

Sept. 2, 1958

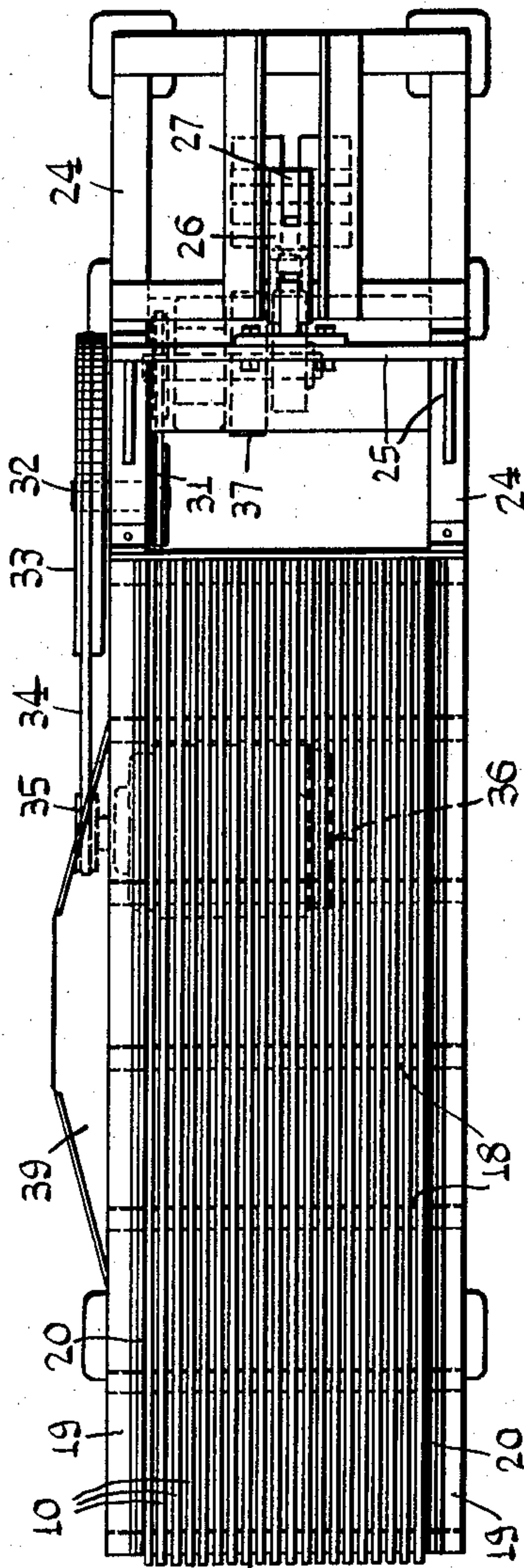
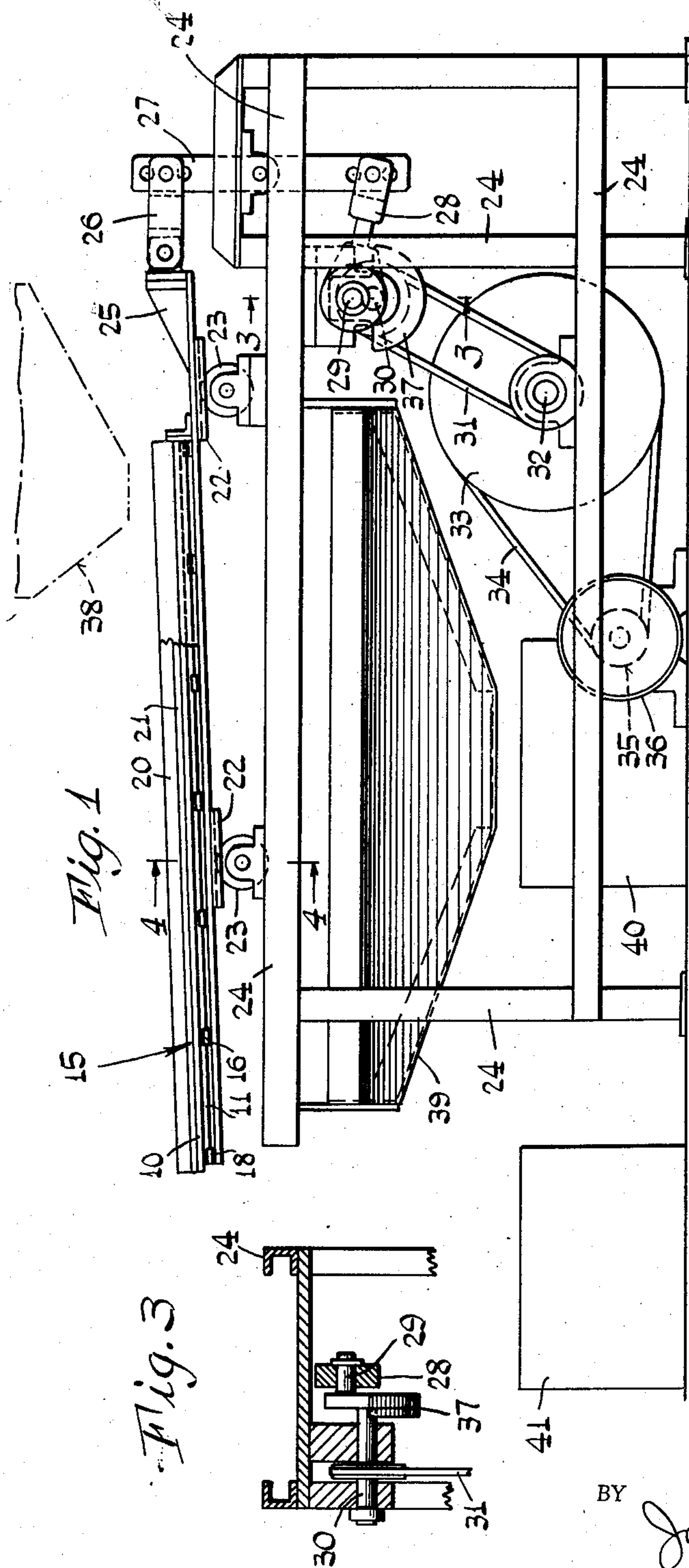
J. J. REILLY

2,850,161

THUMB TACK SORTING APPARATUS

Filed May 20, 1954

2 Sheets-Sheet 1



INVENTOR

James J. Reilly

BY

Johnson and Kline
ATTORNEYS

Sept. 2, 1958

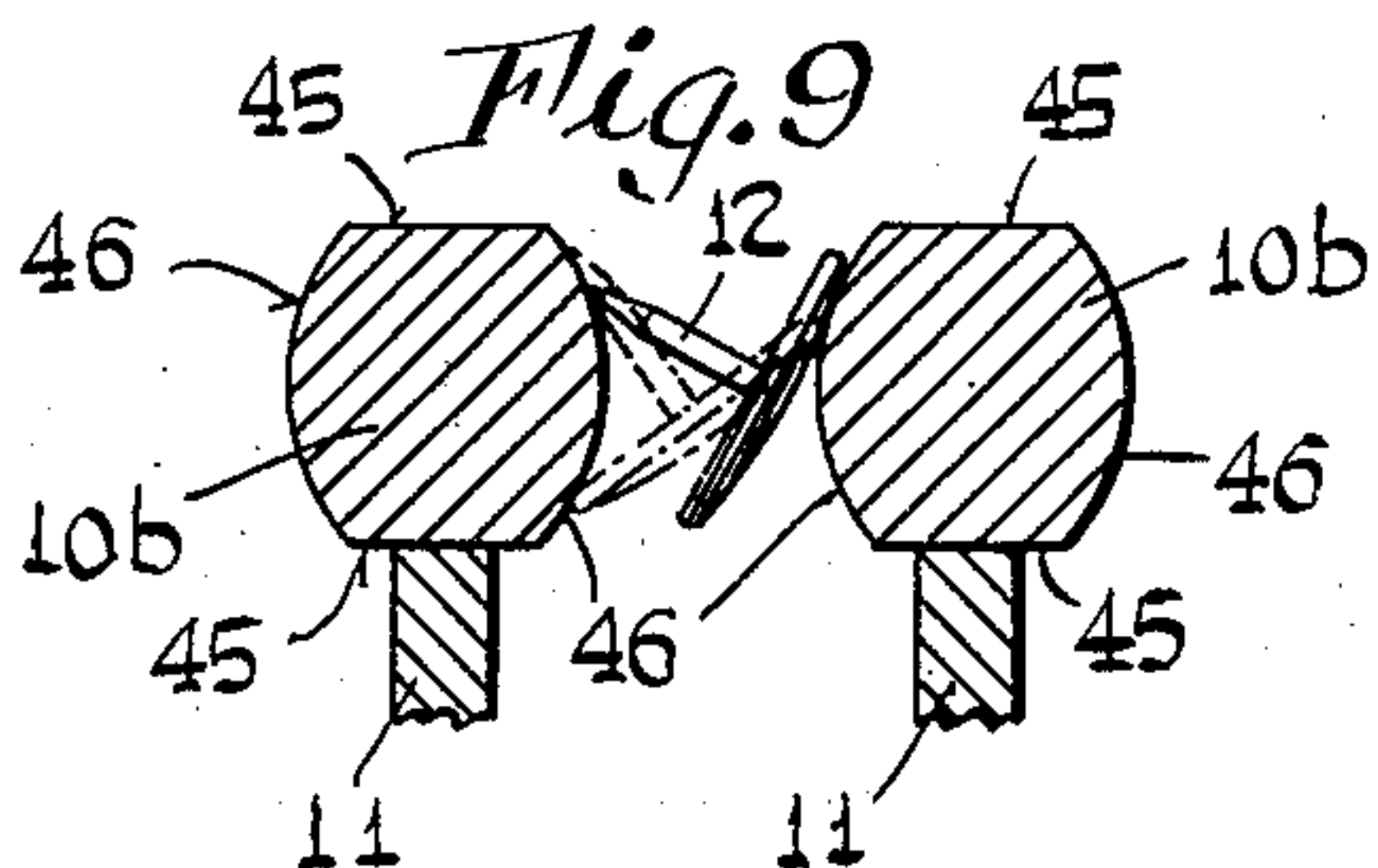
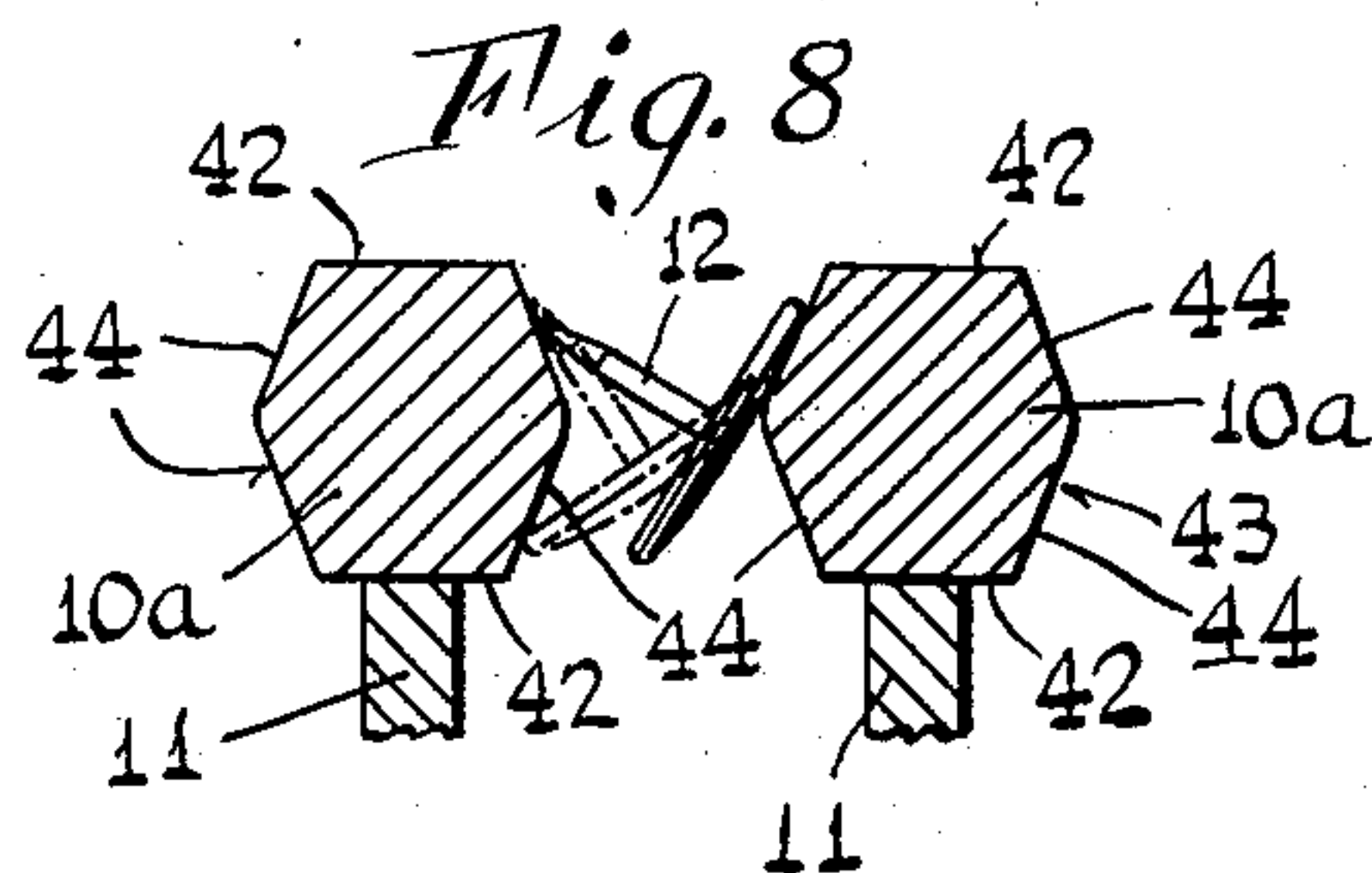
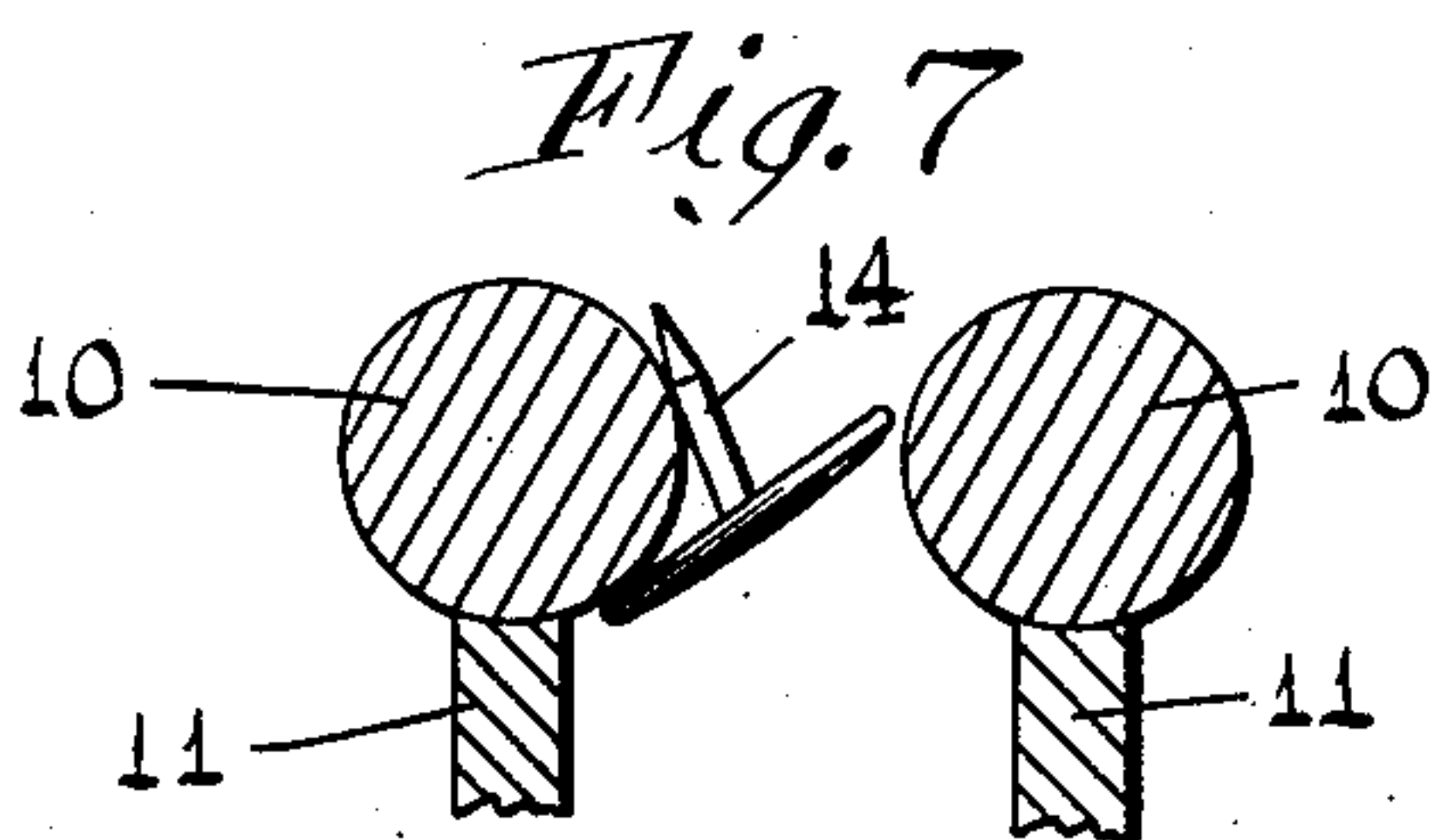
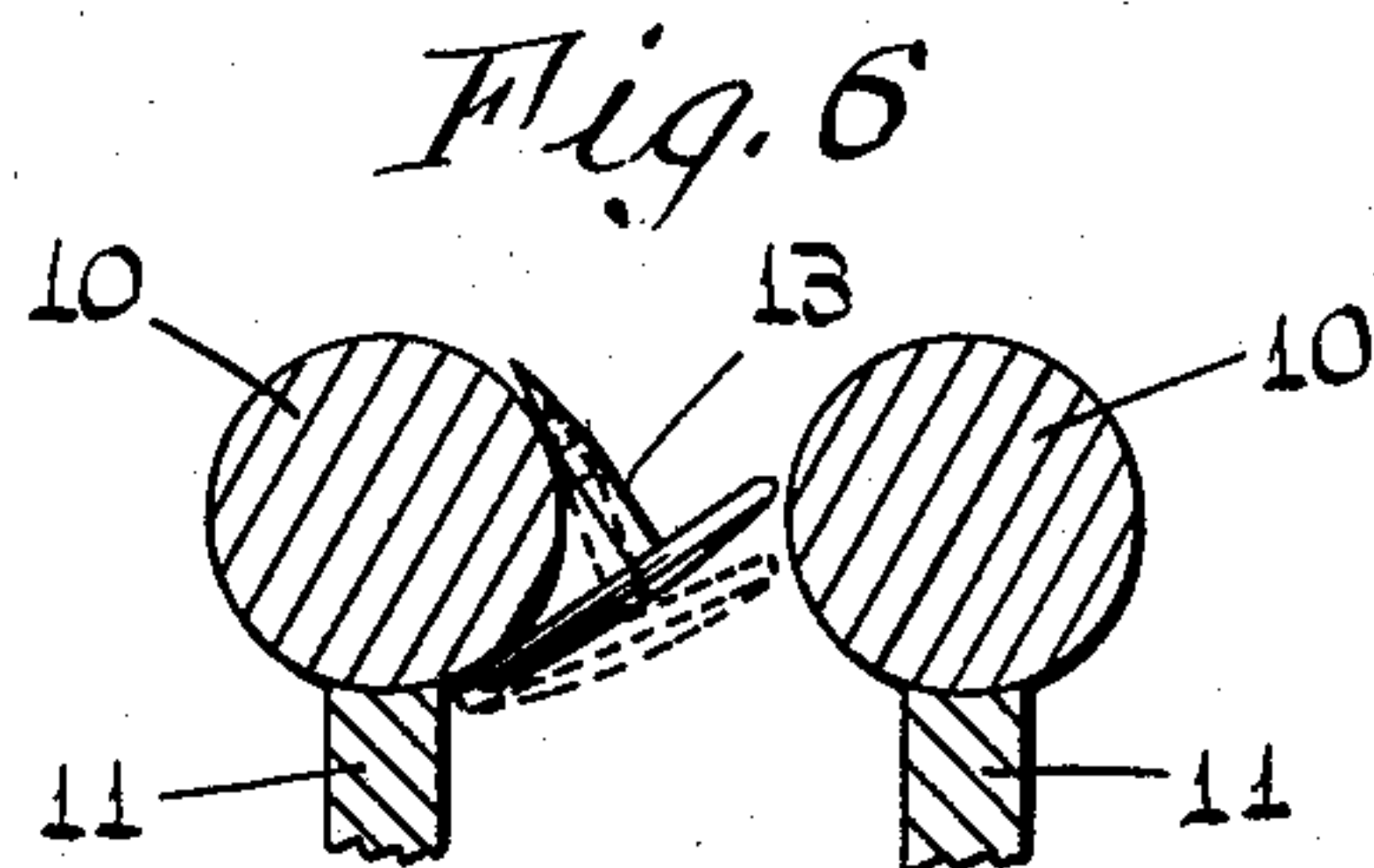
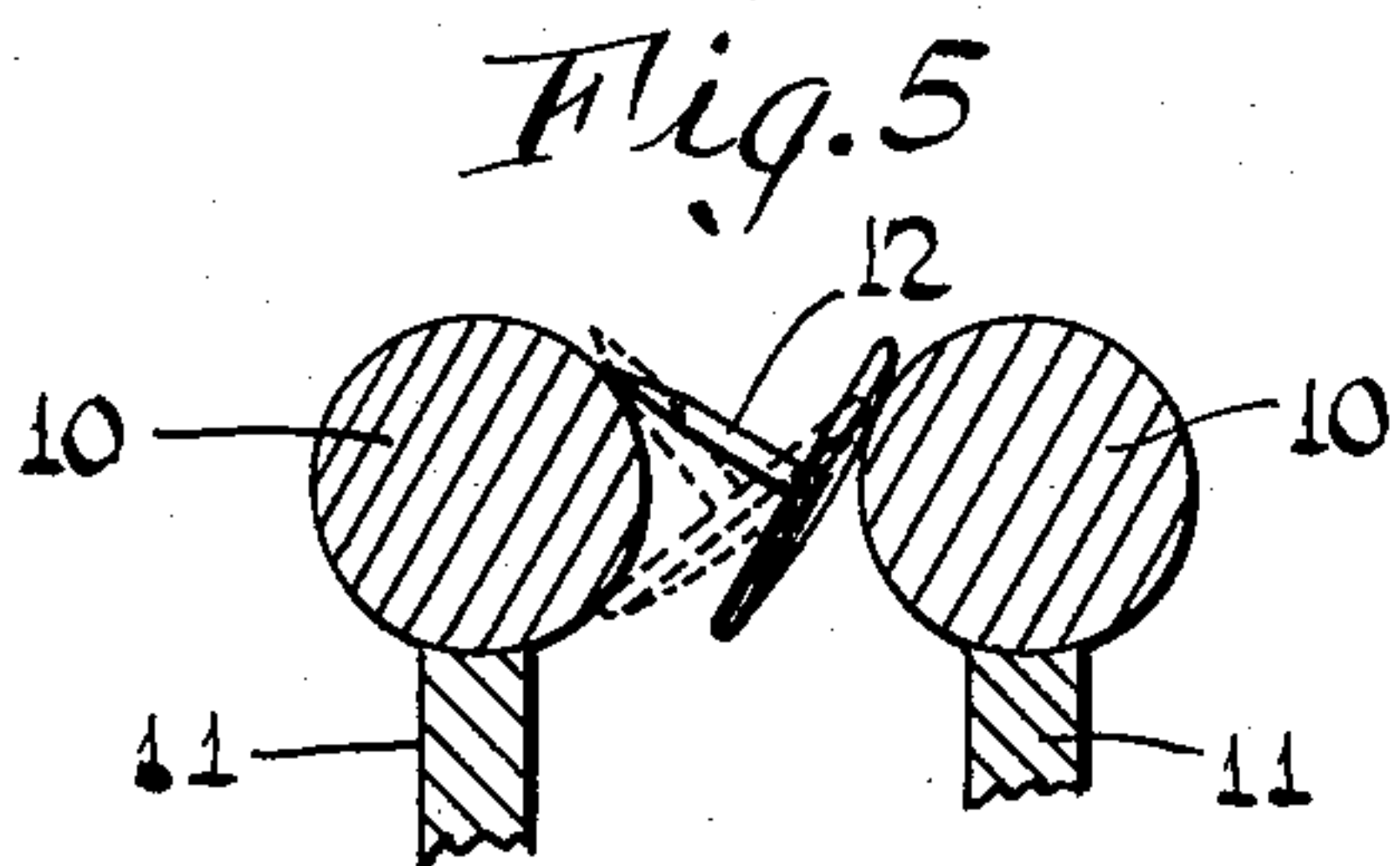
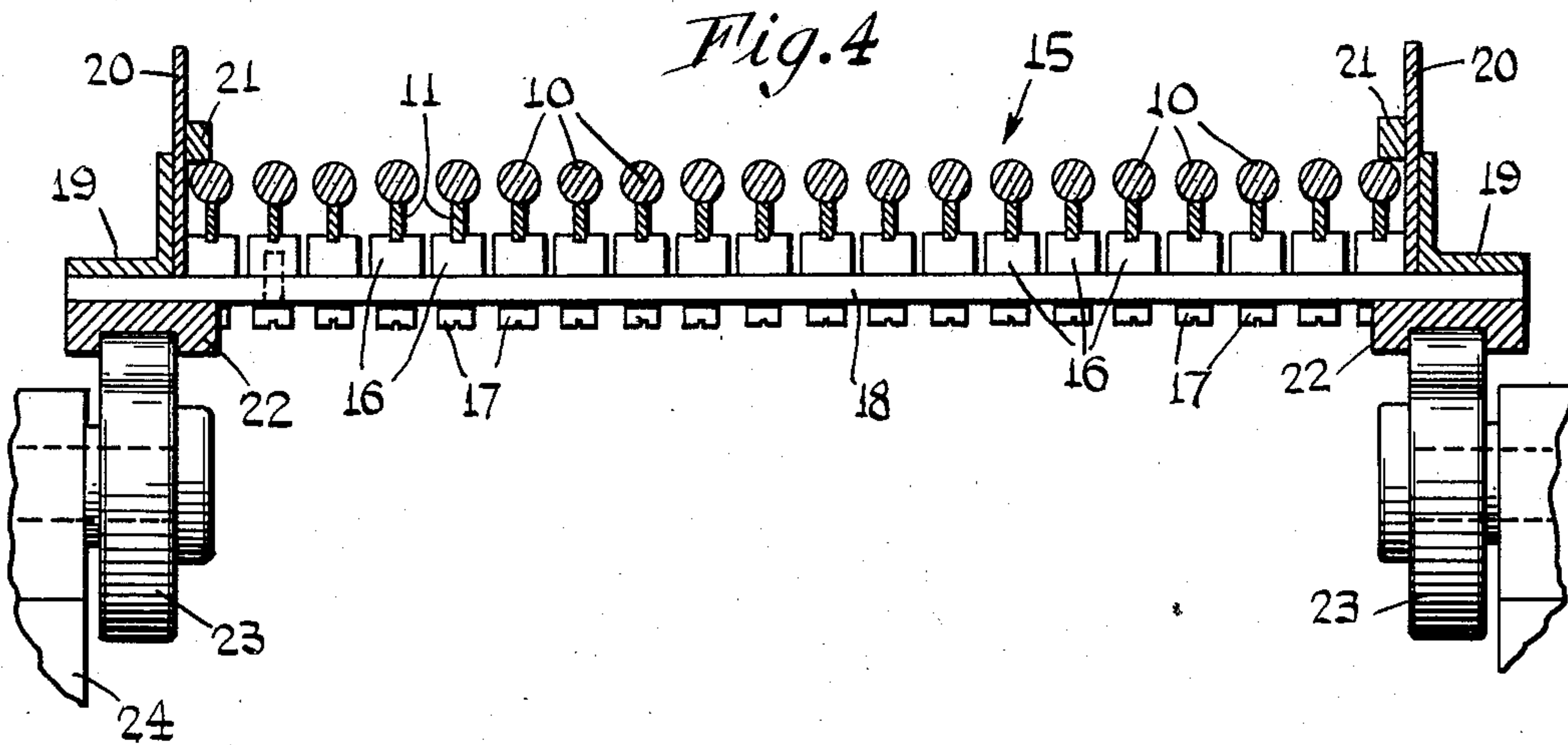
J. J. REILLY

2,850,161

THUMB TACK SORTING APPARATUS

Filed May 20, 1954

2 Sheets-Sheet 2



INVENTOR

James J. Reilly

BY

Johnson and Kline
ATTORNEYS

1

2,850,161

THUMB TACK SORTING APPARATUS

James J. Reilly, Derby, Conn., assignor to The Waterbury Tack Company, Inc., Shelton, Conn., a corporation of Connecticut

Application May 20, 1954, Serial No. 431,036

5 Claims. (Cl. 209—99)

This invention relates to an apparatus for sorting or sifting thumb tacks or like articles, for the purpose of separating the bad from the good.

In the field of merchandising and selling of thumb tacks, high and uniform quality of the product is of utmost importance. Often, thumb tacks are retailed in packages having relatively small quantities, the tacks being mounted on cards, for example, and being in full view. The inclusion of defective tacks, such as those having crooked heads in such a package, would be quickly noticed by the consumer, and would also be a source of annoyance when the use of the defective tack is attempted. It is readily understandable, therefore, that to insure customer satisfaction, which is of prime importance to the distributor and retailer, the manufacturer must separate all bad tacks from the good. Moreover, where automatic machinery is utilized in the packaging process, the presence of defective tacks may result in jamming or improper operation of the equipment.

A defect which often occurs in the manufacture of thumb tacks and which is significant in connection with the above, involves the improper placement of the shank of the tack on the head. At times, due to some fault of the manufacturing equipment, the shank of the tack may be eccentrically located, that is, attached to the head in an off-center position. At other times the shank, while centrally located, may not be perpendicular but instead sloping with respect to the head.

An object of the present invention is to provide an improved and simplified apparatus for sorting or sifting thumb tacks, to separate from the good or acceptable thumb tacks those in which the shanks are either located off-center or else sloping with respect to the head, or both.

Another object of the invention is to provide an improved and simplified apparatus as above set forth, which is capable of handling a continuous flow of production, without requiring stoppage of the apparatus, except if a breakdown should occur.

A feature of the invention resides in the provision of apparatus in accordance with the above, which is extremely simple in its construction, economical to fabricate, and sturdy and reliable in operation.

Another object of the invention is to provide an improved thumb tack sorting or sifting apparatus as above set forth, which is extremely efficient in separating bad tacks from the good, thereby insuring a uniformly high quality of product.

Other features and advantages will hereinafter appear.

In the accompanying drawings:

Figure 1 is a side elevational view of a thumb tack sifting apparatus made in accordance with the invention.

Fig. 2 is a top or plan view of the apparatus shown in Fig. 1.

Fig. 3 is a fragmentary vertical sectional view taken on line 3—3 of Fig. 1.

Fig. 4 is a fragmentary sectional view taken on line 4—4 of Fig. 1.

2

Fig. 5 is a fragmentary transverse sectional view taken through two adjacent tack-supporting bars of the apparatus, showing a perfectly formed and acceptable thumb tack supported between the bars, said tack being prevented from falling through the space between the bars.

Fig. 6 is a view like Fig. 5 but showing a thumb tack having an eccentrically located shank, said tack being in the process of falling through the space between the bars.

Fig. 7 is a view like Figs. 5 and 6, but showing a thumb tack having a centrally mounted but sloping shank, falling through the space between the bars.

Fig. 8 is a view like Fig. 5, showing a perfectly formed thumb tack in conjunction with bars having a different cross-sectional shape from those of Fig. 5.

Fig. 9 is a view like Fig. 5, but showing a perfectly-formed thumb tack in conjunction with bars having a different cross-sectional shape from those of Figs. 5 and 8.

The principle upon which the present improved thumb tack sifting apparatus is based is illustrated clearly in Figs. 5, 6, and 7. In these figures two round bars 10 are disposed alongside each other in spaced, substantially parallel, coextensive relation. The bars are carried by flat supporting strips 11 secured to the bottom surfaces of the bars. The bars 10 have a predetermined diameter and spacing which are preferably fairly closely held or maintained, and are so related that acceptable thumb tacks such as the thumb tack 12 having a centrally located perpendicular shank, cannot pass between the bars and through the space therebetween, while rejectable thumb tacks, such as the thumb tack 13 of Fig. 6 which has an eccentrically located shank and the thumb tack 14 of Fig. 7 which has an angularly disposed shank, can readily pass downward through the space between the bars.

I have found that, for conventional thumb tacks of average size, the diameters of the bars 10 may be advantageously on the order of $\frac{3}{8}$ " and the distance between the bars approximately .24".

Utilizing these dimensions I have discovered that it is ordinarily not possible for an accurately fabricated thumb tack, such as the thumb tack 12 shown in Fig. 5, to pass between the bars 10. In this figure an alternative position of the thumb tack 12 is shown in broken outline, and it will be observed that the curvature of the left one of the bars 10 is sufficiently flat, and the width of the rounded surface of the left one of the bars 10 which faces the right one of the bars is sufficiently great that, taken with the spacing between the bars there is not enough clearance to pass the tack 12. On the other hand, referring to Fig. 6, it will be readily seen that the thumb tack 13 having an eccentric shank may readily pass between the two bars. Also, referring to Fig. 7, whenever there is an appreciable angularity other than 90 degrees between the shank of the thumb tack and the head, as shown by the thumb tack 14, such a tack can also readily pass between the bars 10.

I utilize this principle in the apparatus shown in Figs. 1—4 to effect a continuous and highly efficient sifting of thumb tack production whereby rejectable tacks having either offset or sloping shanks or both, are separated from acceptable tacks having perpendicular and concentric shanks.

Referring to Figs. 1 and 2 I provide a rectangular screen 15 formed of a large number of the bars 10, said bars being disposed alongside each other in spaced, parallel, coextensive relation as indicated above in connection with Figs. 5—7. The bars 10 in the apparatus of Figs. 1, 2 and 4 are all carried by flat strips 11 set on edge, the bars and strips being secured together in any suitable manner, as by welding, etc.

The strips 11 are mounted on blocks 16 which are secured by screws 17 to transverse supports 18, and the

latter at their ends are carried by an angle iron frame 19. The frame 19 has side plates 20 provided with strips 21 engaging the two end bars 10 of the screen for the purpose of preventing thumb tacks from becoming wedged between said end bars and side plates.

To effect a traversal of the screen 15 by tacks deposited thereon, I provide on the screen tracks 22 riding over rollers 23 mounted on a stationary frame 24 of the apparatus, the right-most set of rollers 23 being somewhat higher than the left set of rollers as viewed in Fig. 1. By the difference in level of the rollers a slope is imparted to the screen 15 whereby the left end of the screen is lower than the right end.

The screen 15 is secured to a driving yoke 25 which is connected by a pivoted link 26 with an oscillating lever 27, the latter being connected to a connecting rod 28 journaled on a crank pin 29 (Fig. 3) of a shaft 30. The shaft 30 is driven through means including a belt 31 from a jack shaft 32 rotatably mounted on the frame 24, and the shaft 32 has a large pulley 33 driven by a belt 34 from a drive pulley 35 of an electric motor 36. The crank shaft 30 carries a counterweight 37 to provide a dynamic balance.

Above the elevated end portion of the screen 15 a hopper 38 is provided, from which the production run of thumb tacks may be supplied to the screen 15.

Below the screen 15 and carried by the frame 24 is a chute 39 emptying into a container 40, into which rejectable thumb tacks are deposited.

Below the lower end of the screen 15 a container 41 is provided into which acceptable thumb tacks drop, after being discharged from the lower end of the screen 15.

Operation of the apparatus shown in Fig. 1 through 4 is as follows: When the motor 36 is running, the screen 15 will be agitated or oscillated, the direction of movement being longitudinal with respect to the bars 10. Thumb tacks which are deposited on the raised end of the screen 15 will, if they are imperfect tacks such as the tacks 13 and 14 shown in Figs. 6 and 7, drop through the screen, passing between adjacent bars 10. These tacks will be collected by the chute 39 and deposited in the container 40. Perfectly formed thumb tacks, such as the thumb tack 12 shown in Fig. 5, will traverse the entire length of the screen 15 and will be ultimately discharged from the lower end of the screen, falling into the container 41 for the acceptable tacks.

I have found that apparatus made in accordance with the above is extremely effective in separating tacks having the defects illustrated in Figs. 6 and 7, from tacks which have perfectly centered, perpendicular shanks as illustrated by the thumb tack 12 in Fig. 5.

The apparatus of this invention is sturdy in construction, and foolproof and reliable in its operation. The working parts are all readily accessible and can be readily serviced if this should be necessary. The apparatus is capable of handling a continuous flow of thumb tacks, since the screen 15 disposes of both the acceptable and rejectable tacks. It is obvious that in place of the containers 40 and 41 chutes may be provided by which the good and bad tacks can be brought into conveyors or other continuous types of material handling equipment.

A modification of the invention is illustrated in Fig. 8. In this figure two bars 10a are shown supporting between them a perfectly formed thumb tack 12. The bars 10a have upper and lower flat sides 42, and have generally protuberant walls 43 formed by angularly-disposed pairs of flat surfaces 44. Where the surfaces 44 join each other, a small radius is provided, as shown. The action of the bars 10a is similar in all respects to the bars 10 as regards supporting or not supporting the tacks which are placed on the screen 15.

Another modification of the invention is illustrated in Fig. 9. In this figure bars 10b are shown, supporting a properly fabricated, acceptable thumb tack 12. The bars 10b have upper and lower flat surfaces 45, and have pairs

of convex surfaces 46 arranged for engagement by the thumb tacks. The sorting or screening action of the bars 10b is similar to that described above in connecting with the bars 10.

5 Variations and modifications may be made within the scope of the claims and portions of the improvements may be used without others.

I claim:

10 1. Apparatus for sifting tacks, each being substantially the same size and having a head and a shank attached thereto, comprising a plurality of horizontally-extending bars of uniform cross section disposed alongside each other in spaced, substantially parallel, coextensive relation, said bars having generally rounded surfaces facing each other, the widths of said surfaces measured transversely of the bars and the curvatures of and spacing between the surfaces being all so related that an acceptable thumb tack having a centrally-located, perpendicular shank is prevented from passing between the bars by the shank portion of the tack engaging a surface portion of one bar and a first portion of the outer edge of the head of the tack engaging a second surface portion of the one bar and a second portion of the outer edge of the head diametrically opposite the first portion being prevented from passing by an adjacent bar by the nearest portion of the adjacent bar being closer to the one bar than the second edge portion of the head of an acceptable tack while rejectable thumb tacks having off-center shanks or angularly disposed shanks or both can pass between the said bars by the second edge portion of the head of an unacceptable tack being closer to the one bar than the nearest portion of the adjacent bar, said bars being further spaced closer together than the diameter of the heads of the tacks; and means for agitating the bars to cause relative movement between the bars and tacks which are deposited thereon, thereby to effect a sifting of the tacks whereby the rejectable tacks fall between the bars while acceptable tacks are retained by the bars.

20 2. The invention as defined in claim 1 in which the bars are mounted on flat strips extending below and along the lengths of the bars, said strips being disposed with their opposite flat sides in substantially vertical planes.

3. The invention as defined in claim 2 in which the said flat strips are carried by a plurality of cross supports, and in which there is a frame extending around the bars, to which the ends of the cross supports are secured.

4. Apparatus for sifting tacks, each being substantially the same size and having a head and a shank attached thereto, comprising a plurality of horizontally-extending bars of uniform cross section disposed alongside each other in spaced, substantially parallel, coextensive relation, said bars having generally rounded surfaces facing each other, the widths of said surfaces measured transversely of the bars and the curvatures of and spacing between the surfaces being all so related that an acceptable thumb tack having a centrally-located, perpendicular shank is prevented from passing between the bars by the shank portion of the tack engaging a surface portion of one bar and a first portion of the outer edge of the head of the tack engaging a second surface portion of the one bar and a second portion of the outer edge of the head diametrically opposite the first portion being prevented from passing by an adjacent bar by the nearest portion of the adjacent bar being closer to the one bar than the second edge portion of the head of an acceptable tack while rejectable thumb tacks having off-center shanks or angularly disposed shanks or both can pass between the said bars by the second edge portion of the head of an unacceptable tack being closer to the one bar than the nearest portion of the adjacent bar, said bars being further spaced closer together than the diameter of the heads of the tacks; and means for agitating the bars to cause relative movement between the bars and tacks which are deposited thereon, thereby to effect a sifting

5

of the tacks, said bars being sloped slightly to cause the acceptable thumb tacks to travel longitudinally along the bars and to be discharged from the lower ends of the bars whereby the rejectable tacks fall between the bars while acceptable tacks are retained by the bars.

5. Apparatus for sifting tacks, each being substantially the same size and having a head and a shank attached thereto, comprising a plurality of horizontally-extending bars having a uniform cross sectional area disposed alongside each other in spaced, substantially parallel, coextensive relation, said bars having generally protuberant walls facing each other, the widths of said walls measured transversely of the bars and the extent of protrusion of and spacing between the walls being all so related that an acceptable thumb tack having a centrally-located, perpendicular shank is prevented from passing between the bars by the shank portion of the tack engaging a surface portion of one bar and a first portion of the outer edge of the head of the tack engaging a second surface portion of the one bar and a second portion of the outer edge of the head diametrically opposite the first portion being prevented from passing by an adjacent bar by the nearest portion of the adjacent bar being closer to the one bar than the second edge portion of the head of an acceptable tack; while rejectable thumb tacks

6

having off-center shanks or angularly disposed shanks or both can pass between the said bars by the second edge portion of the head of an unacceptable tack being closer to the one bar than the nearest portion of the adjacent bar, said bars being further spaced closer together than the diameter of the heads of the tacks; and means for agitating the bars to cause relative movement between the bars and tacks which are deposited thereon, thereby to effect a sifting of the tacks whereby the rejectable tacks fall between the bars while acceptable tacks are retained by the bars.

References Cited in the file of this patent

UNITED STATES PATENTS

721,421	Carnochan	Feb. 24, 1903
1,117,876	Mason	Nov. 17, 1914
1,331,901	Catinzearo	Feb. 24, 1920
1,491,802	Irwin	Apr. 29, 1924
1,552,397	Edwards	Sept. 1, 1925
2,549,316	Kremer et al.	Apr. 17, 1951

FOREIGN PATENTS

597,598	France	Sept. 5, 1925
---------	--------	---------------