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(54) **Method for cleaning dirty surfaces on handballs, and an apparatus for the execution of the method**

Verfahren zur Reinigung von schmutzigen Oberflächen auf Handbällen und Vorrichtung zur Ausführung des Verfahrens

Procédé de nettoyage de surfaces sales sur des ballons de handball et appareil pour l'exécution du procédé

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Description

Field of the Invention

[0001] The present invention relates to a method for cleaning surfaces on handballs which have been treated with a sticky/adhering material, mainly resin, which by use of the handball has become dirty, and an apparatus for the execution of the method according to the invention.

Background of the Invention

[0002] On a worldwide basis, thousands of handballs are discarded every year after a relatively short lifetime (approx. 1% years). The replacement of the balls is due primarily to the players' use of resin. The players use the sticky resin in order to improve the grip around the handball. But the "smearing" of the ball with resin has the result that dirt and dust from the floor adheres to the ball. Therefore, in a relatively short time, a crust of these materials is formed on the surface of the ball. The crust reduces the softness of the leather and makes the ball very smooth to play with. As a consequence hereof, the handball clubs spend a lot of money every year in the purchase of new balls, money which could be used for many other purposes within the sport. An alternative to the purchasing of new balls is that of cleaning the balls to remove said crust, and use is made at present of various methods for this purpose.

[0003] One of these methods can consist of smearing the ball with brown soap, packing the ball in a bag and letting the soap "dissolve" the resin. However, this process takes approximately one week, and naturally with the consequence that the ball cannot be used. At the same time, the process has a highly detrimental effect on the leather, and can only be carried out a few times before the ball is ruined. Another alternative is that of removing the resin mechanically by scraping, e.g. with a knife, or some other suitable tool or utensil, but in all probability this will result in damage to the surface of the ball, and the process takes a relatively long time.

[0004] From WO 02096526 there is known a portable golf ball cleaner comprising a U-shaped cabinet, the two opposing sides of which comprise projecting brushes, and the bottom of which has a sponge for the moistening of the surface of a golf ball placed in the cabinet. The cleaner functions by the golf ball being manually pressed down against the moistened sponge in the bottom, after which it is rotated manually whereby the surface of the golf ball is processed by the brushes standing out from the sides, whereby the golf ball is cleaned.

[0005] From JP20021 13211 there is known a cleaning machine for the cleaning of balls for gaming machines, this comprising a partly open cabinet containing rotating brushes in connection with a tray for collection of said balls, and where the balls are processed mechanically with the two rotating brushes for the removal of dirt which

is collected in an underlying tray, after which the balls are led out of the machine in the cleaned condition for further use.

[0006] Another ball cleaning apparatus is known from US 5,660,751 wherein the idea is to heat a bowling ball such that liquid trapped in the material from which the bowling ball is made, will be heated and the liquid in the ball will be transferred to the surface after which the player may wipe the liquid away from the surface and in this manner restore the bowling ball to its original weight having the characteristics the player expects.

[0007] A further cleaning device is known from US 3,078,591 wherein a specialized apparatus for cleaning oval shaped balls as for example used in rugby and American football is devised. The device comprises rotating brushes as well as a drying unit. The object is to provide a ball which is clean, dry and having a temperature higher than the ambient temperature in which the game is played. Usually American football games are played during the winter and due to the influence of temperature the balls become very hard and thereby very difficult to handle for the players. It is therefore the object of the invention according to US 3,078,591 to clean, dry and heat the ball such that it becomes more comfortable for the players to play with and that the game is not reduced to chance but will be up to the skills of the players.

[0008] None of the prior art devices addresses the problem of removing resin from the surface of the balls. This shall probably be seen in the light that only very few games in the world allow the players to improve their grip on the ball with the application of resin to the ball or to the hands. For most ball games it is undesirable to apply resin to the ball in that this will be directly working against the purpose or intention of the game. Handball is the only game devised with the inclusion of resin in order to improve the grip and thereby the handling of the ball during the fast ball movements of that game.

[0009] On this background it is not surprising that none of the prior art documents cited above recognizes a similar problem. By cleaning the surface of balls from dirt or other debris the ball is restored to its original condition but the cleaning processes involved are all designed to remove substances such as dirt or mud which does not adhere very strongly to the ball and in any case does not destroy the ball during normal removal which could be effected by a simple washing.

[0010] It is therefore also evident that the prior art methods will hardly be applicable for the cleaning of the dirtied resin from a handball, the reason being that the resin does not lend itself to removal merely by normal mechanical processing alone.

Object of the Invention

[0011] It is thus the object of the present invention to provide a method for an effective and relatively brief cleaning procedure for the cleaning of resin-treated handballs which have become dirty.

Description of the Invention

[0012] This object is achieved with an apparatus for the cleaning of the surfaces of handballs according to claim 1, and a corresponding method for the cleaning of the surfaces of handballs according to claim 8.

[0013] There is hereby achieved the advantage that the dirtied resin on the surface of the ball is more easily cleaned off, inasmuch as the resin is softened by being heated, whereby this allows itself to be removed by a mechanical processing of the surface of the ball.

[0014] Within the present invention the term dirty means only that the resin which has been used in order to improve the grip between the ball and the players hand overtime will adhere foreign matter such that the stickiness of the resin will be seriously reduced. Consequently the term dirty does not refer to the kind of dirt which may adhere to a football, bowling ball, basket ball or other types of ball during normal use such as for example grease, dirt, soil and the like but refer specifically to resin which due to its adhesive/sticky properties will attach foreign matter (dirt) such that over time the resin loses its stickiness and therefore the improved grip which was otherwise provided for the player.

[0015] There are numerous possibilities in the manner in which operations could be carried out in the execution of the above-mentioned method, for instance in the ways in which the dirtied surface of the ball could be heated, and also in the implementation of the mechanical processing. Without renouncing other methods, it can be mentioned that the heating of the surface of the ball can with advantage be carried out with a flow of hot air, and that the mechanical processing can with advantage be carried out by means of elements standing out from rotating rollers.

[0016] It can be mentioned that the relevant cleaning temperature can with advantage be lying within the interval of 30-130°C, typically within the interval 45-120°C and preferably 55-110°C. For the execution of the method according to the invention, there is disclosed an apparatus which is characterised in that it comprises a partly open cabinet comprising at least one heating element and at least one blower aggregate associated herewith with an opening placed close to a partly open area in the enclosure, where there is at least one roller with protruding elements which can be rotated for mechanical processing of relevant parts of the surface of a ball, or what can be termed the cleaning area of a ball, which is pressed against the protruding elements on the rotationally-driven roller.

[0017] By placing the mouth of the blower aggregate in the vicinity of the rotationally driven rollers with the protruding elements, it is achieved that the part area of a handball which has been coated with resin and has become dirty is processed mechanically by the protruding elements in the immediate vicinity of the place where the heating is carried out, which will result in a more effective removal of the layer of dirty resin on the ball. The

embodiment disclosed is primarily envisaged as a more simple embodiment of the apparatus for the execution of the method according to the invention, where the user manually introduces the handball into the flow of heated air, whereby the layer of dirty resin is heated in a relevant part area (the cleaning area), which at the same time is processed/cleaned mechanically by means of the protruding elements on the rotating roller. In a special embodiment, the apparatus can be provided with a sensor whereby the apparatus is activated when a ball is introduced into the processing area.

[0018] In a preferred embodiment of the apparatus for the execution of the method, this can be arranged so that the cabinet further comprises at least two support rollers for the guiding and the pressing of the surface of a ball placed in the cabinet against the protruding elements on the at least two rotationally-driven rollers in the cabinet, where the mutual axle distance of said support rollers is adapted to the size of an actual ball, and where under the rotating rollers there is provided a detachable tray for the collection of dirt removed from the surface of the ball.

[0019] There is hereby achieved an automatic cleaning of dirtied resin from the ball, where the handball is simply placed in the cavity in the cabinet of the apparatus in contact respectively with the support rollers and the elements protruding from the two rotationally driven rollers, after which the apparatus is started by activation of heating elements and the blower aggregate and the drive unit for the rollers, after which the surface of the ball is heated and processed mechanically by the elements protruding from the rotating rollers, whereby the dirty resin on the surface of the ball is cleaned off and collected in the collection tray. The person responsible for the maintenance of the balls can thus undertake other work while the ball is being cleaned. However, after a suitable cleaning time, this person will be required to remove the cleaned ball from the apparatus and, if necessary, place another dirty ball in the apparatus for cleaning.

[0020] In a special embodiment of the apparatus according to the invention, this operation can, however, be rendered superfluous by providing the apparatus according to the invention with a feeding arrangement which has a supply of dirtied balls, a guiding arrangement which guides the cleaned balls out of the apparatus cabinet, and a sensor unit with an activation switch for the apparatus, and a control unit for controlling the supply of dirty balls to and the exit of cleaned balls from the apparatus. The cleaning of dirtied resin from handballs can hereby be carried out in a fully automatic manner and, except for the placing of dirtied handballs in the supply and the fetching of the cleaned balls, without any noteworthy manual labour.

[0021] Since there is a difference in the size of the handballs used by male players and female players, the apparatus can be arranged so that the distance between the axles of the support rollers and the rotationally-driven rollers with protruding elements is adjustable in accordance with the size of an actual ball. With the object of

providing an apparatus with the flexibility necessary for being able to be used for the cleaning of handballs of different sizes, the apparatus according to the invention can with advantage be arranged so that the axle distance between the support rollers is adjustable, in that at least one of the axles of the support rollers is housed in the cabinet in a displaceable and lockable manner, and where at least one of the rotationally-driven rollers with protruding elements is housed in the cabinet in a displaceable manner, so that the distance between these and the support rollers, and the distance between the rotationally-driven rollers with protruding elements is adjustable.

[0022] The possibility is hereby achieved of being able to use the same apparatus for the cleaning of balls of both types. In a further embodiment of the invention, the apparatus can also be provided with a ball-size sensor coupled with actuators for adjustment of said axle distances, so that with the registration of a deviating ball type in the cabinet, the apparatus automatically adjusts the axle distance for an optimum cleaning of dirtied resin from the surface of the ball. Without renouncing the rights to other embodiments, it can be mentioned that the protruding elements can with advantage consist of brushes and/or segments which stand out from the surfaces of the rollers in a mainly radial manner, the free ends of said brushes/segments together forming a concave section in the longitudinal direction of the rollers, which section corresponds substantially to the curvature on a handball.

[0023] There is hereby achieved a suitable though lenient processing of the surface of the ball at the same time that the dirtied resin allows itself to be removed, and with the concave extent of the brushes/segments it is achieved that a uniform processing of a larger area of the surface of the handball is carried out at one and the same time. With the object of ensuring that the dirtied resin is cleaned from the whole of the surface of a ball placed in the cabinet, the apparatus can be arranged so that the direction of rotation of the rollers with protruding elements is oppositely directed and with asynchronous peripheral speed. It is hereby achieved that, during the processing of the ball by the elements protruding from the rotating rollers, the ball will fortuitously rotate, which will result in the whole surface of the ball being heated and processed mechanically by the protruding elements, and will hereby be cleaned of dirtied resin.

[0024] With the object of ensuring that a preferred working temperature is maintained in the cabinet, the apparatus according to the invention is arranged so that the cabinet comprises an adjustable thermostat which is connected to the heating element for adjustment of the temperature of the air emitted from the blower aggregate. The working temperature preferred for the removal of the dirtied resin on the surface of a relevant ball can thus be maintained, whereby the cleaning time becomes optimal, and working temperatures which are too high and can result in damage to the ball can hereby be avoided.

Description of the Drawing

[0025] In the following, the invention will be explained in more detail with reference to the drawing, where

- Fig. 1 is a side-sectional view of a first embodiment of an apparatus for the cleaning of the surfaces of handballs according to the invention,
- Fig. 2 is a sectional view of the apparatus shown in fig. 1 seen along the line A-A,
- Fig. 3 is a side-sectional view of a second embodiment of an apparatus for the cleaning of the surfaces of handballs according to the invention,
- Fig. 4 is a plan view of the apparatus shown in fig. 3, and
- Fig. 5 is an end view of the apparatus shown in fig. 3.

[0026] In fig. 1 there is shown a first embodiment of an apparatus 2 for the cleaning of the surface 4 on a handball 6 which has been coated with dirty resin 8. The apparatus 2 comprises a cabinet 10 provided with a partial enclosure 12 in which a blower 14 and the heating elements 16 are placed. The blower 14 has an air intake from the surroundings via a grating 18 in the side of the cabinet 10, and the partial enclosure has a discharge opening 20 placed over a rotationally-driven roller 22 comprising protruding elements 24 in the form of brushes, the free ends 26 of which in combination form a concave section 28, cf. fig. 2, in the longitudinal direction of the roller 22, said concave section 28 correspondingly substantially to the curvature of the surface on a handball 6, whereby a more uniform processing of a greater part-area of a handball is achieved than if the free ends in combination had formed a rectilinear section in the longitudinal direction of the roller. The rotating roller 22 in the embodiment shown is driven by an electric motor 30 via a belt. It shall be noted that the brushes 24 on the roller 22 are protruding through an opening 25 in the lower end of the cabinet 10.

[0027] With reference to fig. 1, the apparatus 2 functions as follows:

The apparatus is activated, i.e. the blower motor 14, the heating element 16 and the el-motor 30 which drives the roller 22 with the brushes 24 are activated. In a special embodiment of the apparatus (not shown), this can take place automatically via a movement sensor placed near the opening 25 and connected to a control unit (not shown). Hereafter, a handball 6 with a surface dirtied by resin 8 which is desired to be cleaned is placed in the apparatus with the brushes 24 on the rotating roller 22. At the same time, hot air which flows out through the opening 20 is blown onto that part of the ball's surface 4 which is processed by the brushes 24. The dirty resin 8 is hereby softened in the cleaning area 5, and hereafter the dirty resin 8 is able to be removed as particles 8' by the processing with the brushes 24, as is indicated in fig.

1. It will thus be necessary for the user of the apparatus to turn the handball 6 and bring new part areas of the ball's surface 4 with dirtied resin 8 against the brushes 24, until the surface 4 of the handball 6 has been satisfactorily cleaned.

[0028] In fig. 3, fig. 4 and fig. 5 there is shown a second embodiment of the apparatus 2 according to the invention. This similarly comprises a cabinet 10 having a partial enclosure 12 in which there is placed a blower 14 and a heating element. The blower 14 has an air intake from the surroundings via a grating 18 in the side of the cabinet 10, and the partial enclosure 12 has an outflow opening 20 placed over two rotationally-driven rollers 22 comprising outstanding elements 24 in the form of brushes, the free ends 26 of which in combination form a concave extent 8, cf. fig. 4, in the longitudinal direction of the rollers, which corresponds substantially to the curvature on the surface of a handball 6.

[0029] The shown embodiment also comprises support rollers 38 which are housed on a cover 40 which is connected to the cabinet 10 by a hinge connection 42. The support rollers can be brought into contact with a handball 6 placed in the cabinet by a closing of the cover 40, whereby the support rollers 38 are brought into contact with the surface 4 of the handball 6, so that this is held in contact with the free ends 26, 26' of the brushes 24, 24' on the rollers 22, 22'. In this embodiment, the apparatus 2 also comprises a collection tray 44 for the collection of dirty resin removed by the cleaning of the surfaces of the handball, as shown in fig. 1. The collection tray 44 can be removed in a known manner via an opening (not shown) in the cabinet 10. In the shown embodiment, the rotating rollers 22, 22' are driven by an electric motor 30 via a belt 32 which, in the shown embodiment, extends via a reversing wheel 34 so that the rollers rotate in opposite directions, as indicated by the arrows B and C in fig. 3. It shall also be noted that the diameter of the drive wheel 36 on the roller 22' is smaller than the diameter on the drive wheel 36 on the roller 22, the result being that the speed of rotation of the rollers is asynchronous, which means that a handball 6 which is placed in the apparatus with the rotating brushes 24, 24' will be brought into rotation around itself, the result being that when a handball 6 with a surface 4 from which dirtied resin 8 shall be cleaned is placed in the apparatus, the whole of the surface 4 will be processed automatically. The apparatus shown in fig. 3, fig. 4 and fig. 5 for the cleaning of a dirtied layer of resin 8 from the surface 4 of handballs 6 functions as follows:

An actual handball 6 placed in the cabinet 10 as indicated in fig. 1 is brought into contact with the free ends of the brushes 24, 24' on the rollers 22, 22', after which the cover 40 is closed and the apparatus is activated, i.e. the blower motor 14, the heating element 16 and the el-motor 30 which drives the rollers 22, 22' with the brushes 24 are activated. The activation can possibly take place automatically by means of a not-shown switch which is activated when the cover 40 is in the closed position. The

surface 4 of the ball is heated by the blowing-on of hot air from the heating element 16 in the proximity of the opening 20, whereby the dirtied resin 8 which has adhered to the surface 4 is softened to such an extent that it allows itself to be removed by processing with the brushes 24, 24' on the underlying rotating rollers 22, 22', as shown in fig. 1, where the dirtied resin 8' cleaned from the ball falls down under gravitation into the collection tray 44, which is emptied when and as required. With the asynchronous, oppositely directed rotation of the rollers 22, 22', a handball 6 placed in the cabinet 10 will rotate around itself, 13 whereby the dirtied resin will be removed from the whole of its surface in a relatively quick manner, without any assistance by a person being necessary for the manipulation of the ball. Trials have shown the cleaning of dirtied resin 8 from the surface of a handball will have a duration of approx. 1-3 minutes, which in comparison with methods which have hitherto been accessible is a particularly short cleaning time, and the balls will be able to be used a relatively short time after the treatment.

[0030] The heating of the dirtied resin takes place by the blowing-on of hot air, and in this connection the apparatus is provided with a temperature sensor and a control unit for controlling the temperature of the hot air blown onto the surface 4 of the handball so that it lies within a preferred interval, within which the dirtied resin on a handball's surface allows itself to be removed in the best and the quickest manner.

[0031] In a further not-shown embodiment, the apparatus shown in fig. 3, 4 and 5 can be provided with a feeding arrangement for the supply of handballs with surfaces from which dirtied resin shall be removed, and a control arrangement for the leading of cleaned handballs out of the cabin, and a control unit for the coordination of the feeding and leading-out arrangements and for the apparatus.

[0032] With the invention, there is thus disclosed an arrangement which, with use in an active handball club, will enable significant savings to be made in the purchase of new handballs. for the reason that the lifetime for a handball from which dirtied resin is cleaned according to the method and an apparatus for the execution of said method will be able to be increased twofold, which will result in a reduction of up to 50% in the costs involved for a club in the purchase of new balls.

Claims

1. Apparatus (2) for the cleaning of the surfaces (4) of handballs (6) which have been treated with sticky adhering material where the apparatus comprises a partly open cabinet provided with a partial enclosure in which at least one heating element and at least one blower aggregate (14) are placed, with an opening (20) placed near a partly open area in the enclosure, where there is at least one rotationally-driven

roller (22) with protruding elements (24) for mechanical processing of a cleaning area (5) or relevant parts of the surface (4) of a ball (6) which is pressed against the protruding elements (24) on the rotationally-driven roller (22) **characterised in that** the apparatus is arranged so that the cabinet comprises an adjustable thermostat which is connected to the heating element for adjustment of the temperature of the air emitted from the blower aggregate and wherein the apparatus is provided with a temperature sensor and a control unit for controlling the temperature of the hot air blown onto the surface of the handball.

2. Apparatus (2) according to claim 1, **characterised in that** the cabinet (10) further comprises at least two support rollers (38) for controlling and the pressing of the surface (4) of a ball (6) placed in the cabinet (10) against the protruding elements (24, 24') on at least two rotationally-driven rollers (22, 22') in the cabinet (10), where the mutual axle distance of said support rollers conforms with the size of an actual ball (6), and where under the rotationally-driven rollers (22, 22') there is a detachable collection tray (44) for the collection of dirt (8') cleaned from the surface (4) of the ball.
3. Apparatus (2) according to claim 2, **characterised in that** the distance between the axles of the support rollers and the rotationally-driven rollers (22, 22') with protruding elements (24, 24') conforms with the size of an actual ball (6).
4. Apparatus (2) according to claim 2 or 3, **characterised in that** the distance of the axles between the support rollers (38) is adjustable, with at least one of the axles of the support rollers being housed in the cabinet (10) in a manner in which it can be displaced and locked, and that at least one of the rollers (22, 22') with protruding elements (24, 24') is housed in the cabinet (10) in a manner in which it can be displaced, so that the distance between these and the support rollers (38) and the distance between the rotationally-driven rollers (22, 22') with protruding elements (24, 24') is adjustable.
5. Apparatus (2) according to any of the claims 1-4, **characterised in that** the protruding elements (24, 24') on the rollers (22, 22') consist of brushes and/or segments which extend from the surfaces of the rollers in a substantially radial manner, the free ends (26, 26') of said brushes/segments in combination forming a concave section which corresponds substantially to the curvature (4) of the surface of a handball (6).
6. Apparatus (2) according to any of the claims 2-5, **characterised in that** the direction of rotation of the

rotationally-driven rollers (22, 22') with protruding elements (24, 24') is in opposite directions, and with asynchronous peripheral speed.

7. Apparatus (2) according to any of the claims 2-6, **characterised in that** the cabinet (10) comprises an adjustable thermostat which is connected to the heating element for adjustment of the temperature of the air emitted from the blower aggregate.
8. Method for the cleaning of the surfaces (4) of handballs (6) using an apparatus (2) for the cleaning of the surfaces (4) of handballs (6) according to any of claims 1 to 7 which handballs have been treated with sticky adhering material where said apparatus comprises a partly open cabinet provided with a partial enclosure in which at least one heating element and at least one blower aggregate are placed, with an opening (20) placed near a partly open area in the enclosure, where there is at least one rotationally-driven roller (22) with protruding elements (24) for mechanical processing of a cleaning area (5) or relevant parts of the surface (4) of a ball (6) which is pressed against the protruding elements (24) on the rotationally-driven roller (22), wherein in a cleaning area (5) which consists of a dirtied part-area of the handball's surface (4) there is carried out a heating of the surface (4) of the ball and herewith the dirtied sticky adhering material (8) until this is softened or almost fluid, and where in immediate association herewith there is effected a removal of the dirtied sticky/adhering material (8,8') by mechanical processing of the cleaning area (5) on the surface (4) of the ball, or of said relevant parts of the handball's surface (4), and that a turning of the actual handball (6) is carried out, after which the process is repeated until the whole of the surface (4) has been cleaned.
9. Method according to claim 8, **characterised in that** the heating of the surface (4) is effected by a flow of hot air, and that the mechanical processing takes place by protruding elements (24), preferably brushes protruding from rotating rollers (22).
10. Method according to claim 8 or 9, **characterised in that** the relevant cleaning temperature lies within the interval 30-130°C, typically within the interval 45-120°C and preferably 55-110°C.

Patentansprüche

1. Vorrichtung (2) zur Reinigung der Oberflächen (4) von Handbällen (6), die mit einem klebrigen/haftenden Material behandelt wurden, wobei die Vorrichtung ein teilweise offenes Gehäuse umfasst, das mindestens ein Heizelement und mindestens ein

- Gebläseaggregat (14) mit einer Öffnung (20) umfasst, platziert in der Nähe eines teilweise offenen Bereichs in dem Gehäuse, wobei mindestens eine drehend angetriebene Rolle (22) mit vorstehenden Elementen (24) zum mechanischen Bearbeiten eines Reinigungsbereichs (5) oder relevanter Teile der Oberfläche (4) eines Balls (6) vorhanden ist, der gegen die vorstehenden Elemente (24) an der drehend angetriebenen Rolle (22) gedrückt wird, **dadurch gekennzeichnet, dass** die Vorrichtung so angeordnet ist, dass das Gehäuse einen einstellbaren, mit dem Heizelement verbundenen Thermostat und eine Steuereinheit zum Einstellen der Temperatur der Luft, die von dem Gebläseaggregat abgegeben wird, umfasst.
2. Vorrichtung (2) nach Anspruch 1, **dadurch gekennzeichnet, dass** das Gehäuse (10) ferner mindestens zwei Stützrollen (38) zum Kontrollieren und Drücken der Oberfläche (4) eines in dem Gehäuse (10) platzierten Balls (6) gegen die vorstehenden Elemente (24, 24') an mindestens zwei drehend angetriebenen Rollen (22, 22') in dem Gehäuse (10) umfasst, wobei der gegenseitige Achsabstand der Stützrollen der Größe eines aktuellen Balls (6) entspricht, und wobei sich unter den drehend angetriebenen Rollen (22, 22') eine abnehmbare Sammelablage (44) zum Sammeln von Schmutz (8'), der von der Oberfläche (4) des Balls entfernt wurde, befindet.
3. Vorrichtung (2) nach Anspruch 2, **dadurch gekennzeichnet, dass** der Abstand zwischen den Achsen der Stützrollen und den drehend angetriebenen Rollen (22, 22') mit vorstehenden Elementen (24, 24') der Größe eines aktuellen Balls (6) entspricht.
4. Vorrichtung (2) nach Anspruch 2 oder 3, **dadurch gekennzeichnet, dass** der Abstand der Achsen zwischen den Stützrollen (38) einstellbar ist, wobei mindestens eine der Achsen der Stützrollen in dem Gehäuse (10) in einer Weise untergebracht ist, in der sie versetzt und gesperrt werden kann, und dass mindestens eine der Rollen (22, 22') mit vorstehenden Elementen (24, 24') in dem Gehäuse (10) in einer Weise untergebracht ist, in der sie versetzt werden kann, sodass der Abstand zwischen diesen und den Stützrollen (38) und der Abstand zwischen den drehend angetriebenen Rollen (22, 22') mit vorstehenden Elementen (24, 24') einstellbar ist.
5. Vorrichtung (2) nach einem der Ansprüche 1-4, **dadurch gekennzeichnet, dass** die vorstehenden Elemente (24, 24') an den Rollen (22, 22') aus Bürsten und/oder Segmenten bestehen, die sich von den Oberflächen der Rollen in einer im Wesentlichen radialen Weise erstrecken, wobei die freien Enden (26, 26') der Bürsten/Segmente in Kombination einen konkaven Abschnitt bilden, der im Wesentlichen der Wölbung (4) der Oberfläche eines Handballs (6) entspricht.
6. Vorrichtung (2) nach einem der Ansprüche 2-5, **dadurch gekennzeichnet, dass** die Drehrichtung der drehend angetriebenen Rollen (22, 22') mit vorstehenden Elementen (24, 24') entgegengesetzt ist und mit einer asynchronen peripheren Geschwindigkeit erfolgt.
7. Vorrichtung (2) nach einem der Ansprüche 2-6, **dadurch gekennzeichnet, dass** das Gehäuse (10) einen einstellbaren Thermostat umfasst, der mit dem Heizelement zum Einstellen der Temperatur der aus dem Gebläseaggregat abgegebenen Luft verbunden ist.
8. Verfahren zur Reinigung der Oberflächen (4) von Handbällen (6) unter Verwendung einer Vorrichtung (2) zur Reinigung der Oberflächen (4) von Handbällen (6) nach einem der Ansprüche 1 bis 7, wobei Handbälle mit einem klebrigen/haftenden Material behandelt wurden, wobei die Vorrichtung ein teilweise offenes Gehäuse umfasst, das mindestens ein Gebläseaggregat (14) mit einer Öffnung (20) umfasst, platziert in der Nähe eines teilweise offenen Bereichs in dem Gehäuse, wobei mindestens eine drehend angetriebene Rolle (22) mit vorstehenden Elementen (24) zum mechanischen Bearbeiten eines Reinigungsbereichs (5) oder relevanter Teile der Oberfläche (4) eines Balls (6) vorhanden ist, der gegen die vorstehenden Elemente (24) an der drehend angetriebenen Rolle (22) gedrückt wird, wobei in einem Reinigungsbereich (5), der aus einem verunreinigten Teilbereich der Oberfläche (4) des Handballs besteht, ein Heizen der Oberfläche (4) des Balles und damit des verunreinigten klebrigen/haftenden Materials (8) ausgeführt wird, bis dieses aufgeweicht oder fast flüssig ist, und wobei in unmittelbarer Verbindung hiermit ein Entfernen des verunreinigten klebrigen/haftenden Materials (8, 8') durch mechanisches Bearbeiten der Reinigungsfläche (5) auf der Oberfläche (4) des Balles oder der relevanten Teile der Oberfläche (4) des Handballs bewirkt wird, und dass ein Drehen des aktuellen Handballs (6) ausgeführt wird, nach dem das Verfahren wiederholt wird, bis die gesamte Oberfläche (4) gereinigt ist.
9. Verfahren nach Anspruch 8, **dadurch gekennzeichnet, dass** das Heizen der Oberfläche (4) durch einen Strom von heißer Luft bewirkt wird, und dadurch, dass das mechanische Bearbeiten durch vorstehende Elemente (24), vorzugsweise Bürsten, die von drehenden Rollen (22) vorstehen, vorgenommen wird.
10. Verfahren nach Anspruch 8 oder 9, **dadurch gekennzeichnet, dass** die relevante Reinigungstemperatur

peratur innerhalb des Intervalls von 30-130 °C liegt, in der Regel innerhalb des Intervalls von 45-120 °C und vorzugsweise 55-110 °C.

Revendications

1. Appareil (2) de nettoyage des surfaces (4) de ballons de handball (6) qui ont été traités avec un matériau collant/adhérent, où l'appareil comprend une enceinte partiellement ouverte, qui comprend au moins un élément chauffant et au moins un agrégat de soufflante (14) comportant une ouverture (20) placée à proximité d'une région partiellement ouverte dans l'enceinte, où il est prévu au moins un rouleau entraîné en rotation (22) présentant des éléments saillants (24) pour traiter mécaniquement une région de nettoyage (5) ou des parties appropriées de la surface (4) d'un ballon (6) qui est pressé contre les éléments saillants (24) sur le rouleau entraîné en rotation (22), **caractérisé en ce que** l'appareil est agencé de telle sorte que l'enceinte comprenne un thermostat réglable qui est connecté à l'élément chauffant et une unité de commande pour régler la température de l'air émis par l'agrégat de soufflante.
2. Appareil (2) selon la revendication 1, **caractérisé en ce que** l'enceinte (10) comprend en outre au moins deux rouleaux de support (38) pour commander et pour le pressage de la surface (4) d'un ballon (6) placé dans l'enceinte (10) contre les éléments saillants (24, 24') sur au moins deux rouleaux entraînés en rotation (22, 22') dans l'enceinte (10), où la distance mutuelle d'entre-axe desdits rouleaux de support correspond à la taille d'un ballon réel (6), et où un plateau de collecte détachable (44) est placé en dessous des rouleaux entraînés en rotation (22, 22') afin de collecter les saletés (8') détachées de la surface (4) du ballon.
3. Appareil (2) selon la revendication 2, **caractérisé en ce que** la distance entre les axes des rouleaux de support et des rouleaux entraînés en rotation (22, 22') pourvus des éléments saillants (24, 24') correspond à la taille d'un ballon réel (6).
4. Appareil (2) selon la revendication 2 ou 3, **caractérisé en ce que** la distance des axes entre les rouleaux de support (38) est réglable, au moins un des axes des rouleaux de support étant logé dans l'enceinte (10) de telle sorte qu'il puisse être déplacé et verrouillé, et **en ce qu'**au moins un des rouleaux (22, 22') pourvu des éléments saillants (24, 24') est logé dans l'enceinte (10) de telle sorte qu'il puisse être déplacé, de telle sorte que la distance entre ceux-ci et les rouleaux de support (38) et la distance entre les rouleaux entraînés en rotation (22, 22') présentant des éléments saillants (24, 24') soit réglable.
5. Appareil (2) selon l'une quelconque des revendications 1 à 4, **caractérisé en ce que** les éléments saillants (24, 24') sur les rouleaux (22, 22') sont constitués de brosses et/ou de segments qui s'étendent à partir des surfaces des rouleaux d'une manière sensiblement radiale, les extrémités libres (26, 26') desdits brosses/segments en combinaison formant une section concave qui correspond sensiblement à la courbure (4) de la surface d'un ballon de handball (6).
6. Appareil (2) selon l'une quelconque des revendications 2 à 5, **caractérisé en ce que** le sens de rotation des rouleaux entraînés en rotation (22, 22') avec des éléments saillants (24, 24') est orienté dans des directions opposées, et avec une vitesse périphérique asynchrone.
7. Appareil (2) selon l'une quelconque des revendications 2 à 6, **caractérisé en ce que** l'enceinte (10) comprend un thermostat réglable qui est connecté à l'élément chauffant pour régler la température de l'air émis par l'agrégat de soufflante.
8. Procédé de nettoyage des surfaces (4) de ballons de handball (6) en utilisant un appareil (2) de nettoyage des surfaces (4) de ballons de handball (6) selon l'une quelconque des revendications 1 à 7, lesquels ballons de handball ont été traités avec un matériau collant/adhérent, où ledit appareil comprend une enceinte partiellement ouverte, qui comprend au moins un agrégat de soufflante (14) comportant une ouverture (20) placée à proximité d'une région partiellement ouverte dans l'enceinte, où au moins un rouleau entraîné en rotation (22) présentant des éléments saillants (24) est prévu pour traiter mécaniquement une région de nettoyage (5) ou des parties appropriées de la surface (4) d'un ballon (6) qui est pressé contre les éléments saillants (24) sur le rouleau entraîné en rotation (22), dans lequel, dans une région de nettoyage (5) qui consiste en une partie de région sale de la surface (4) du ballon de handball, un chauffage de la surface (4) du ballon et avec celle-ci du matériau collant/adhérent (8) sale est réalisé jusqu'à ce que celui-ci soit ramolli ou presque fluide, et où en immédiate association avec lequel est effectué un enlèvement du matériau collant/adhérent (8, 8') sale par un traitement mécanique de la région de nettoyage (5) sur la surface (4) du ballon, ou desdites parties appropriées de la surface (4) du ballon de handball, et en ce qu'une rotation du ballon de handball réel (6) est exécutée, et ensuite le processus est répété jusqu'à ce que la totalité de la surface (4) ait été nettoyée.
9. Procédé selon la revendication 8, **caractérisé en ce que** le chauffage de la surface (4) est effectué par un écoulement d'air chaud, et **en ce que** le traitement

mécanique est effectué par des éléments saillants (24), de préférence des brosses en saillie à partir des rouleaux rotatifs (22).

10. Procédé selon la revendication 8 ou 9, **caractérisé en ce que** la température de nettoyage appropriée se situe à l'intérieur de l'intervalle 30 °C - 130 °C, typiquement à l'intérieur de l'intervalle 45 °C - 120 °C et de préférence 55 °C - 110 °C.

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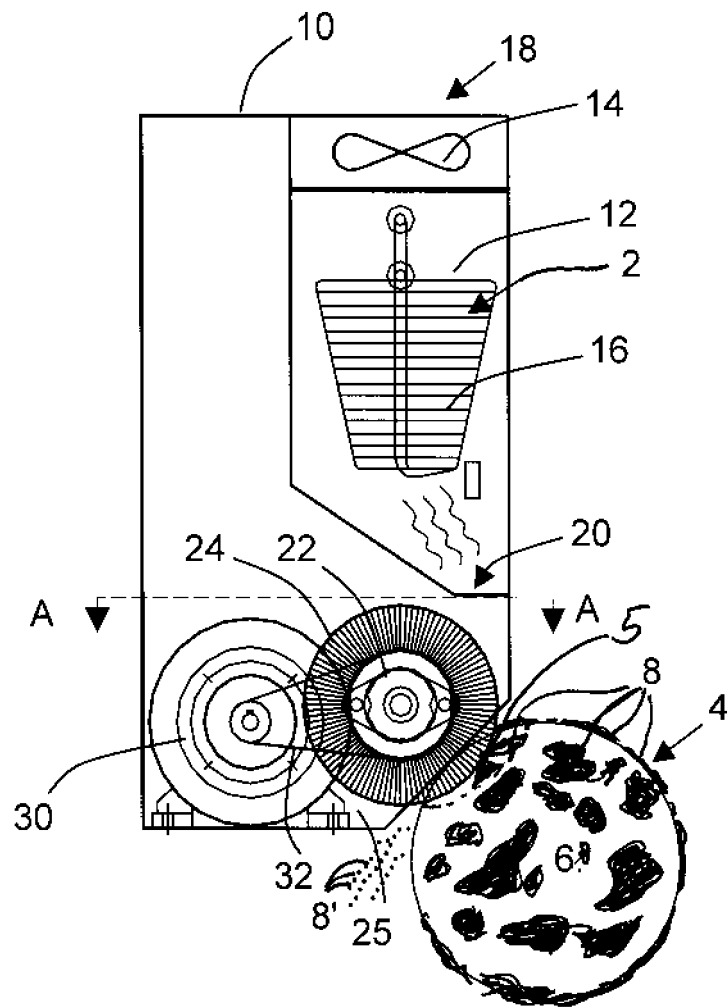


Fig. 1

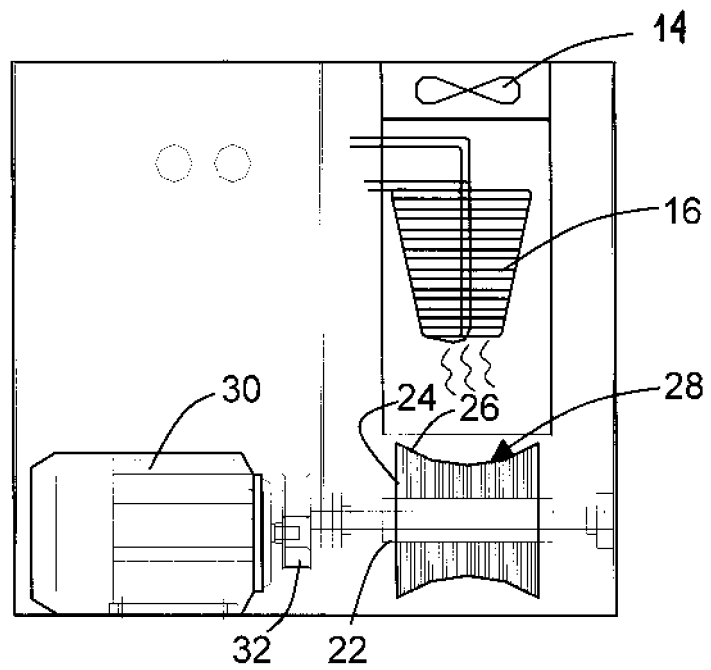


Fig. 2

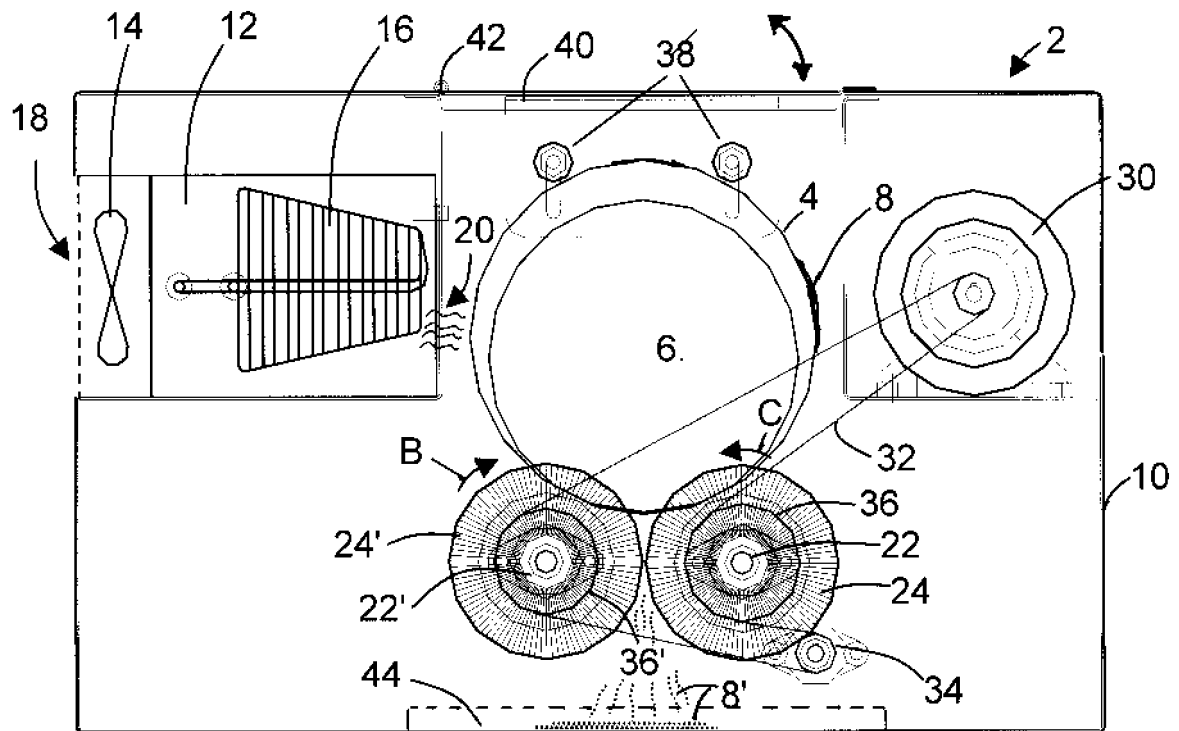


Fig. 3

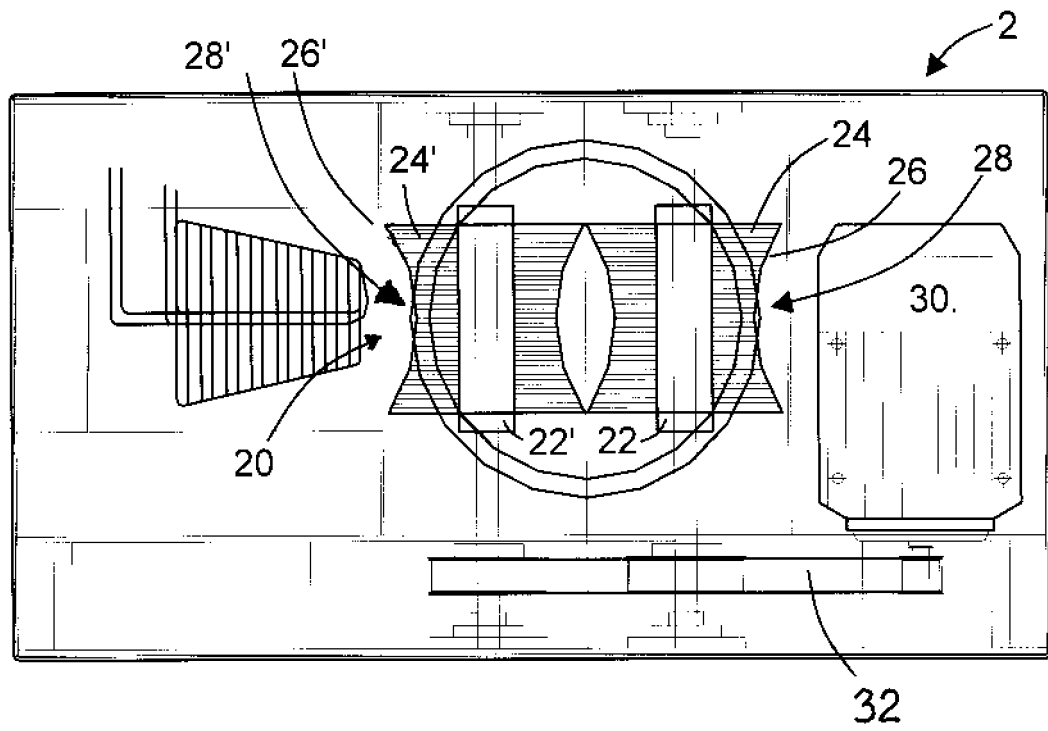
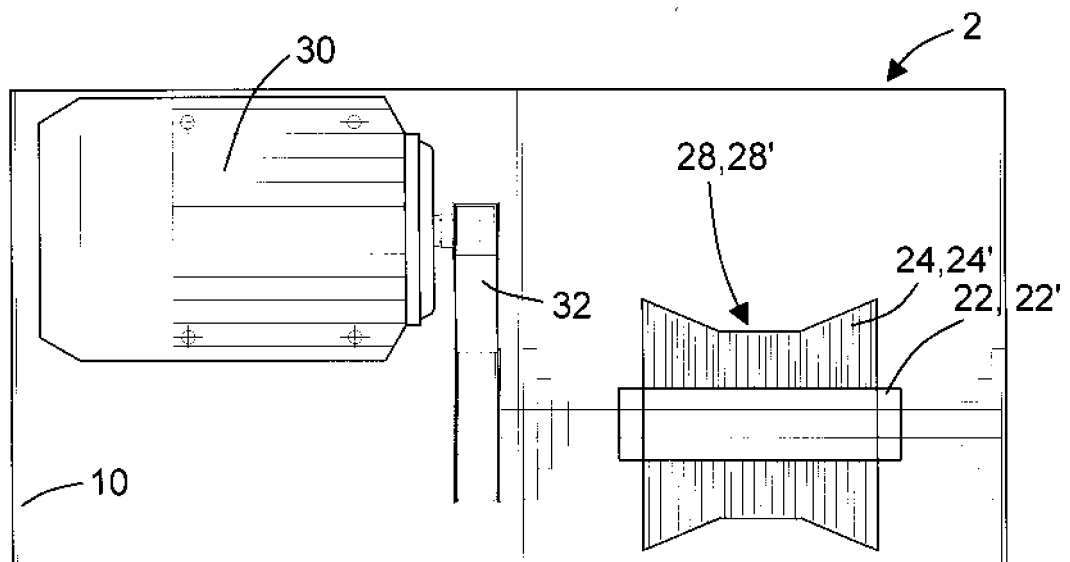


Fig. 4



Section A-A

Fig. 5

REFERENCES CITED IN THE DESCRIPTION

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