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(12) # EUROPEAN PATENT APPLICATION

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(54) **Process and apparatus for smoothing, buffing and finishing metal components and work pieces.**

(57) A semi-continuous process is described for smoothing metal pieces by the relative apparatus. The pieces and abrasives introduced in the processing vat (3) are subjected to the centrifugal action of a rotation member; at the end of the processing the vat is tipped by 180° and its content is overturned into a suitable underlying container (6), thereupon the vat (3) is brought back to its initial position and a second processing cycle may start. At the same time, the material contained in the underlying container (6) is progressively poured in a vibrating separator (10) which separates the finished pieces from the abrasives which are re-utilized in a successive processing cycle.

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"PROCESS AND APPARATUS FOR SMOOTHING, BUFFING AND FINISHING METAL COMPONENTS AND WORKPIECES"

The present invention relates to a process for smoothing, buffing and finishing metal parts and pieces, as well as, in particular, the relative apparatus.

It is known that deburring and finishing operations on metal pieces are effected by mixing with abrasives in vibrators or in apparatuses wherein the mass formed by the pieces and abrasives is subjected to the centrifugal force imparted thereto by means of a rotating element such as a horizontal plate or disk.

A finishing apparatus exployting the centrifugal force is described for example in Italian Patent No. 793.300 granted on November 15, 1967 to Roto-Finish Italiana S.r.l.

Though the finishing apparatuses operating by centrifugal force represent a progress with respect to the vibrators, nevertheless, they present the drawback, which incidentally is common also to other apparatus, of requiring rather prolonged idle times, due to the necessity of having to interrupt the finishing operation itself for allowing the processed mass to be gradually transferred from the finishing vat to the screener or separating device having limited dimensions, which provides for the separation of the processed pieces from the abrasive material.

The object of the present invention is to overcome the above noted drawback by providing an apparatus which has, between the processing vat and the separating device, an intermediate container suitable to accomodate in a lump the whole mass of processed pieces and abrasive material, thereupon the processing vat, now empty, may be returned immediately to its working position to accomodate a new charge to be processed. At the same time, the intermediate container may gradually transfer by gravity its load in the separation device until completely empty, thereafter it may return to its initial position to accomodate the successive charge which has, meanwhile, been processed in the finishing vat.

The processing times in the finishing vat and emptying times of the intermediate collecting container are suitably synchronized in such a way that, when processing vat has completed its operation cycle, the collecting container is in its starting position already emptied of any prior charge.

The present invention will now be illustrated in more detail on the basis of the annexed sole figure schematically representing the apparatus briefly defined hereinabove.

A container 1 is initially charged with the pieces to be processed and the abrasives coming from a vibrating conveyor 11, thereupon it is raised along path 2, shown in the figure by a dash-single-dot line, until it reaches a position above a processing vat 3 and is tipped thereinto as shown by the dash line 1'. The charge formed by the pieces to be processed and by abrasive material thus falls by gravity into the processing vat 3 where it is wetted and submerged by an

aqueous solution of auxiliary chemicals coming from a tank 8.

When the solution has reached the necessary volume as measured by a volumetric counter, the deburring cycle starts. At the end of this cycle, the aqueous solution is discharged through a suitable valve located on the bottom of vat 3 and the latter is successively tipped by rotating it around a shaft 4 according to a semi-circular path 5, shown in the drawing by a dash-single-dot line, until it assumes the end position 3' shown by a dash line. Operating in this way, the mass of processed pieces and abrasive material is completely discharged by gravity in a collecting container 6.

The vat 3' is thence brought back to its initial position 3 making it to travel the path 5 in an opposite direction, while the controlled rate tipping of container 6 containing the abrasives and processed pieces is simultaneously started by means of a telescopic arm 7. With the progressive raising and tipping of container 6 according to a path 9, shown in the drawing by a dash-single-dot line, the processed pieces and abrasives fall progressively in a vibrating separator 10 which provides for the separation of the deburred pieces, conveyed outside by means of a vibrating conveyer 15, from the abrasives which are made to fall in container 1 to be re-utilized in a successive finishing cycle.

When container 6 has reached position 6', shown in the drawing by a dashed line, at the end of the tipping run, it is completely empty and is brought back to its starting position by retracting the telescopic arm 7.

At this point container 6 is ready to receive a new

charge of machined pieces and abrasives coming from the processing vat 3 which will have completed its operation cycle and be tipped to the position 3', thus giving start to a successive processing cycle.

The advantages which are obtainable with an apparatus of the type herein described with respect to those so far utilized are mainly represented by the elimination of idle times, since the screening which takes place in separator 10 is effected during the working time of vat 3, by an improved dosage and separation of the mass of processed pieces and abrasives, as the operation times and shifting speed of collecting container 6 are accurately adjustable, as well as by the decrease of collisions during the separation step of the processed pieces, in that the abrasives are separated in a more regular and uniform way.

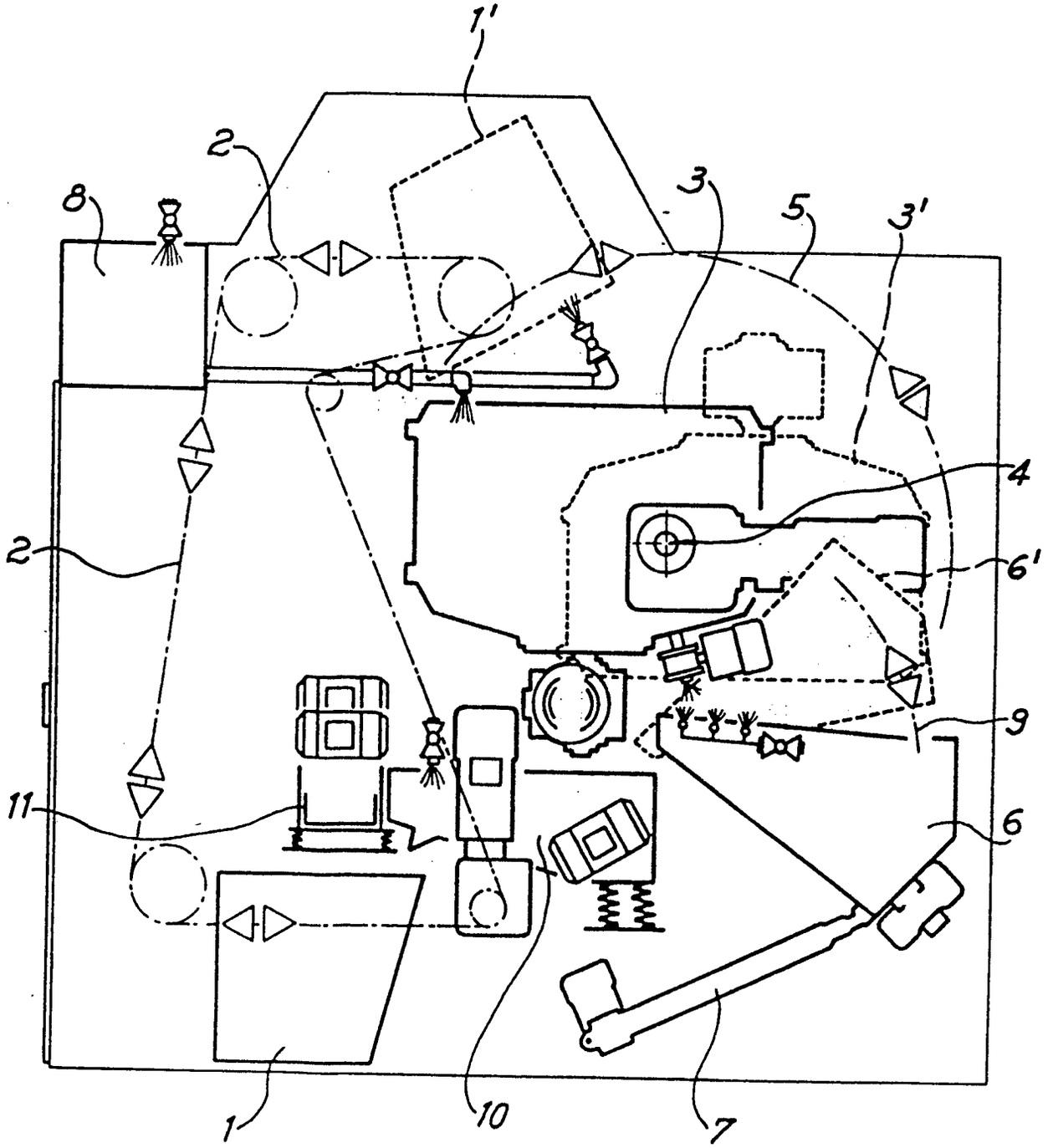
Though the present invention has been described on the basis of an embodiment thereof which is at present preferred, it is obvious that modifications and/or changes may be introduced by those skilled in the art without departing from the scope of the invention.

CLAIMS

1. An apparatus for smoothing metal pieces with a processing vat provided with means apt to impart a swirling rotary motion by centrifugal force to the mass of pieces to be processed and abrasives, characterized in that said processing vat (3) may be tipped by 180° by rotation around a shaft (4).

2. Smoothing apparatus according to claim 1, characterized in that it comprises further an underlying collecting container (6) apt to be tipped for the discharge of said processed pieces and said abrasives in a vibrating separator (10).

3. Smoothing apparatus according to claim 2, characterized in that said vibrating separator (10) discharges said abrasives separated from said processed pieces in a container (1) shiftable along a closed path (2) and capable of being tipped over the charging hole of said processing vat (3).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EUROPEAN SEARCH REPORT

0222050
Application number

EP 85 83 0261

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int Cl.4)
A	GB-A-2 094 192 (ROTO-FINISH CO. INC.) * claim 1; page 5, lines 8-44; figures 2, 3 *	1	B 24 B 31/10
A	US-A-4 380 137 (BALZ) * claim 1, figures 2-4 *	1	
A	DE-U-7 429 283 (SPALECK KG) * claim 1; figures 1-3 *	1	
P,A	EP-A-0 125 545 (RÖSLER GLEITSCHLIFFTECHNIK MASCHINENBAU U. TECHNISCHE KERAMIK GMBH) * page 3, lines 22-30; page 6, line 24 - page 8, line 6; figures 4, 5 *	1-3	
A	EP-A-0 063 102 (RENI CRILLO S.R.L.) * figures 2, 3 *	2,3	TECHNICAL FIELDS SEARCHED (Int Cl.4) B 24 B 31/00
A	FACHBERICHTE FÜR OBERFLÄCHENTECHNIK, vol. 11, no. 4, 1973, pages 118-121, Coburg; H. HINZ "Möglichkeiten beim Einsatz von Hochleistungsfliehkraftmaschinen" * page 119, figure 5 *	3	

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
BERLIN	08-01-1986	MARTIN A E W

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
Y : particularly relevant if combined with another document of the same category
A : technological background
O : non-written disclosure
P : intermediate document

T : theory or principle underlying the invention
E : earlier patent document, but published on, or after the filing date
D : document cited in the application
L : document cited for other reasons

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