Fig. 2.



Fig. 3.

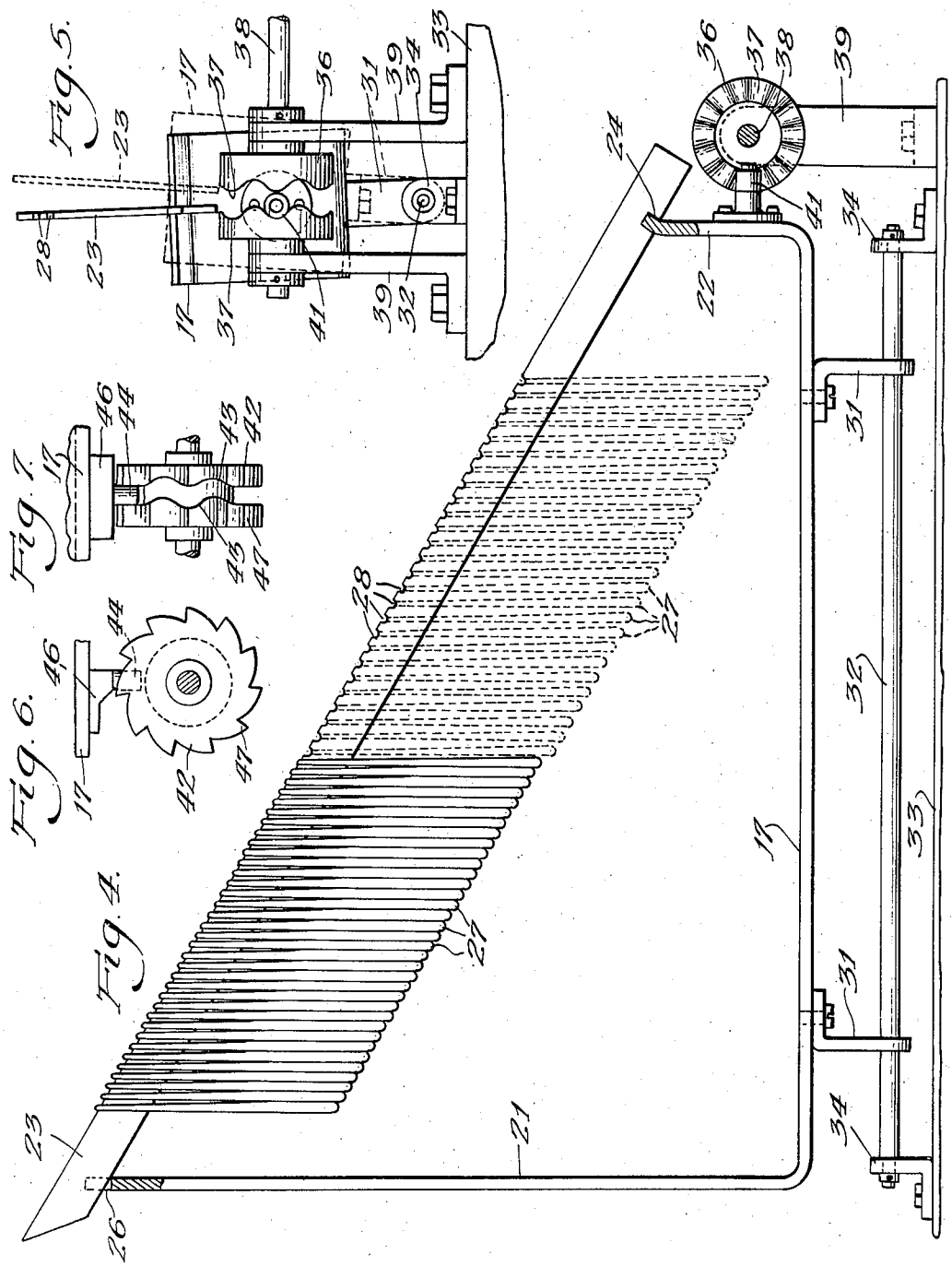
Fig. 1.

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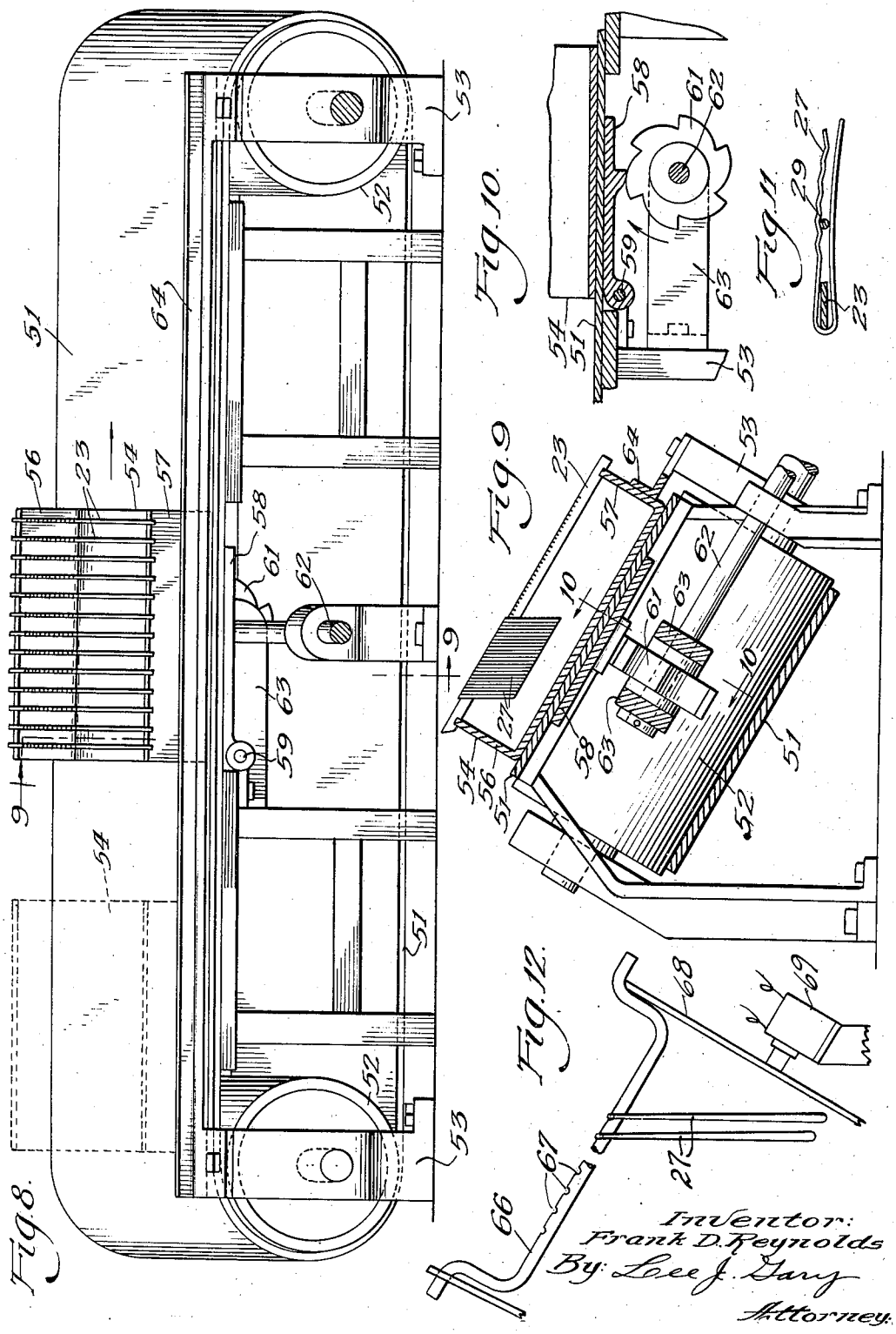
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METHOD AND APPARATUS FOR SPACING HAIR FASTENERS

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3 Sheets-Sheet 3



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METHOD AND APPARATUS FOR SPACING HAIR FASTENERS

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Application July 24, 1944, Serial No. 546,399

4 Claims. (Cl. 214—1)

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This invention relates to a method and apparatus for arranging a plurality of parts such as hair fasteners in spaced parallel alignment along a rod or bar by vibrating same, and has for an object the provision of an apparatus which is simple in operation, inexpensive in construction and which will not readily get out of order.

An object of this invention is to arrange a group of hair fasteners in spaced parallel relation to facilitate subsequent manufacturing operations such as japanning, tempering, or carding, as set forth in Patent No. 2,432,339 granted December 9, 1947, to Frank D. Reynolds for Apparatus for delivering and gripping hair fasteners.

This invention further contemplates the use of vibratory means for arranging a group of hair fasteners in spaced parallel relation.

Other novel features, details of construction and arrangement of parts are hereinafter set forth in the specification and claims and illustrated in the accompanying drawings, wherein:

Fig. 1 is a side elevational view, partly in section, showing one form of apparatus embodying features of this invention.

Fig. 2 is a front elevational view of the apparatus shown in Fig. 1.

Fig. 3 is a transverse sectional view taken along the line 3—3 of Fig. 1.

Fig. 4 is a side elevational view partly in section showing a modified form of this invention.

Fig. 5 is a front elevational view of the apparatus shown in Fig. 4.

Fig. 6 is a fragmentary detail view in side elevation, showing a modified form of the vibrator wheel.

Fig. 7 is a front elevational view of same.

Fig. 8 is a side elevational view showing another modified form of this invention.

Fig. 9 is a transverse sectional view taken along the line 9—9 of Fig. 8.

Fig. 10 is a detail sectional view taken along the line 10—10 of Fig. 9.

Fig. 11 is a detail sectional view illustrating the manner in which the hair fasteners are mounted upon an oven wire.

Fig. 12 is a detail side elevational view showing a modified form of a catcher rod, and vibrating means.

Referring now to the drawings for a better understanding of this invention and more particularly to Figs. 1 to 3 therein, the vibrating apparatus is shown as comprising a base 16 having a rod carrier frame 17 pivotally connected thereto at 18. The frame 17 is supported at its free end upon a toothed wheel 18 which is secured to shaft

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20 journaled in bearings 19. The shaft is driven in the direction indicated by the arrow in Fig. 1, from any suitable source of power (not shown). The frame is provided with a relatively high back wall 21 and low front wall 22 for holding one or more catcher rods 23 in an inclined plane.

The catcher rods are held against longitudinal displacement by notches 24 formed in the rods for engagement with the upper edge of the front wall 22. Lateral displacement of the rods is prevented by means of notches 26 formed in the upper edge of the back wall 21. The catcher rod may be formed of rectangular stock to receive a plurality of hair fasteners 27, as illustrated in Figs. 1 and 2. A plurality of equally spaced notches 28 are formed in the upper edge of the catcher rod to receive and equally space several hair fasteners. The form and depth of the notches is determined by the weight and size of the hair fasteners, the degree of incline of the catcher rod, and the strength of the vibrations.

In the operation of the apparatus thus described, the catcher rod is mounted upon the frame 17 with the hair fasteners grouped at the upper end of the rod as shown in Fig. 1. Rotational movement of the toothed wheel 18 imparts vertical vibrations to the catcher rod and thereby causes the hair fasteners to travel down the catcher rod until each of the several hair fasteners is engaged in its respective notch, as illustrated in dotted lines in Fig. 1. In the spacing of hair fasteners as thus described, it is to be noted that the desired results are accomplished by causing seating and unseating movement of the hair fasteners into and out of the several notches until each of the hair fasteners is engaged or seated in a notch. In other words, an unseated hair fastener acts to unseat and take the place of its adjacent seated hair fastener. After all of the hair fasteners are arranged in proper spaced relation, further vibratory movement of the catcher rod will not cause the fasteners to be unseated from their respective notches. After the hair fasteners have been thus arranged in spaced relation they are transformed from the catcher rod to an oven wire 29, as shown in Fig. 11, for further manufacturing operations such as tempering, japanning, carding, etc.

Figs. 4 and 5 illustrate a modified form of this invention in which a frame 17 is journaled for lateral vibratory movement. The frame 17 is provided with bearings 31 mounted on a shaft 32 which is secured to a base 33 by end brackets 34. A cam 36 having cam surfaces 37 is secured to a drive shaft 38 journaled in a bearing

bracket 39. A cam roller 41 is mounted on the frame 17 for engagement by said cam surfaces. It will thus be seen that rotation of the cam 36 imparts vibratory movement to the catcher rod 23 and acts to move the hair fasteners down same to their seated positions in the notches 28.

A modified form of vibrating wheel 42 is illustrated in Figs. 6 and 7 and may be employed in place of the toothed wheel 18 illustrated in Figs. 1 and 2 to impart both lateral and vertical vibratory movement to the catcher rod 23. An electric vibrator of the type shown in Fig. 12 may be mounted to vibrate the frame 17 longitudinally, in addition to its lateral and vertical movement.

The wheel 42 is formed with cam surfaces 43 for engagement with a cam roller 44 journaled on a block 46 which in turn is secured to the frame 17. The wheel is also formed with teeth 47 for engagement with the block 46.

Figs. 8, 9, and 10 illustrate another modified form of this invention comprising an endless belt 51 mounted on rollers 52 which are journaled on a frame 53 and driven by any suitable means. By disposing the axes of the rolls at an angle, as shown in Fig. 9, the catcher rod frames or trays 54 may be formed with front and back walls 56 and 57 of equal height. A plate 58 is pivotally connected to the conveyor frame 53 at 59 and is engaged by a toothed wheel 61 to impart vertical vibrations to the tray 54 and catcher rods 23 supported thereon for spacing the hair fasteners 27. The wheel 61 is secured to a shaft 62 which is journaled in bearings 63 and driven from any source of power. A guide rail 64 is provided along the lower edge of the belt. In this form of the invention the trays of catcher rods are placed upon one end of the endless belt for spacing the hair fasteners as they pass over the plate 58. It will be observed that trays of catcher rods as shown in this form of the invention may readily be stacked upon skids for interdepartment movement.

A modified form of catcher rod 66, shown in Fig. 12, is formed of round wire and provided with a plurality of notches 67 to receive and arrange the hair fasteners in spaced relation. After being properly spaced thereon, the hair fasteners may either be transferred to an oven wire 29, as shown in Fig. 11, or they may be moved transversely on the catcher rod 66 to occupy the same relative position thereon as they would occupy on the oven wire in which event the catcher rod also serves to replace the oven wire. In this form of the invention I have shown a catcher rod 66 supported upon a tray 68. Electro-magnetic means such as a solenoid 69 is employed to vibrate the tray to impart longitudinal vibratory movement to the catcher rod for seating the hair fasteners in spaced relation. The trays 68 may be supported by any suitable means.

While this invention has been shown in several forms, it is obvious to those skilled in the art that it is not so limited but is susceptible of various changes and modifications without departing from the spirit thereof which consists in the employment of any suitable form of vibratory means, electrical, mechanical, pneumatic, etc., for imparting vibratory movement to a catcher rod in one or more directions for spacing hair fasteners or the like. For example, it may be desirable to vibrate a catcher rod longitudinally, laterally, and vertically in sequence, or to vibrate the rod in one direction, or in any combination of these directions.

I claim as my invention:

1. An apparatus for spacing a group of hair fasteners comprising a catcher rod disposed in an inclined plane, said catcher rod having a plurality of notches formed therein, a tray for supporting said catcher rod at its ends, an endless conveyor to receive said tray, and vibratory means for moving a group of hair fasteners downwardly along said catcher rod and into seated position in the notches formed therein.

2. An apparatus for spacing a group of hair fasteners comprising a catcher rod disposed in an inclined plane, said catcher rod having a plurality of notches formed therein, a tray for supporting said catcher rod at its ends, means to receive said tray, and vibratory means for moving a group of hair fasteners downwardly along said catcher rod and into seated position in the notches formed therein.

3. The method of spacing a group of hair fasteners along a notched catcher rod which comprises, disposing a catcher rod at an angle to a horizontal plane, arranging a group of hair fasteners to straddle the upper end of said single catcher rod, and then vibrating said catcher rod to move the group of hair fasteners toward the lower end of said catcher rod by gravity and into seated spaced position within their respective notches.

4. The method of equally spacing a group of hair fasteners along a notched catcher rod which comprises, arranging a group of hair fasteners to straddle one end of a single catcher rod, mounting the catcher rod at an angle to a horizontal plane with the hair fasteners straddling the upper end thereof, and imparting alternate up and down movement to the catcher rod to move each of the hair fasteners downwardly along said catcher rod and into seated position in their respective notches.

FRANK D. REYNOLDS.

REFERENCES CITED

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

UNITED STATES PATENTS

Number	Name	Date
816,323	Hellstrom	Mar. 27, 1906
1,096,641	Phifer	May 12, 1914
1,326,925	Goldberg	Jan. 6, 1920
1,448,829	Clinton	Mar. 20, 1923