

Feb. 14, 1933.

O. H. HANSEN

1,897,664

APPARATUS FOR TREATING BEANS

Filed Feb. 20, 1928

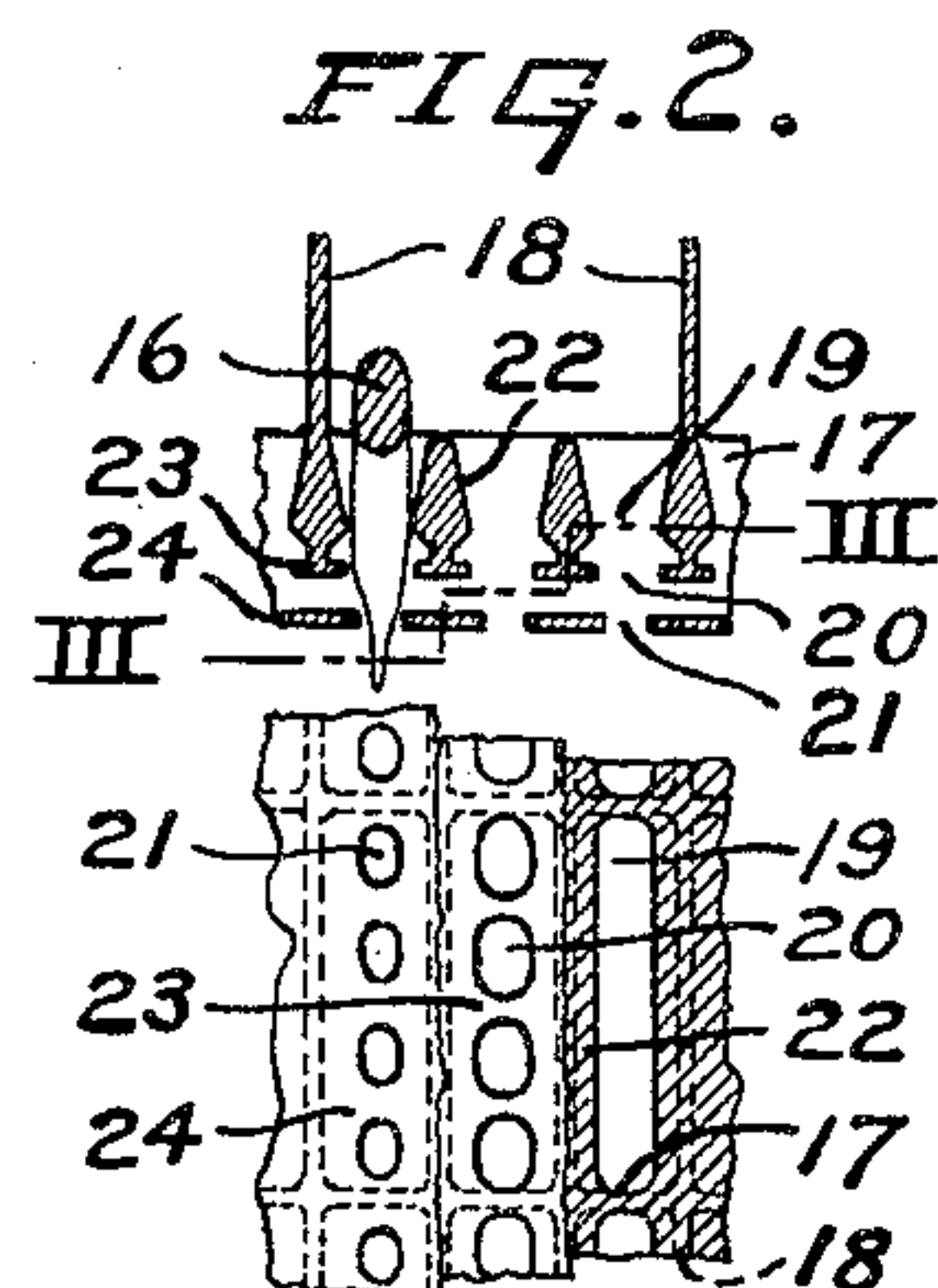
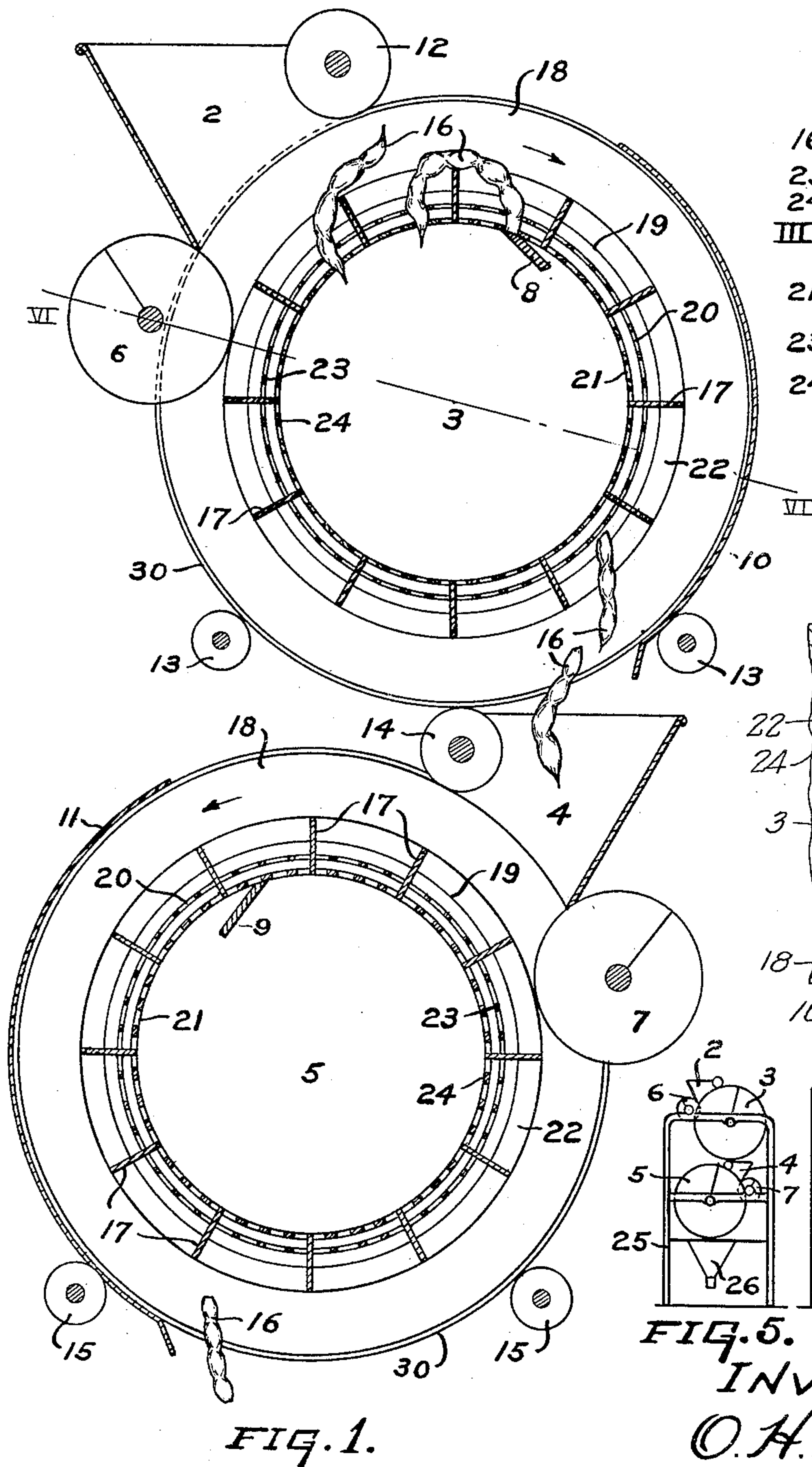


FIG. 3.

FIG. 6

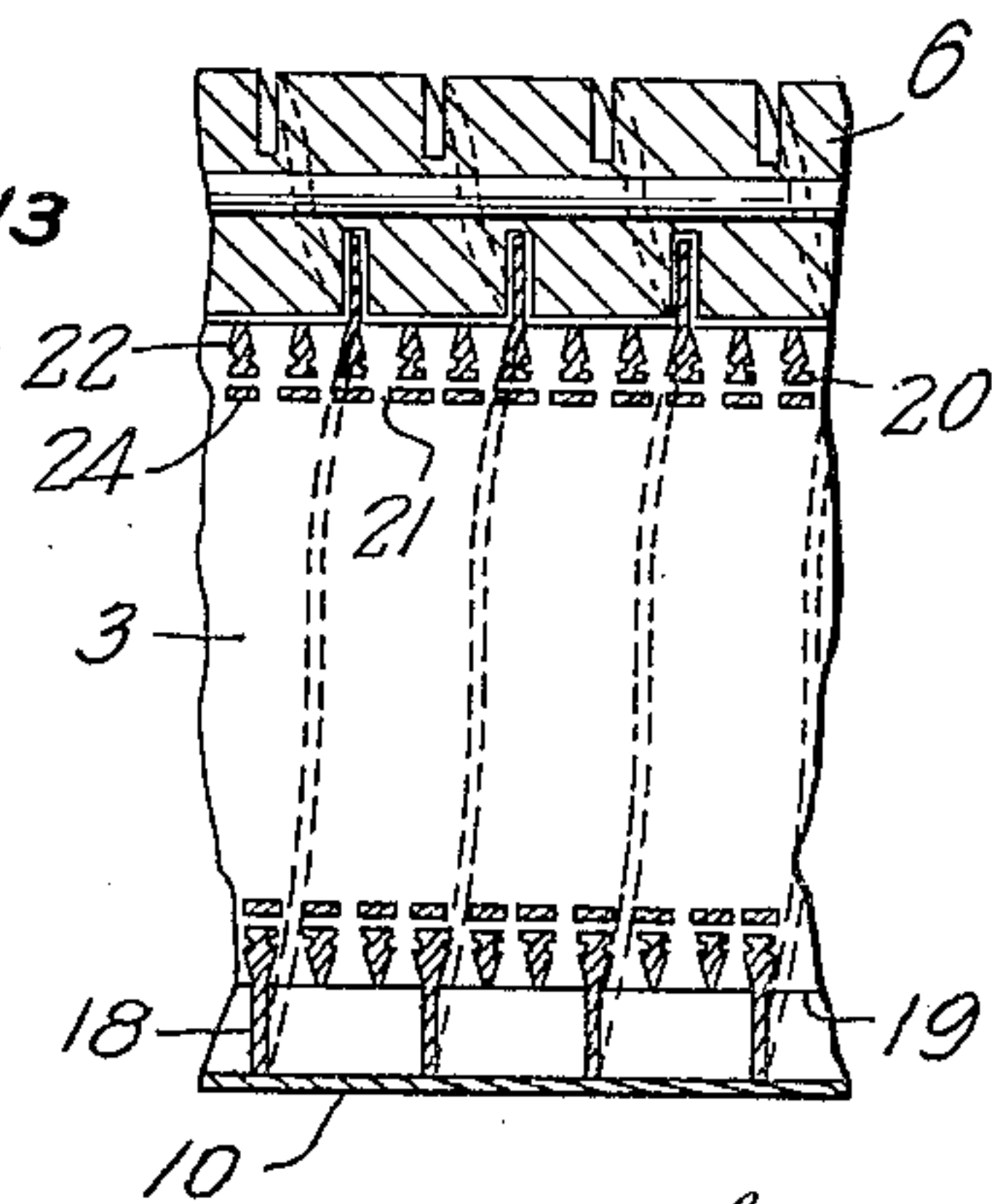


FIG. 4.

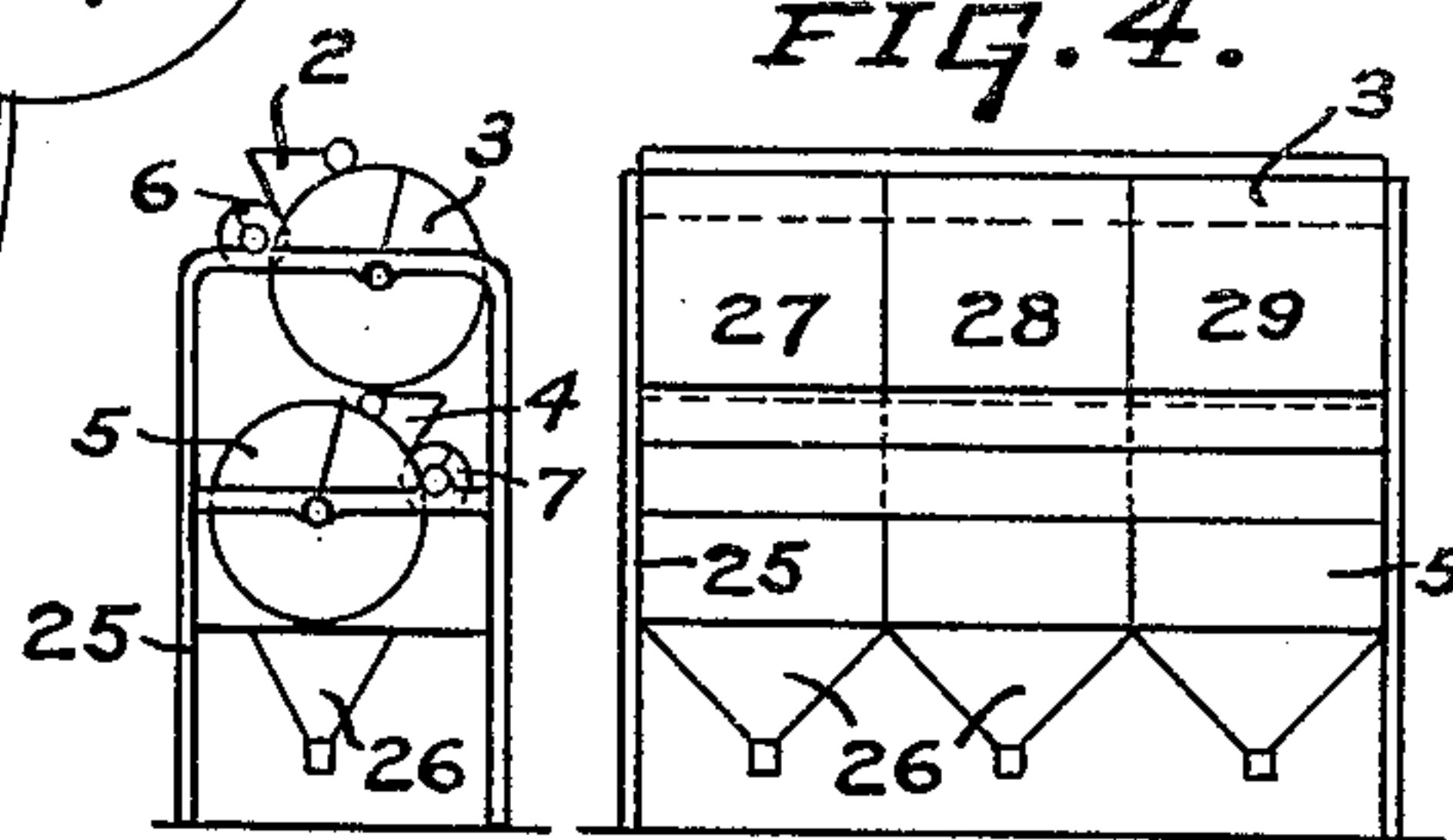


FIG. 5.

INVENTOR -
O. H. Hansen

BY *W. H. Lieber*
ATTORNEY.

UNITED STATES PATENT OFFICE

OSWALD H. HANSEN, OF CEDARBURG, WISCONSIN, ASSIGNOR TO HANSEN CANNING MACHINERY CORPORATION, OF CEDARBURG, WISCONSIN, A CORPORATION OF WISCONSIN

APPARATUS FOR TREATING BEANS

Application filed February 20, 1928. Serial No. 255,570.

The present invention relates in general to improvements in the art of treating relatively irregular elongated objects, and relates more specifically to an improved process of grading and snipping vegetables such as string beans preparatory to canning the same.

An object of the invention is to provide an improved method of treating a previously ungraded mass of string beans or the like, whereby the beans are accurately graded as to size and are subsequently positively snipped at both ends. Another object of the invention is to provide an improved process of effectively grading elongated irregular objects such as string beans. A further object of the invention is to provide an improved process of snipping the opposite ends off of elongated irregular objects such as string beans, in rapid succession. Still another object of the invention is to provide simple, compact and highly efficient apparatus for effecting commercial exploitation of the improved process of treating string beans or the like. These and other objects and advantages of the invention will be apparent in the course of the following description.

A clear conception of the several steps involved in carrying on the improved process of grading and snipping beans, and of one embodiment of apparatus for effecting commercial exploitation thereof, may be had by referring to the drawing accompanying and forming a part of this specification in which like reference characters designate the same or similar parts in the various views.

Fig. 1 is a diagrammatic transverse vertical section through the first grading and snipping compartment of one form of apparatus for effecting exploitation of the improved process.

Fig. 2 is a fragmentary sectional view of one of the grading and snipping rotors, the section being taken longitudinally of the rotor.

Fig. 3 is a fragmentary part sectional view of the portion of the grading and snipping rotor shown in Fig. 2, the section being taken along the irregular line III—III of Fig. 2.

Fig. 4 is a diagrammatic side elevation of the grading and snipping apparatus.

Fig. 5 is a diagrammatic end elevation of the grading and snipping apparatus.

Fig. 6 is a fragmentary sectional view through the first snipping rotor, the section being taken along the line VI—VI of Fig. 1.

While the drawing discloses one embodiment of apparatus for effecting commercial exploitation of the present improved process of treating string beans or the like, it should be understood that such disclosure is not to be considered a limitation in scope of the invention and that the steps of the said process are capable of being performed in other forms of apparatus. The apparatus specifically illustrated comprises in general upper and lower rotors 3, 5 providing revolving perforated surfaces, the perforations being arranged in groups of increasing size disposed side by side along each rotor. A string bean supply hopper 2 located laterally of and above the axis of rotation of the upper rotor 3 is adapted to deposit an ungraded mass of string beans 16 upon the upwardly and laterally advancing perforated surface of the upper rotor 3, a feed roller 12 serving to assist gravity in gradually feeding the beans into and through the hopper 2. The bean supply opening of the hopper 2 may be confined to the section of the rotor 3 having the smallest perforations, and a guard plate 10 coacting with the periphery of the upper rotor 3 maintains the beans 16 in proximity to the rotor 3 after snipping of one of the ends thereof has been effected. A transfer hopper 4 which extends throughout the length of the lower rotor 5 below the discharge end of the guard plate 10, is located laterally of and above the axis of rotation of the rotor 5. The hopper 4 is adapted to deliver the graded and preliminarily snipped beans 16 against the upwardly and laterally advancing perforated surface of the lower rotor 5, and a feed roller 14 serves to assist gravity in gradually feeding the beans toward the rotor 5. A guard plate 11 coacting with the periphery of the lower rotor 5 maintains the finally snipped beans in proximity to the rotor 5 until the beans are eventually delivered by gravity

into the discharge hoppers 26. The upper rotor 3 has a supporting tire 30 cooperating with rollers 13 to rotatably support this rotor, and the lower rotor 5 is likewise rotatably supported upon rollers 15 coacting with a tire 30 thereof. The upper rotor 3 has a spirally grooved bean supporting roller 6 cooperating with the periphery thereof and with the supply hopper 2 in order to maintain the mass of beans in contact with the perforated surface, and a similar spirally grooved roller 7 cooperates with the rotor 5 and with the transfer hopper 4 for the same purpose. Upper and lower snipping knives 8, 9 which may be either stationary or movable, cooperate with the interiors of the rotors 3, 5 respectively in order to cut the inwardly protruding ends from the successive beans 16 as presented.

The upper and lower rotors 3, 5 are of similar construction but are rotatable in opposite directions as indicated. Each of these rotors consists of an inner cylindrical drum 24 having relatively small perforations 21 therein arranged in three groups disposed longitudinally of the drum. The first group of perforations are confined to the first compartment or division 27 of the machine, and are of smallest size; the second group of perforations are confined to the second compartment or division 28, and are of intermediate size; while the final group of perforations are confined to the third compartment or division 29, and are the largest in size. Surrounding the inner drum 24 of each rotor and spaced therefrom, is a bean supporting shell 23 having perforations 20 therein which register with the adjacent perforations 21 of the inner drum 24 but which are somewhat larger than the inner perforations. The perforations 20 are of sufficient size to engage the several grades of beans 16 presented thereto, somewhat remote from the ends thereof, and the shell 23 functions to determine the degree of snipping. Surrounding the bean supporting shell 23 of each rotor and spaced therefrom, is a bean grading grid composed of laterally spaced bars 22 extending around the axis of the rotor. These bars may be perpendicular to the rotor axis or they may extend spirally therealong, and are separated by elongated slots 19 which grade the beans as to size. The grid bars 22, shell 23 and drum 24 are rigidly united by means of division plates 17 which extend longitudinally of the rotor and which act as elevators for advancing the segregated beans upwardly around the rotors and past the snipping knives. The grid bars 22 of each rotor are also embraced by spiral fins or plates 18 which extend into the spiral grooves of the rollers 6, 7 and which are adapted to advance the remaining beans 16 of the mass longitudinally along the rotors for subsequent grading and snipping as the several size grades are removed. The rotors

3, 5 are mounted in a suitable frame 25 of any desired form, and suitable means for removing the snips may also be provided within the rotors 3, 5.

During normal operation of the apparatus to exploit the improved process, the previously ungraded mass of string beans may be deposited within the supply hopper 2 of the machine. As the admitted mass of beans 16 engages the upwardly and laterally advancing surface of the upper rotor 3, the ends of the smallest beans become lodged in the relatively small perforations of the rotor 3 located within the first compartment 27, and the small beans are thereby withdrawn from the mass and have their inwardly protruding ends cut off by the knife 8 as indicated in Fig. 1. After passing the knife 8, the small beans with one or both ends snipped, are carried along the interior of the guard plate 10 and are eventually delivered by gravity through the transfer hopper 4 and against the upwardly and laterally advancing perforated surface of the lower rotor 5. If an end of the beans 16 entering the hopper 4, has not been previously snipped, such unsnipped end will eventually be tumbled into one of the perforations of the lower rotor 5 and will protrude inwardly through the rotor wall. As the protruding beans are carried past the knife 9, the ends are likewise snipped, and the finally treated beans are eventually delivered from the lower rotor 5 by gravity as shown in Fig. 1 and are deposited in the discharge hopper 26 beneath the compartment 27.

The larger beans 16 remaining in the mass after removal and snipping of the smallest beans has been effected, are advanced longitudinally of the rotor 3 by means of the spiral fin 18 thereof. Upon reaching the second compartment 28 wherein the rotor perforations are of sufficient size to accommodate the ends of the medium size beans 16, these beans are automatically removed from the mass and have their opposite ends snipped in the manner previously described, being eventually delivered into the discharge hopper 26 of this compartment. The largest beans of the mass are ultimately advanced by the fin 18 into the third compartment 29 wherein they are likewise snipped at their opposite ends and are delivered in treated condition into the discharge hopper 26 of this final compartment. If for any reason, an oversize bean 16 is prematurely removed from the mass and is delivered into the transfer hopper 4, the spiral fin 18 of the lower rotor 5 becomes effective to advance the oversize bean to the proper succeeding compartment 28, 29 thereby insuring accurate grading of the final product. The fins 18 of the rotors 3, 5, moreover cooperate with the longitudinal division plates 17 to agitate or tumble the beans of the mass, thereby also assisting the grading action of the device.

It will be apparent from the foregoing description, that with the aid of the improved process, the beans 16 are accurately graded as to size and subsequently have their opposite ends positively removed or snipped. The apparatus functions to automatically exploit the process, and is obviously capable of grading and of snipping the beans in rapid succession. By presenting the beans to external surfaces of rotors 3, 5 having perforations of different sizes at various portions thereof, rather than to the internal surfaces of these rotors, the capacity of the machine is materially increased and more accurate grading of the beans is made possible. While the invention has been described as being specifically applied to the treatment of string beans, it will be apparent that the principles involved may be more generally applied to the treatment of other products having characteristics similar to those of beans.

It should be understood that it is not desired to limit the invention to the exact steps of the process or to the precise details of construction of apparatus described and shown herein, for various modifications within the scope of the claims may occur to persons skilled in the art.

It is claimed and desired to secure by Letters Patent:—

1. A bean snipper comprising means for presenting an ungraded mass of beans to a rotor having a revolving surface and successive perforations of selected size formed to remove from the mass of mixed beans presented to said surface only beans of definite size, and means cooperating with said rotor to snip the ends of the beans as they are removed from the mass.

2. A bean snipper comprising, a rotor having an upwardly moving surface provided with a succession of perforations of a size adapted to receive the ends of and to successively remove from an ungraded mass of beans of mixed sizes presented to said surface only beans of selected size, means for feeding an ungraded mass of beans laterally toward said surface, and means cooperating with said rotor to snip the ends of the removed beans as the latter are removed from the mass.

3. A bean snipper, comprising, a rotor having perforations of predetermined size for receiving the ends of and thus removing individual beans of definite selected size from an ungraded mass of beans of mixed sizes resting against the exterior of the rotor, and means within said rotor for snipping the ends of the individual beans after removal of the beans from the mass.

4. A bean snipper, comprising, a rotor having successive sets of perforations of definite size for receiving the ends of and thus removing individual beans of definite selected

sizes from an ungraded mass of beans of mixed sizes resting against the exterior of said rotor, and a cutter within said rotor adjoining each set of said perforations for snipping the ends of the individual beans removed from the mass by said perforations.

5. A bean snipper, comprising, a rotor having perforations of predetermined size, means for supporting an ungraded mass of beans in contact with the exterior of said rotor adjacent to said perforations so that beans of definite size are withdrawn from said mass by said perforations with their ends projecting therethrough, means within said rotor for snipping the inwardly protruding ends from said withdrawn beans, and means for transporting the remainder of the mass along the exterior of said rotor.

6. A bean snipper, comprising, a rotor having perforations of predetermined size and an outer helical fin, means for supporting an ungraded mass of beans in contact with said rotor and fin adjacent to said perforations so that beans of definite size are withdrawn from said mass by said perforations with their ends projecting therethrough and the remainder of said mass is urged along the exterior of said rotor by said fin, and means within said rotor for snipping the inwardly protruding ends from said withdrawn beans.

7. A bean snipper, comprising, a rotor having concentric drums provided with aligned perforations, the perforations of the outer drum being larger than those of the inner drum, means for supporting an ungraded mass of beans in contact with said outer drum so that beans of definite size are withdrawn from said mass by said perforations with their ends projecting through the perforations of both drums, and means within said inner drum for snipping the inwardly protruding ends from said withdrawn beans.

8. A bean snipper, comprising, a perforated rotor having an outer helical fin, means including a rotary member having a helical groove formed to receive said fin for supporting an ungraded mass of beans in contact with said rotor and fin so that beans of definite size are withdrawn from said mass by said perforations with their ends projecting therethrough and the remainder of said mass is moved along said drum by said fin, and means within said rotor for snipping the inwardly protruding ends from said withdrawn beans.

In testimony whereof, the signature of the inventor is affixed hereto.

OSWALD H. HANSEN.