

Sept. 26, 1933.

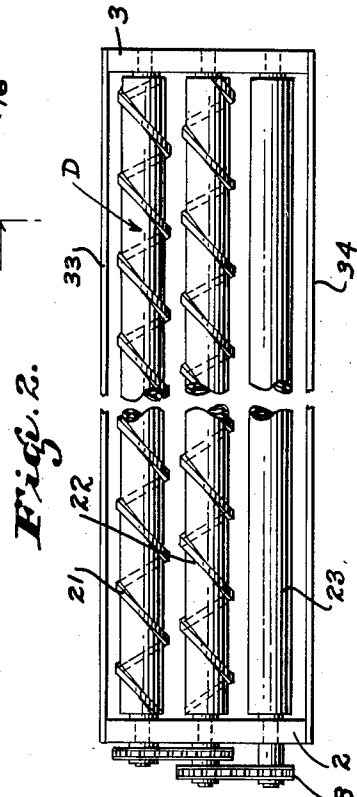
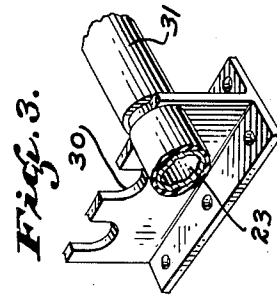
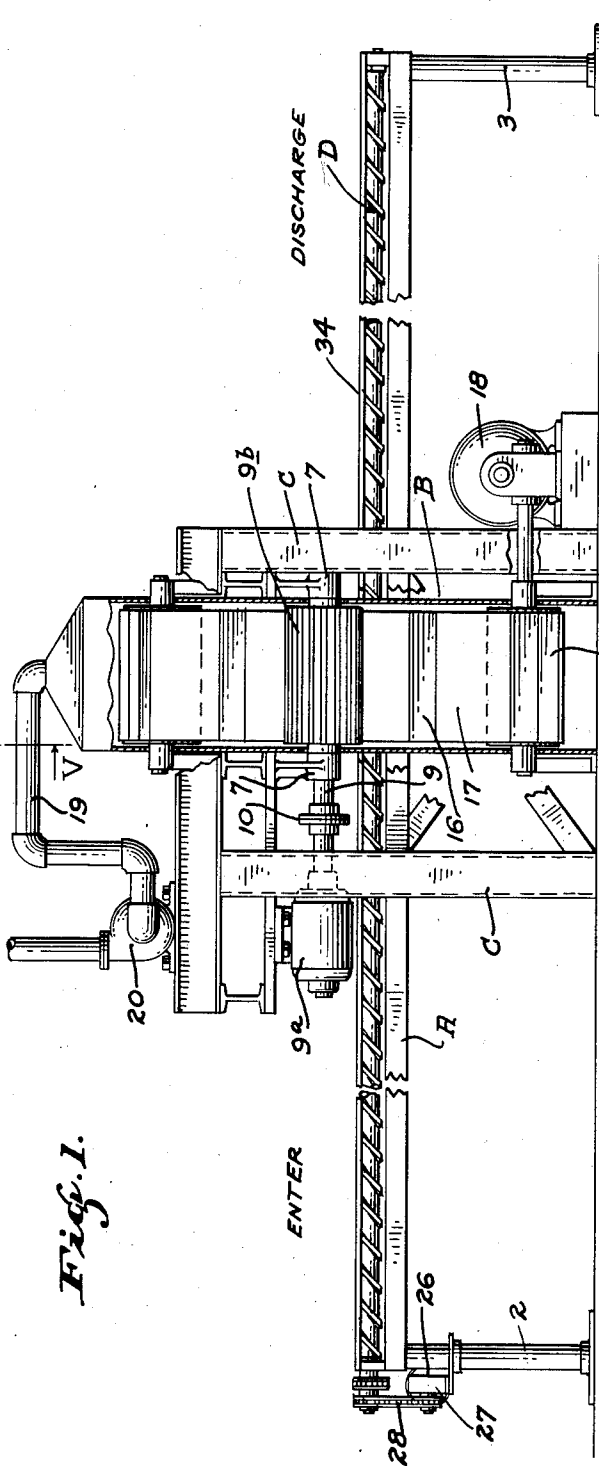
H. A. MULVANY

1,928,339

CONVEYER

Filed Sept. 3, 1930

2 Sheets-Sheet 1



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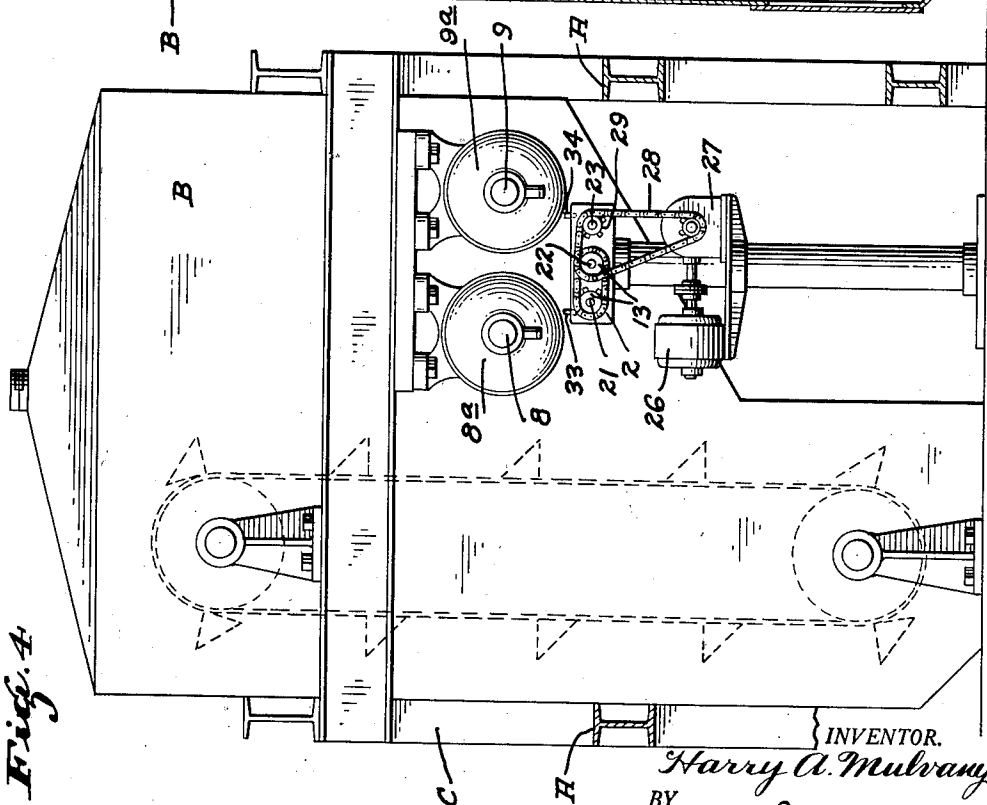
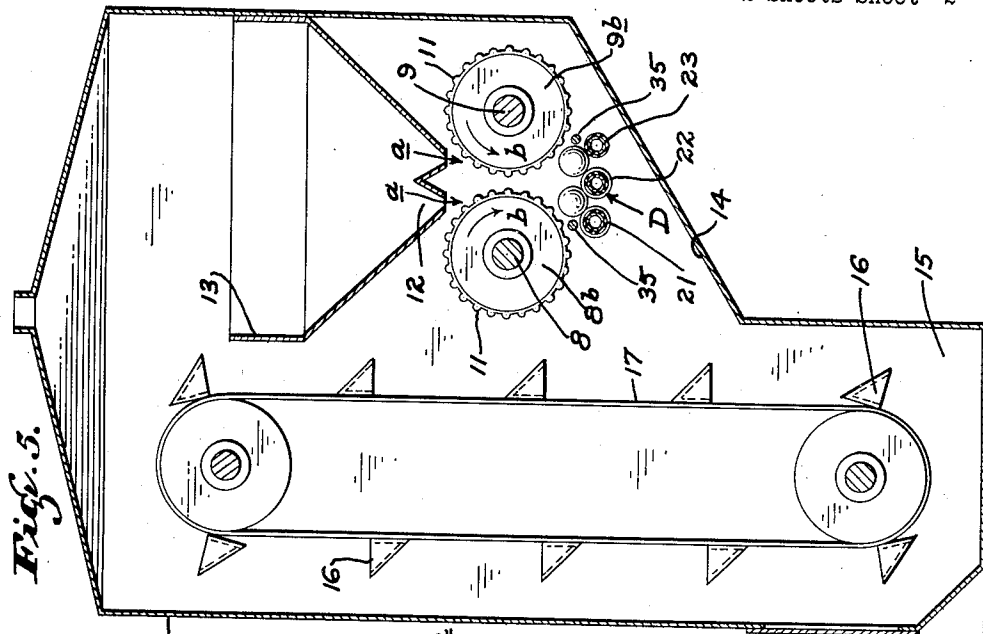
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2 Sheets-Sheet 2



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UNITED STATES PATENT OFFICE

1,928,339

CONVEYER

Harry A. Mulvany, Berkeley, Calif.

Application September 3, 1930. Serial No. 479,474

5 Claims. (Cl. 51—8)

This invention relates to a conveyer especially constructed to feed articles such as eggs, apples, nuts, and the like, through a sand-blast cleaning machine such as shown in my co-pending application entitled "Method and apparatus for projecting comminuted materials", filed November 16, 1927, Serial Number 233,726, or the type of machine described in Patent Number 1,505,484, issued October 19, 1924.

10 The sand-blast cleaning machine described in Patent Number 1,505,484, of which I am a co-inventor, was particularly designed for large scale operation, that is, a machine capable of handling several hundred cases of eggs or like articles per day. The machine shown in my co-pending application was particularly designed for a small out-put, for instance, a maximum of 75 cases per day.

20 The problem of conveying such objects as eggs or apples under a blast of abrasive material requires not only that the objects progress uniformly, but that they must be positively rotated so that all surfaces will be uniformly exposed to the blast for cleaning.

25 The design of a conveyer for a small sand-blast cleaning machine such as above referred to proved to be more of a problem than a conveyer for the larger machines, as it is desirable to convey the eggs or other objects in row formation through the smaller machines and, when eggs are so conveyed, there is a tendency for the eggs to roll end over end, and as such cause considerable breakage.

35 The object of the present invention is to generally improve and simplify the construction and operation of conveyers of the character described; to provide a conveyer which is particularly intended for blast cleaning machines of small capacity; to provide a conveyer which will feed eggs, apples, or the like in row formation and in one, two, or more parallel rows; to provide a conveyer capable of withstanding the abrasive action of the cleaning material employed; and, further, to provide a conveyer which will not only advance the eggs in row formation, but also impart a rotary motion to the eggs about their longitudinal axis, thereby insuring a uniform cleaning of the exposed surfaces.

50 The conveyer is shown by way of illustration in the accompanying drawings, in which—

Fig. 1 is a side elevation of a sand-blast cleaning machine showing the application of the conveyer, said side elevation showing a portion of the housing broken way,

55 Fig. 2 is a plan view of the conveyer,

Fig. 3 is a perspective view of a central bearing,

Fig. 4 is an end view of the sand-blasting machine, and

Fig. 5 is a central, vertical cross section taken on line V—V of Fig. 1.

Referring to the drawings in detail and particularly Figs. 1, 4 and 5, A indicates a horizontally disposed frame supported at opposite ends by standards or uprights such as indicated at 2 and 3. Disposed substantially centrally of the frame is a housing generally indicated at B. Arranged at opposite sides thereof are frame members C and secured in the frames are bearing members 7, in which are journaled shafts 8 and 9. Separate driving motors are employed for the shafts 8 and 9, as indicated at 8a and 9a and these motors are coupled to the shafts 8 and 9 by flexible couplings or the like indicated at 10. Secured on the shafts 8 and 9 are elongated cylinders 8b and 9b. These cylinders may be constructed of any suitable material, but their faces are preferably covered with rubber and a corrugated finish is desirable, as indicated at 11. These cylinders rotate at a high rate of speed and sand or like material is delivered between the rollers in the direction of arrow a from one or more openings formed in the bottom 12 of a hopper 13. The cylinders rotate in the direction of arrow b, or toward each other, and the sand delivered by the hopper 13 is deposited on the corrugated surfaces of the rotating cylinders and, as such, is projected at high velocity downwardly between the same.

The objects to be cleaned, for instance, eggs or the like, are placed on a conveyer generally indicated at D and, as such, are subjected to the abrasive action of the sand or other abrasive material employed, which is projected against the eggs under high velocity. The sand, after serving its purpose, drops on an inclined bottom section 14 and is deflected thereby into a lower chamber 15. The sand is here picked up by the buckets 16 of an endless conveyer 17 and this returns the sand to the hopper 13 for reuse, the conveyer being driven by means of a motor 18. The upper end of the housing is connected through a pipe 19 with the suction side of the blower 20 and any dust which is formed is thus automatically and continuously carried away from the housing.

The conveyer forming the subject matter of the present application is best illustrated in Figs. 1 and 2. It consists of a plurality of shafts such as indicated at 21, 22, and 23. These shafts are

journalled in the standards 2 and 3 and they are driven in unison from a motor 26 through means of a reduction drive 27 and the chain and sprockets 28, the sprocket indicated at 29 being slightly smaller in diameter than the sprocket indicated at 13 so as to rotate the shaft 23 at a slightly higher rate of speed than the shafts indicated at 21 and 22. In actual practice, the shafts are made of 1 inch steel tubing and are covered with rubber tubing approximately $\frac{1}{8}$ inch thick, this tubing being made in sections so that it may be readily removed or applied as conditions demand. The rubber tubing enclosing or covering the shaft 23 is provided with a smooth surface, while the rubber tubing enclosing the shafts indicated at 21 and 22 is provided with a spiral thread having a pitch of approximately $2\frac{1}{2}$ inches and a height of about $\frac{3}{8}$ inch. The shafts are spaced approximately on 2 inch centers and, as they are all rotated in the same direction, the roller tends to lift and rotate the eggs and to feed them longitudinally between the rolls. A rotary motion is thus transmitted to the eggs about their longitudinal axis and, as the end of each egg is engaged by the spiral thread-like projections, the eggs are at the same time advanced.

Considerable trouble was encountered in obtaining the right proportions, that is, of shaft dimensions, pitch of thread, height of thread, etc. If the thread is too high, it will turn the eggs end over end, resulting in a high percentage of breakage; if the thread is reversed in direction, the eggs will not progress uniformly; if the spacing between shafts is too great, the eggs will be crushed; and if the diameter of the shafts is too small, crushing of the eggs will again occur. By employed rubber covered shafts of the dimensions specified, the eggs move forward and rotate with their major axes horizontal without any tendency to turn over end for end. The helical thread-like projection also maintains the spacing between the eggs and prevents impact between them.

In actual practice, it has been found that improved results are obtained if the plain surfaced roller or shaft 23 is rotated about 10% faster than the adjacent feeding rolls. In a small machine only two shafts are employed such as indicated at 22 and 23, that is, one roller with a helical thread and one with a smooth surface, but where an increased capacity is desired a third roller is added, as shown at 21. In this case two rows of eggs may be fed through the machine simultaneously. In such a structure, the rollers 21 and 22 will be rotated at the same speed. The thread on the rollers 21 is, however, set slightly in advance of the thread on the roller 22. By slightly advancing one thread in relation to the other, the surface of the roller 22 acts on the eggs in the same manner as the plain surface of the roller 23. Furthermore, this slight advance of one thread in relation to another prevents contact of the thread on the roller 22 with the eggs being advanced by the rollers 21 and 22. In the small machines such as illustrated in the present application, the shafts 21, 22 and 23 are approximately 10 feet long and they are sufficiently stiff so that any central bearings or supports may be eliminated. Where the length is increased as in larger machines, it is possible that a central bearing may be required. If that is the case, bearings such as shown in Fig. 3 may be employed. This bearing is nothing more or less than an angle plate, the upper edge of which is notched, as shown at 30, to receive the respective shafts.

The rubber covering 31 is removed at this point and a metal to metal contact is thus maintained between the shafts and the bearings.

The conveyer here illustrated is ideally suited for small capacity machines, as it insures positive feeding of one or more rows of eggs through the sand-blast portion of the machine at a uniform speed. It eliminates any tendency of turning the eggs over end for end and, furthermore, insures positive rotation of the eggs about their longitudinal axis as they are being advanced. Guide rails such as shown at 33 and 34 may be placed on the sides of the feeding rolls to prevent the eggs from falling off the rolls if they should be lifted too high by the rotating action of the rollers. These guide rails extend from the pedestal 2 to the housing and from the opposite side of the housing to the pedestal 3. Within the housing guide rods are employed as shown at 35. These not only serve to retain the eggs and other objects being handled on the rolls, but they also function as deflectors to direct the sand and air against the eggs and downwardly between the rolls. These rods may be rubber covered, if desired, to prevent too rapid wear by the abrasive material. It was previously stated that the shafts 21, 22 and 23 were covered with rubber tubing and that the tubing was made in sections. This is also important as the only portion of the conveyer that is at all subject to wear is that portion which is subjected to the sand-blast, and while the life is fairly great, they will require removal from time to time. In that case, it is only necessary to cut away the worn sections of the tube and to slip the remaining sections endwise into place, and then merely to apply a new section to the outer ends of the shafts.

It was previously stated that the pitch of the helical thread was approximately $2\frac{1}{2}$ inches. This dimension applies as far as eggs are concerned, as the maximum length of the largest egg is usually less than $2\frac{1}{2}$ inches. Where objects of less length are being handled, for instance, nuts or apples; or, vice versa, if objects of a greater length are being handled, the pitch of the thread will be changed to conform thereto.

While certain features of the present invention are more or less specifically described, I wish it understood that various changes may be resorted to within the scope of the appended claims. Similarly, that the materials and finish of the several parts employed may be such as the manufacturer may decide, or varying conditions or uses may demand.

Having thus described my invention, what I claim and desire to secure by Letters Patent is—

1. A conveyer of the character described comprising a pair of interspaced parallel rollers, a helical projecting thread formed on the surface of the rollers, the thread on one roller being slightly in advance of the other, both threads having the same pitch and direction, a smooth surfaced roller disposed at one side of the first-named rollers and interspaced and parallel thereto, and means for rotating the rollers in the same direction.

2. A conveyer of the character described comprising a pair of interspaced parallel rollers, a helical projecting thread formed on the surface of the rollers, the thread on one roller being slightly in advance of the other, a smooth surfaced roller disposed at one side of the first-named rollers and interspaced and parallel thereto, and means for rotating the rollers in the same direction.

tion with the smooth surfaced roller rotating at a slightly greater speed.

3. A conveyer of the character described comprising a pair of interspaced parallel rollers, one roller presenting a smooth surface and the other roller presenting a projection in the form of a helical thread which extends from end to end of the roller, means for rotating the rollers in the same direction with the speed of the smooth surfaced roller slightly greater than the other, and a pair of guide members disposed one on each side of the rolls to prevent lateral removal of the eggs.

4. A conveyer of the character described comprising a pair of interspaced parallel rollers, one roller presenting a smooth surface and the other roller presenting a projection in the form of a helical thread which extends from end to end of

the roller, means for rotating the rollers in the same direction, a bearing at each end of the rollers, and a central bearing intermediate the ends of the rollers, said bearing comprising a notched plate in which the rollers rest.

5. A conveyer of the character described comprising a pair of interspaced parallel rollers, one roller presenting a smooth surface and the other roller presenting a projection in the form of a helical thread which extends substantially from end to end of the roller, the objects to be conveyed being supported by the rollers between the same and being advanced between the rollers by the helical thread and at the same time frictionally rotated by the surfaces of the rollers, and means for rotating the rollers in the same direction.

HARRY A. MULVANY.

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