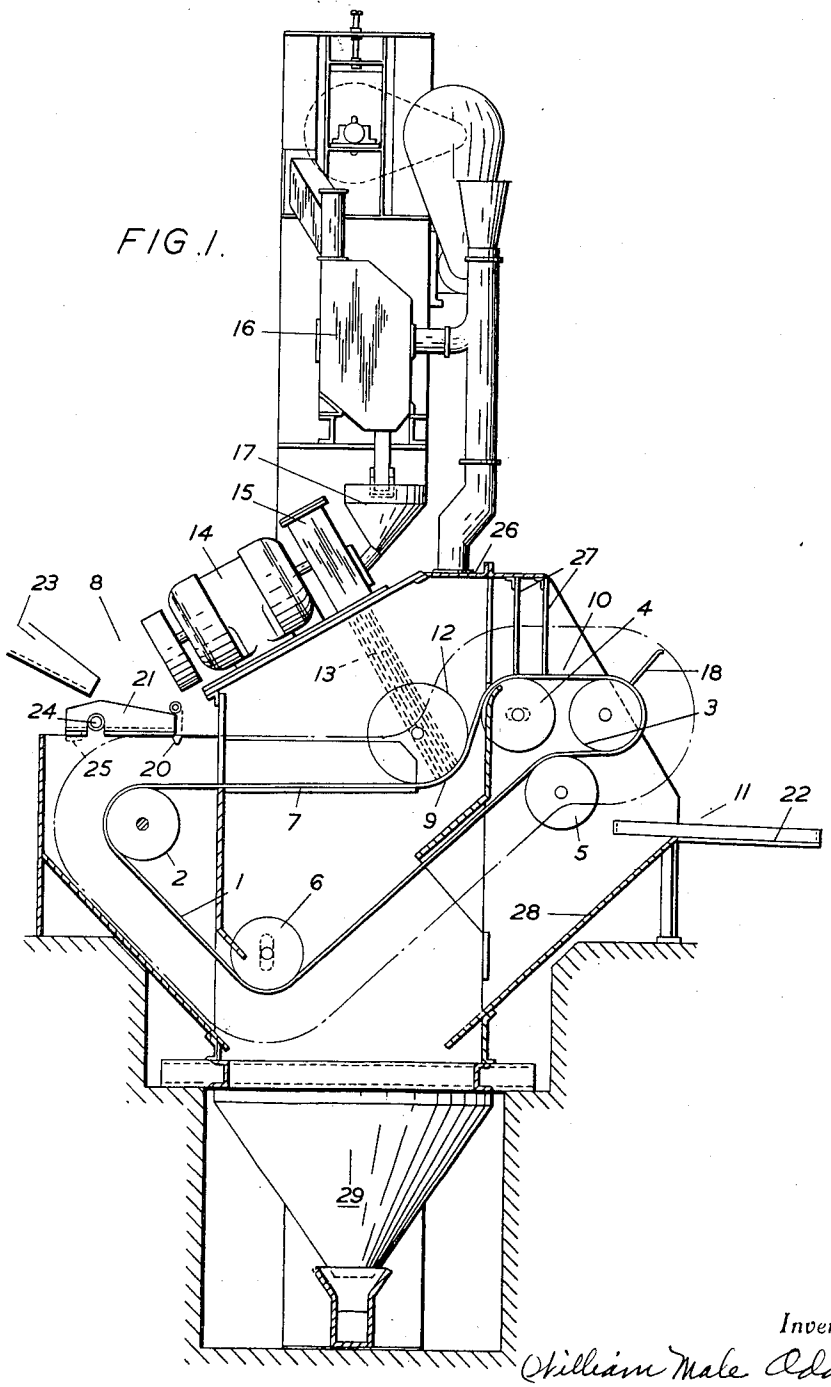
Nov. 29, 1955 W. M. ODDIE 2,724,930

APPARATUS FOR ABRASIVE TREATMENT OF ARTICLES

Filed July 30, 1953 2 Sheets-Sheet 1

FIG. 1.



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APPARATUS FOR ABRASIVE TREATMENT OF ARTICLES

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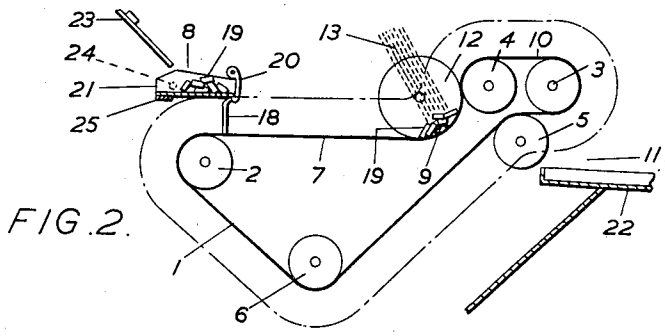


FIG. 2.

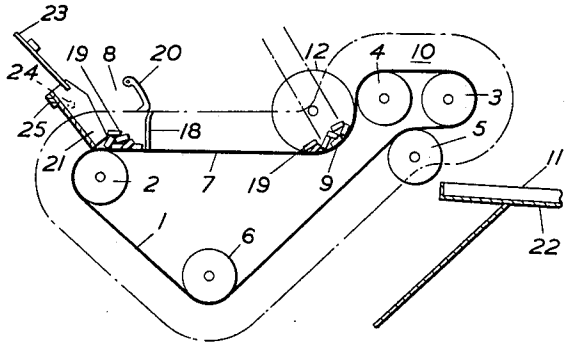


FIG. 3.

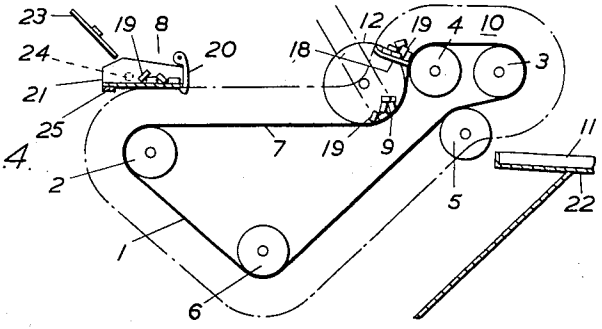


FIG. 4.

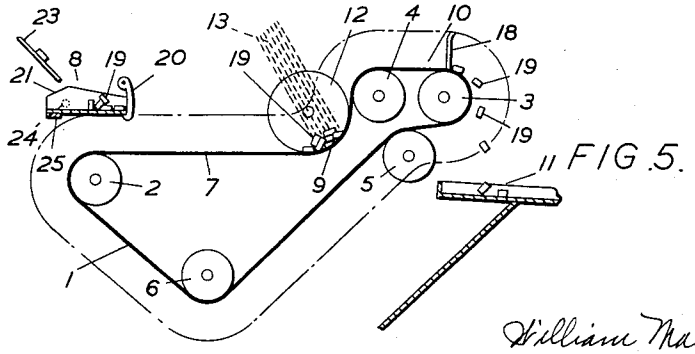


FIG. 5.

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APPARATUS FOR ABRASIVE TREATMENT OF ARTICLES

William M. Oddie, Cossett, England

Application July 30, 1953, Serial No. 371,274

6 Claims. (Cl. 51—13)

This invention relates to abrasive treatment of metallic or other articles, especially for cleaning, polishing, hardening or otherwise treating the surfaces of castings, forgings and other metallic objects.

In cleaning, polishing, hardening or otherwise treating the surfaces of metallic castings, forgings and similar articles it is desirable to turn or otherwise manipulate them whilst they are in, or passing through the abrasive stream in such a manner that all surfaces will be uniformly exposed and treated. It is therefore the practice to expose the surface of the articles to the abrasive stream while the articles are turned or tumbled in a tumbling barrel or similar device.

In continuous processes articles have been transported through an abrasive stream on a flexible conveyor element arranged to form a supporting surface or trough for the articles. To provide the continuity of processing, the flexible conveyor element has been inclined or provided with means whereby the articles supported thereon are advanced along the trough concurrently with their tumbling movement, the articles being deposited on the raised end of the trough forming portion and removed at the lower end thereof when the treating action has been completed. In such apparatus it is not unknown for articles to jump and bounce from the feed point to the discharge point so that their rate of progress through the machine is too rapid and the result is a lack of uniformity in the quality of the treated articles.

The chief object of the present invention is to provide a new or improved method of and means for the abrasive treatment of articles, which will enable continuously fed batches of articles to be treated and the duration of treatment controlled thereby ensuring every article may get equal treatment.

A further object is to provide a machine for abrasive treatment of articles in which the abrasive stream can be readily interrupted at desired intervals in the process cycle so that the batch of articles after treatment can be tumbled to remove the abrasive material from the articles.

According to the invention the articles to be treated are fed onto a conveyor element, which takes them to the tumbling position where they are subjected to the abrasive stream and from the tumbling position, the conveyor element then takes the treated articles to the delivery or discharge point. The conveyor element will be continuously running in a constant direction and the path taken by the articles is in line with the direction of travel of the conveyor element. Thus there are three substantially in line stages in the run of the conveyor, a loading point for the batch of articles, a tumbling point and a discharge point.

The tumbling point may be provided by a step or rise in the conveyor of sufficient depth or incline to prevent the articles riding up said step or rise and whilst the articles are at this point they are subjected to tumbling and to

the abrasive stream. The conveyor element which may be of any suitable type will be provided with a pusher, which removes the treated batch of articles from the tumbling point to the discharge point and said pusher may also control the delivery of a batch of articles onto the conveyor element.

The stream of abrasive material may be actuated by any suitable means such as a rotating impellor, compressed air jet or the like.

In order that the invention may be more clearly understood and readily carried into effect the same will now be more fully described with reference to and by the aid of the accompanying drawings, wherein:

Figure 1 is a sectional side elevation of an apparatus constructed in accordance with the invention.

Figures 2 to 5 are diagrammatic series showing the various stages of operation and treatment.

Referring to the drawings, the apparatus comprises an endless conveyor 1 which is driven by means of suitable rollers 2, 3 and idlers 4, 5 and 6 in a constant direction. The conveyor 1 has a substantially horizontal run at 7 from a feeding point 8 to a tumbling point 9 which is constituted by the conveyor running substantially vertically to run over a roller or idler 4 along a short high level substantially horizontal run 10 to the delivery point 11. At the tumbling point 9 the conveyor passes between and around one or more pairs of discs 12, which constitute the tumbling drum into which the abrasive stream indicated at 13 is projected from an electrically driven impellor unit consisting of an electric motor 14 which drives a centrifugal abrasive-throwing wheel 15 fed with abrasive from a controlled chute 16 and hopper 17.

Secured to the conveyor is a pusher element or elements 18 one being shown, which travels with the conveyor and at every cycle passes through the tumbling drum 12 and carries the treated articles 19 along to the discharge point. The pusher 18 may be arranged to operate a release catch 20 normally holding the batch feed tipping hopper 21, so that once every cycle a batch of articles 19 to be treated is deposited from the feed tipping hopper 21 onto the conveyor 1 at a point behind the pusher element 18, so that a fresh batch automatically enters the tumbling point 9 after the pusher element 18 has removed the treated articles 19. The fresh batch remaining in the tumbling point 9 until the pusher 18 completes the cycle. If desired other means or devices may be used for releasing the catch of the batch feed tipping hopper.

The feed of abrasive material to the impeller unit 15 may be stopped by mechanical or electric action during the period of removal of the treated batch. If desired the stopping of the abrasive material may be commenced when the pusher 18 actuates the release catch 20 of the feed hopper 21 so that during the interval of time taken for the pusher 18 to pass from the feed point 8 to the tumbling point 9, the treated articles may be rumbled, i. e. tumbled without being under the action of the abrasive stream, so that the bulk of abrasive material is removed from the articles. In this connection in order to further ensure the treated articles are relatively free from abrasive material, they may be delivered on to a vibrating screen or the like 22 when they leave the conveyor.

The batch hopper 21 may collect articles either from a delivery conveyor (not shown) or from a chute 23 or other feeding medium and said batch hopper will be pivotally mounted at 24 and weighted at 25 so that after delivery of a batch on to the conveyor 1 of the apparatus, it returns to its normal position in which it is held by the release catch 20.

By controlling the supply of abrasive material to the

impeller it is not necessary to stop the impeller during operation of the machine.

The apparatus will be suitably encased at **26** and normal means adopted for collecting and preventing the escape of the abrasive material during operation. The conveyors **1** between the tumbling point **9** and delivery point **11** will pass through protected screens **27** such as rubber curtains which prevent the escape of the abrasive material and the material removed at the vibrating screens will be returned to the interior of the apparatus by means of a suitable collection device **28** situated below the screen **22.**

The used abrasive material will be collected in the base hopper **29** and returned to the controlled feed chute **16.**

The cycle of operations shown in Figures 2 to 4, is as follows: Figure 2 shows a batch **19** being treated and the pusher about to release the catch **20** for a further batch to be deposited on the conveyor **1.** In Figure 3, the catch **20** has been released and the batch **19** deposited on the conveyor **1.** At the same time, the abrasive stream has been stopped whilst the treated batch is being tumbled. Figure 4 shows the treated batch being removed by the pusher element **18** and the fresh batch in position whilst Figure 5 shows the treated batch being delivered from the conveyor **1** and the fresh batch under the action of the abrasive stream which continues until the pusher element **18** travels round to the feeding point **8.**

It will be seen that a substantially continuous treatment of batches of articles is achieved by means of an apparatus which is adapted for in-line production inasmuch as the articles are travelling forward throughout their handling by the apparatus.

I claim:

1. Apparatus for abrasively treating metal articles including means for projecting a stream of abrasive particles, an endless conveyor element having a feed point, a tumbling point and a delivery point, means for driving said conveyor in a constant direction, means for suspending said conveyor element to provide an upwardly concave support, the conveyor element being arranged to advance the articles in a linear direction from the feed point through the tumbling point to the delivery point in-line with the direction of travel of the conveyor element, means being provided at the feeding point for feeding articles to be treated on to the conveyor element, means associated with the conveyor element arranged to control the operation of said means for feeding articles to be treated on to the conveyor element, means being provided associated with the conveyor element for stopping the projection of the stream of abrasive particles.

2. Apparatus for abrasively treating metal articles including means for projecting a stream of abrasive particles, an endless conveyor element having a feed point, a tumbling point and a delivery point, means for driving said conveyor in a constant direction, means for suspending said conveyor element to provide an upwardly concave support, the conveyor element being arranged to advance the articles in a linear direction from the feed point through the tumbling point to the delivery point in-line with the direction of travel of the conveyor element, means being provided on said conveyor element to remove the articles from the tumbling point, means being provided at the feeding point for feeding articles to be treated on to the conveyor element, means associated with the conveyor element arranged to control the operation of said means for feeding articles to be treated on to the conveyor element, means being provided associated with the conveyor element for stopping the projection of the stream of abrasive particles.

3. Apparatus for abrasively treating metal articles including means for projecting a stream of abrasive particles, an endless conveyor element having a feed point, a tumbling point and a delivery point, means for driving said conveyor in a constant direction, means for suspending said conveyor element to provide an upwardly concave support, the conveyor element being arranged to advance the articles in a linear direction from the feed point through the tumbling point to the delivery point in-line with the direction of travel of the conveyor element, means being provided on said conveyor element to remove the articles from the tumbling point, said means comprising a pusher element mounted on the conveyor element, means being provided at the feeding point for feeding articles to be treated on to the conveyor element, means associated with the conveyor element arranged to control the operation of said means for feeding articles to be treated on to the conveyor element, means being provided associated with the conveyor element for stopping the projection of the stream of abrasive particles.

4. Apparatus for abrasively treating metal articles including means for projecting a stream of abrasive particles, an endless conveyor element having a feed point, a tumbling point and a delivery point, means for driving said conveyor in a constant direction, means for suspending said conveyor element to provide an upwardly concave support, the conveyor element being arranged to advance the articles in a linear direction from the feed point through the tumbling point to the delivery point in-line with the direction of travel of the conveyor element, means being provided on said conveyor element to remove the articles from the tumbling point, said means comprising a pusher element mounted on the conveyor element, means being provided at the feeding point for feeding articles to be treated on to the conveyor element, said pusher element being arranged to control the operation of said means for feeding articles to be treated on to the conveyor element, wherein said means for feeding articles to be treated on to the conveyor element consists of a batch feed tipping hopper, a locking and release catch on said hopper being arranged to be released by the pusher element.

5. Apparatus for abrasively treating metal articles including means for projecting a stream of abrasive particles, an endless conveyor element having a feed point, a tumbling point and a delivery point, means for driving said conveyor in a constant direction, means for suspending said conveyor element to provide an upwardly concave support, the conveyor element being arranged to advance the articles in a linear direction from the feed point through the tumbling point to the delivery point in-line with the direction of travel of the conveyor element, means being provided on said conveyor element to remove the articles from the tumbling point, said means comprising a pusher element mounted on the conveyor element, means being provided at the feeding point for feeding articles to be treated on to the conveyor element, said pusher element being arranged to control the operation of said means for feeding articles to be treated on to the conveyor element, wherein a pair of discs mounted one on each side of the conveyor element at the tumbling point constitute with the conveyor element therebetween a tumbling drum.

6. Apparatus for abrasively treating metal articles including means for projecting a stream of abrasive particles, an endless conveyor element having a feed point, a tumbling point and a delivery point, means for driving said conveyor in a constant direction, means for suspending said conveyor element to provide an upwardly concave support, the conveyor element being arranged to advance the articles in a linear direction from the feed point through the tumbling point to the delivery point in-line with the direction of travel of the conveyor element, means being provided on said conveyor element to remove the articles from the tumbling point, said means comprising a pusher element mounted on the conveyor element, means being proxided at the feeding point for

feeding articles to be treated on to the conveyor element, said pusher element being arranged to control the operation of said means for feeding articles to be treated on to the conveyor element, wherein means are provided for stopping the projection of the stream of abrasive particles.

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