



(51) International Patent Classification:

D06C 5/00 (2006.01)

D06F 69/04 (2006.01)

D06F 59/06 (2006.01)

(21) International Application Number:

PCT/TR2019/050214

(22) International Filing Date:

02 April 2019 (02.04.2019)

(25) Filing Language:

English

(26) Publication Language:

English

(30) Priority Data:

2019/02979

27 February 2019 (27.02.2019) TR

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(81) Designated States (unless otherwise indicated, for every

kind of national protection available): AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BN, BR, BW, BY, BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DJ, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IR, IS, JO, JP, KE, KG, KH, KN, KP, KR, KW, KZ, LA, LC, LK, LR, LS, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PA, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SA, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

(84) Designated States (unless otherwise indicated, for every

kind of regional protection available): ARIPO (BW, GH, GM, KE, LR, LS, MW, MZ, NA, RW, SD, SL, ST, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, RU, TJ, TM), European (AL, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK, SM,

(54) Title: HOSIERY BOARDING MACHINE

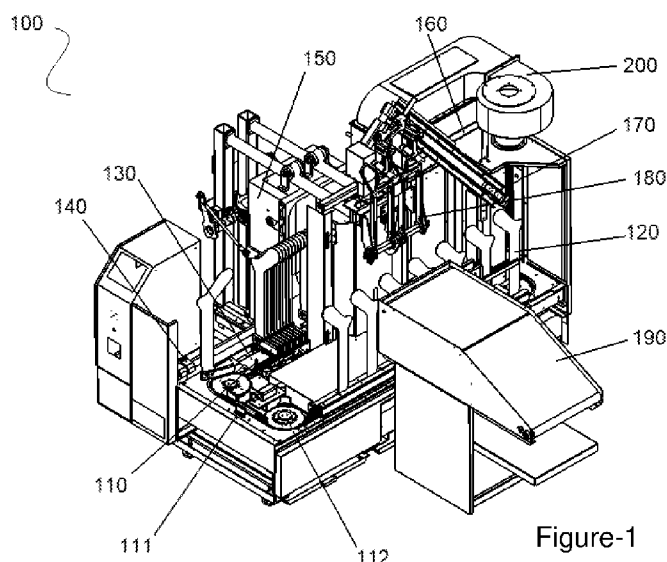


Figure-1

(57) Abstract: This invention relates to a socks boarding machine (100) that performs finishing operations before packaging under pressurized steam after knitting of hosiery and similar 3D textile products. The said socks boarding machine (100) consists of maximum 16 forms (120), which are secured to the carrier chain system (110), which are made of aluminum and on which the socks are loaded; an autoclave unit (150), in which the socks to be processed by steam are kept according to the temperature and pressure determined according to the type of the socks and which is locked by autoclave unit lock system (14) and an economizer unit (200), which allows recycling of the heated air inside to increase the energy efficiency of the heater system used and to minimize the energy consumption.

TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW,
KM, ML, MR, NE, SN, TD, TG).

Published:

- *with international search report (Art. 21(3))*
- *in black and white; the international application as filed
contained color or greyscale and is available for download
from PATENTSCOPE*

HOSIERY BOARDING MACHINE

Technical Field

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This invention relates to a hosiery boarding machine that performs finishing operations setting, ironing under steam pressure before packaging, after knitting process of hosiery and similar 3D textile products.

10 This invention is particularly relating to a hosiery boarding machine with decreased number of forms to reduce the area that machine occupies in the facility, which has a compact and easy-to-control structure with lower energy consumption and reduced labor force requirement as well as the decreased labor cost.

15 State of the Art

With the current developments in technology, there are always innovations in the electronic sock knitting machines used to manufacture socks. The first step in production of socks is to manufacture the product. To manufacture the first product, it is
20 required to determine the yarns of the sock, to install the yarns in the machine and to introduce the yarns into the shuttle and finally to enter the directions for manufacture of the sock into the machine. Then, the toe of the knitted socks with required color, pattern and yarn are closed. The final step of manufacture of the socks, which starts to reach the final appearance after sewing the toes, is ironing (forming) and packaging. The
25 ironing process is basically performed by applying steam at pressure and temperature determined according to the characteristics of the yarn used to manufacture the socks. The most important factor in ironing process is the duration of applying pressure. The duration of applying pressure to the socks directly effects the quality. The socks can be transferred to a specialized press after the ironing process. This process allows that the
30 socks keep the ironed form for a longer time. Finally, the socks are labeled, packed and made ready for marketing.

In textile industry, all synthetic yarns like elasthanes, polyester, acrylic, nylon and others used in fabrics, hosiery products have to be set except cotton yarn. Otherwise these

synthetic yarns cannot be stable as the size wise as well as the structure wise. There are two ways to set the synthetic yarns. One of it to process by 200°C hot air during certain amount of time like 15-20 seconds. Second way is to process under the steam pressure. We are using steam pressure in our boarding machine in order to set the synthetics yarns.

Today, there are different machines and methods used in the boarding (setting) process, which prevents deformation of the socks after use or washing. One of them is the process of ironing the socks with an electrical hand form, which doesn't allow manufacture of the socks in desired quality as no steam is used in this process. Another method is to perform this process in automatic machines, which can offer setting with steam. The machines offering setting with steam are also divided into two structural classes. In the first type of machines, the aluminum forms (boarding forms), on which the socks are loaded, move one by one or two by two after the operator loads the socks and enter into the steam chamber (autoclave), which can accommodate one or two forms and then they are fixed after applying pressurized steam for a short time. In the second type of machines, the socks are collected in an area after they are loaded by the operators and then they are transferred into the steam room in batches for setting. In this method, the socks can be applied with the pressurized steam for a longer time and this allows socks with higher quality, so the manufacturer companies have to use such machine to manufacture all socks with medium or higher quality according to the requirements of their customers. Although the machines that transfer the socks into the steam room in batches are required for high-quality products, they have some disadvantages such that they require a wide area for installation and higher labor force required for forming process. Such machines consist of a total of 120 and more aluminum forms as a result of combining the 4 separate groups, each consisting of 30 forms, in order to create groups and perform steaming process in batches. In such case, the dimensions of the machine are higher than other machines and this has a negative impact on the ergonomic use of the facilities by the operators. As such machines have higher number of forms and they are bigger than other machines in size, they consume higher energy and they have a negative impact on the long-term profitability of the manufacturers. In addition, such machines require a higher number of operators compared to the other machines and so the labor cost per sock is higher. On the other hand, as such machines have 120 and higher aluminum forms, when it is required to process a sock with another size on the same machine, each form should be

removed and replaced with an appropriate one, which causes a waste of time to replace the forms as well as a loss in productivity.

Today, many studies have been performed and new machines have been developed to
5 fix the three-dimension textile products, such as socks, rapidly, easily and smoothly. One of them is described in the patent no. EP19910830445, titled "Ironing machine for socks". This invention relates to a method and machine for industrial ironing of the socks, in which the pre-damped forms move along a predetermined path, where the socks are applied with pressing up to the cycling operations purified with air and steam
10 between the heated plates. The machine has a rotating table and there is at least one pair of forms for the socks applied to each side of the said table and a series of pressing stations in cycle with the stop or steam stations starting from a loading station for the socks on the said forms.

15 Another study is an invention described in the patent no. WO2017IB56209 titled "Apparatus to finish men's sock and similar products". The invention consists of a framework that shapes a flat bed that extends on a horizontal or almost horizontal plane; here, a series of work stations are arranged between the polyangular or elliptical closed lines. Along this closed line, there are multiple transfer mechanisms that allow
20 transferring at least one form, in which the textile products are placed with steam. The work stations of the apparatus comprise a steam load station consisting of a first loading room and second loading room arranged on the said closed line in the feeding direction of the said transfer mechanism.

25 Another study is an invention, which is described in patent no. IT1993BO00377, titled "Feeding equipment for machines to fix socks". The invention consists of an auxiliary rotating table equipped with a rotating platform with at least one pair of pipe-shaped former to control the socks. The said auxiliary rotating table can be driven to the related steps with a control station for socks and another station to remove the said socks. The
30 rotating table in the boarding machine drives a series of boarding forms in one station for placing the socks adjacent to the extraction station of the auxiliary rotating table. A robot unit is equipped with a guided frame operating vertically between a lower position and a raised position and it has a double clamp to process the socks between a position aligned with the removing station and a position aligned with the station for placement.

The said boarding forms can run with increasing stroke to remove the socks from the clamps and pipe-shaped forms and with decreasing stroke to load the said socks in the boarding forms.

Another study is described in the patent no. TR201813014, titled "Machine for reversing 3D textile products". The invention relates to a machine that reverses the socks and similar textile products. The invention is characterized in that the gloves loaded into the form in a glove-shaped form fixed to a rotating plate driven by a motor are loaded onto a female form by the stripper driven by a timing belt and then compressed by a compressor driven by press piston and collected on the collection plate by being released from the female form by pulling back the female form, when the glove is inside out. The invention allows performing both the setting and pressing processes during reversing operation.

Consequently, the boarding machine that eliminates the disadvantages of the present technique and the insufficiency of the existing solutions have made it necessary to make a development in the related technical area.

Brief Description of the Invention

This invention relates to a socks boarding machine that performs finishing operation before packaging under pressurized steam after knitting of hosiery and 3D textile products, which meets the aforementioned requirements, eliminates the current disadvantages and offers some additional advantages.

Considering the state of the art, the purpose of this invention is to decrease the number of forms in the said boarding machine and thereby to ensure that machine occupies less area by reducing the total volume of the machine and thereby to ensure that the manufacturers can use their area more ergonomically.

The purpose of this invention is to decrease the total volume of the boarding machine and to provide a more compact and easy-to-control machine.

Another purpose of this machine is to decrease the power required for the setting process by reducing the total volume of the boarding machine and thereby to provide a machine with high energy efficiency, which consumes less power.

- 5 Another purpose of this invention is to ensure that the medium- and long-term profitability of the manufacturer is increased by decreasing the power requirement of the boarding machine for setting process.

- 10 Another purpose of this invention is to ensure that the number of operators required to operate the machine is decreased by decreasing the number of aluminum forms in the boarding machine and that a more efficient machine with lower labor costs is provided.

- 15 Another purpose of this invention is to ensure that the forms are replaced more quickly in case of any change in the size of the socks to be fixed thanks to the decrease in the number of aluminum forms in the ironing and fi boarding machine.

- Another purpose of this invention is to ensure that a more efficient machine is provided due to the fact that the aluminum forms can be replaced in a shorter time in case that the size of the socks to be fixed in the boarding machine is changed.

- 20 The structural and characteristic features of the invention can be understood more clearly with the following figures and the detailed description that refers to the said figures; therefore, the evaluation is required to be made by taking these figures and the detailed description into account.

- 25 **Short Description of Figures**
- This invention should be considered with the figures described below in order to understand the advantages of this present invention with its structural and additional characteristics.

Figure-1 is the schematic general view of the installed boarding machine; Figure-2 is the schematic general front view of the boarding machine; Figure-3 is the schematic general side view of the boarding machine; Figure-4 is the schematic general back view

of the boarding machine; Figure-5 is the schematic general view of the dismantled autoclave section; Figure-6 is the schematic general side view of the dismantled autoclave section; Figure-7 is the schematic general back view of the dismantled autoclave section; Figure-8 is the detailed view of the multiple forms on the carrier chain system in the autoclave; Figure-9 is the schematic general top view of the collection area before autoclave; Figure-10 is the schematic general view of the economizer unit, Figure-11 is the schematic general top view of the main driving group chain wheel and the chain that carry the forms.

Reference Numbers

100. Boarding machine 110. Carrier chain system 111. Drive group moto-reducer 112. Chain wheels 120. Forms 130. Collection area before autoclave 140. Transfer unit 150. Autoclave unit 151. Drive moto-reducer 152. Drive actuator system 153. Drive pulley system 154. Lock system 155. Lock angles 156. Lock piston mechanism 160. Drying unit 170. Automatic remover system 180. Racket system 190. Conveyor carrying system 200. Economizer unit

Detailed Description of the Invention

In this detailed description, the socks boarding machine (100) that performs finishing operations before packaging under compressed steam after knitting process of the hosiery and similar 3D textile products according to this present invention is described to ensure that this invention is understood more clearly without any restricting implication.

The boarding machine (100) in Figure-1 is developed to iron and set the socks, hosiery and similar 3D textile products under steam before packaging. The said boarding machine (100) consists of a carrier chain system (110) moving through the chain wheels (112) with pitch of 138 mm or less and outer diameter of 294.2 mm or less driven by the drive group moto-reducer (111) shown in figure-11; the forms (120) secured to this

carrier chain system (110), made of aluminum material and on which the socks are loaded, and the collection area before autoclave (130), where the forms (120) are grouped and waited before being transferred to the autoclave unit (150). In the said boarding machine (100), the socks loaded on the aluminum forms (120) manually are waited in the collection area before autoclave (130) until a group of minimum 1 to maximum 16 forms (120) is created.

On the ironing and fixing machine (100) shown in Figure-2, there is a transfer unit (140), which allows to transfer the form (120) group collected in the collection area before autoclave (130) to the autoclave unit (150) in batches, an autoclave unit (150), where setting process is performed by keeping the socks to be processed during a required period of time at the temperature and pressure determined according to the type of the socks and a drying unit (160), where the fixed socks from the autoclave unit (150) are dried.

At the top of the boarding machine (100) shown in Figure-3, there is an automatic unloading system (170), which allows unload the socks from the form (120) after being dried in the drying unit (160). The conveyor carrying system (190) in the said boarding machine (100) allows transferring the steam-setted socks to the related personnel for packaging.

In the boarding machine (100) shown in Figure-4 and 5, there is a racket system (180), which allows the socks removed by the automatic remover system (107) after being dried in the drying unit (160) to be dropped on the conveyor belt. The steam-setted socks dropped on the conveyor belt by the said racket system (180) are transferred by the conveyor carrying system (190) to the packaging line. In the said boarding machine (100), there is also an economizer unit (200), which allows recycling of the air heated in it in order to increase energy efficiency in the heater system used and to minimize the energy consumption.

The autoclave unit (150) in the said boarding machine (100) consists of a drive moto-reducer (151), which is shown in figure-6 and allows collecting the socks on the forms (120), a drive actuator system (152), which is shown in figure-6 and transfers the motion provided by the drive moto-reducer (151), a drive pulley system (153), on which the

autoclave unit (150) moves, a lock system (154), which is shown in figure-7 and closes and locks the autoclave unit (150) being driven by the lock piston mechanism (156), lock angles (155), which are shown in figure-8 and secure the lock system (154) and a lock piston mechanism (156), which drives and moves the lock system (154).

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In the boarding machine (100) shown in Figure-9, the socks are manually loaded in the sock-shaped aluminum forms (120) secured to the carrier chain system (110) driven by the motor. Following manual loading of the socks to be processed by the operators on the forms (120), which come in front of the operators empty, the socks loaded are collected in the collection area before autoclave (130) and after creation of a group consisting of minimum 1 to maximum 16 forms (120) optionally, they are driven and transferred by the transfer unit (4) to the autoclave unit (150), which is the steam chamber, in batches and they are steam-setted by keeping them under pressurized steam at the temperature and pressure determined according to the type of the socks to be processed during the required period of time. On the said boarding machine (100), a total of maximum 48 aluminum forms (120) are formed in 3 groups, each consisting of 16 forms. When the first of these groups is collected in the collection area before autoclave (130) and reaches to maximum number of 16 forms (120), it is driven by the transfer unit (140) to be transferred to the autoclave unit (150) for setting process. After transferring maximum 16 aluminum forms (120) into the unit, they are driven by the autoclave unit drive moto-reducer (151) and transferred to the autoclave body through the autoclave unit drive actuator system (152) and so the autoclave unit (150) moves on the autoclave system drive pulley system (153) to switch to closed position. Once the autoclave unit (150) is closed, the autoclave unit lock system (140) secured by the autoclave unit lock angles (155) is actuated by being pneumatically driven by the autoclave unit lock piston mechanism (156) to close and lock the autoclave unit (150) in order to give steam to the first group of maximum 16 forms inside the unit at temperature, pressure and during the time to be determined based on the required quality of finished socks as well as the type of the yarn used for knitting the socks. The autoclave unit (150) in the said closed position intakes steam by opening the pneumatic steam valves. After taking the steam until the required temperature and pressure are achieved, the steam inlet valves are turn off to keep the form (120) group in the autoclave unit (150) under steam at this temperature and pressure during the required period of time. When the required period of time is completed, the compressed steam in

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the autoclave unit (150) is safely discharged by the steam discharge pneumatic valves. After completion of the discharge operation, the autoclave unit lock system (154) moves to the opening direction and is opened by being pneumatically driven by the autoclave unit lock piston mechanism (156). As a result of being driven by the autoclave unit drive moto-reducer (151) and transferred to the autoclave body through the autoclave unit drive actuator system (152), the autoclave unit (150) moves on the autoclave system drive pulley system (153) to switch to closed position. The first group consisting of maximum 16 aluminum forms (120) processed in the said autoclave unit (150) is transferred to the drying unit (160) by being pushed by the 2nd Group, which follows the first group and which is collected in the collection area before autoclave (130) during processing of the first group in the autoclave unit (150) and which also consists of the 16 aluminum forms (120) and on which the operators load socks manually. The drying unit (160) shown in Figure-10 is heated to the set temperature according to the type of the socks processed as a result of circulating the hot air through the heat exchanger for heating up, by the circulation fan. In order to heat to such temperatures, the steam or electrical heaters can be used as the energy sources. In order to increase the energy efficiency in the heating system used and to minimize the energy consumption, the boarding machine (100) has an economizer unit (200) that allows recycling of the air heated in it. The dried socks from the said drying unit (160) are transferred under the automatic unloading system (170) on the path followed by the carrier chain system (110). The socks removed from the aluminum forms (120) by the automatic unloading system (170) are transferred on the conveyor carrying system (190) as a result of movement of the racket system (180) from vertical position to horizontal position by 90° and transferred outside the machine to be packed. All of these operations are performed successively and automatically to set the socks.

While the operations are performed in the said boarding machine (100) according to the settings made by the operator using the controller, the operations are controlled and monitored automatically and in a synchronized manner by PLC controllers, speed drivers, sensors, pneumatic cylinders, motors, temperature measuring units, pneumatic valves, pressure control systems and servo systems.

In the said boarding machine (100), the setting medium consists of a total of 48 aluminum forms (120), which is formed by 3 groups of aluminum forms (120), each

consisting of maximum 16 forms. The said boarding machine (100) is designed to operate with a total of 24 aluminum forms (120) in 3 groups, each consisting of 8 aluminum forms (120); a total of 30 aluminum forms (120) in 3 groups, each consisting of 10 aluminum forms (120); a total of 36 aluminum forms (120) in 3 groups, each consisting of 12 aluminum forms (120); a total of 42 aluminum forms (120) in 3 groups, each consisting of 14 aluminum forms (120) and a total of 48 aluminum forms (120) in 3 groups, each consisting of 16 aluminum forms (120).

In a preferred embodiment of this present invention, the boarding machine (100) comprises a moto-reducer, pneumatic piston, hydromotor, hydro-pneumatic, hydraulic piston, motor belt and pulley system, cam system and similar systems as the driving system.

CLAIMS

1. A socks boarding machine (100) that performs finishing processes of the hosiery and similar 3D textile products after knitting process and before
5 packaging under steam, characterized in that it consists of maximum 16 forms (120), which are secured to the carrier chain system (110), which are made of aluminum and on which the socks are loaded; an autoclave unit (150), in which the socks to be processed by steam are kept according to the temperature and pressure determined according to the type of the socks and
10 which is locked by autoclave unit lock system (14) and an economizer unit (200), which allows circulating of the heated air inside to increase the energy efficiency of the heating system used and to minimize the energy consumption.
2. The boarding machine (100) according to Claim 1, characterized in that a total
15 of maximum 48 aluminum forms (120) are formed in 3 groups, each consisting of 16 forms.
3. The boarding machine (100) according to Claim 1, characterized in that it consists of a drive moto-reducer (151), which is located in the autoclave unit (150) and allows the socks loaded in the forms (120) are fed into.
- 20 4. The boarding machine (100) according to Claim 1, characterized in that it consists of a drive actuator system (152), which is located in the autoclave unit (150) and transfers the motion provided by the drive moto-reducer (151).
5. The boarding machine (100) according to Claim 1, characterized in that it consists of a drive pulley system (153), on which the autoclave unit (150)
25 moves.
6. The boarding machine (100) according to Claim 1, characterized in that it consists of a lock system (154), which closes and locks the autoclave unit (150) by actuating the lock piston mechanism (156).
7. The boarding machine (100) according to Claim 1, characterized in that it
30 consists of the lock angles (155), which secure the lock system (154).
8. The boarding machine (100) according to Claim 1, characterized in that it consists of a lock piston mechanism (156), which drives and actuates the lock system (154).

9. The boarding machine (100) according to Claim 1, characterized in that it consists of a collection area before autoclave (130), in which the forms (120) are waited before being transferred to the autoclave unit (150).
- 5 10. The boarding machine (100) according to Claim 1, characterized in that it consists of a transfer unit (140), which allows that the group of forms (120) collected in the collection area before autoclave (130) is transferred to the autoclave unit (150) in batches.
- 10 11. The boarding machine (100) according to Claim 1, characterized in that it consists of a carrier chain system (110), which moves through chain wheels (112) driven by the moto-reducer (111).
12. The boarding machine (100) according to Claim 1, characterized in that it consists of a drying unit (160), which dries the fixed socks from the autoclave unit (150).
- 15 13. The boarding machine (100) according to Claim 1, characterized in that it consists of an automatic remover system (170), which allows removing the socks from the form (120) after being dried in the drying unit (160), at the top of the boarding machine (100).
- 20 14. The boarding machine (100) according to Claim 1, characterized in that it consists of a conveyor carrying system (190), which allows transferring the fixed socks to the personnel for packaging.
- 25 15. The boarding machine (100) according to Claim 1, characterized in that it consists of a racket system (180), which allows the socks removed by the automatic remover system (107) after being dried in the drying unit (160) to be dropped on the conveyor belt.
- 30 16. The boarding machine (100) according to Claim 1, characterized in that it consists of a conveyor carrying system (190) that carries the fixed socks dropped on the conveyor belt by the racket system (180) to the packaging.
17. The boarding machine (100) according to Claim 1, characterized in that it consists of chain wheels (112) with outer diameter of 294.2 mm and pitch of 138 mm or less.
18. The boarding machine (100) used to finalize the 3D textile products, such as socks and hosiery, performing the finishing operations before ironing and packaging, characterized in that it consists of collecting and keeping the socks manually loaded on the forms (120) in the collection area before autoclave

(130) until a group of maximum 16 forms (120) is formed and transferring them to the autoclave unit (150), which is the steam room in batches; transferring the first group consisting of maximum 16 aluminum forms (120) processed in the autoclave unit (150) to the drying unit (160) by being pushed by the 2nd group, which follows the first group and is collected in the collection area before autoclave (130) during processing of the first group in the autoclave unit (150) and which also consists of 16 aluminum forms (120) and which is loaded with socks by the operators manually.

19. The boarding machine (100) according to Claim 18, characterized in that the setting medium consists of a total of 48 aluminum forms (120), which is formed by 3 groups of aluminum forms (120), each consisting of maximum 16 forms.

20. The boarding machine (100) according to Claim 18, characterized in that it can be designed to operate with a total of 24 aluminum forms (120) in 3 groups, each consisting of 8 aluminum forms (120); a total of 30 aluminum forms (120) in 3 groups, each consisting of 10 aluminum forms (120); a total of 36 aluminum forms (120) in 3 groups, each consisting of 12 aluminum forms (120); a total of 42 aluminum forms (120) in 3 groups, each consisting of 14 aluminum forms (120) and a total of 48 aluminum forms (120) in 3 groups, each consisting of 16 aluminum forms (120).

21. The boarding machine (100) according to Claim 18, characterized in that the socks loaded on the aluminum forms (120) manually are waited in the collection area before autoclave (130) until a group of minimum 1 to maximum 16 forms (120) is created

22. The boarding machine (100) according to Claim 18, characterized in that the sock-shaped aluminum forms (120) secured to the carrier chain system (110) driven by the motor come in front of the operators empty and the operators load the socks on the forms (120) manually.

23. The boarding machine (100) according to Claim 18, characterized in that the setting process is performed by keeping the socks to be processed by steam in the autoclave unit (150) at the temperature and pressure determined according to the type of the socks.

24. The boarding machine (100) according to Claim 18, characterized in that a total of maximum 48 aluminum forms (120) are formed in 3 groups, each consisting of 16 forms.

25. The boarding machine (100) according to Claim 18, characterized in that when the first group is collected in the collection area before autoclave (130) until maximum 16 forms (120) are collected, upon driving of the transfer unit (140) it is taken into the autoclave unit (150) to be fixed and upon taking the first group into the autoclave unit (150), the second group is collected in collection area before autoclave (130) until maximum 16 forms (120) are collected.

26. The boarding machine (100) according to Claim 18, characterized in that after transferring maximum 16 aluminum forms (120) into the unit, the movement provided by the autoclave unit drive moto-reducer (151) is transferred to the autoclave body through the autoclave unit drive actuator system (152) and so the autoclave unit (150) moves on the autoclave system drive pulley system (153) to switch to closed position.

27. The boarding machine (100) according to Claim 18, characterized in that once the autoclave unit (150) is closed, the autoclave unit lock system (140) secured by the autoclave unit lock angles (155) is actuated by being pneumatically driven by the autoclave unit lock piston mechanism (156) to close and lock the autoclave unit (150) in order to give steam to the first group of maximum 16 forms inside the unit at temperature, pressure and during the time to be determined based on the required quality of finished socks as well as the type of the yarn used for knitting the socks.

28. The boarding machine (100) according to Claim 18, characterized in that the pneumatic steam valves are opened and start feeding steam into the autoclave unit (150) and, when the required pressure and temperature levels are achieved, the valves are closed and the form (120) in the autoclave unit (150) is kept under steam at this temperature and pressure during a required period of time.

29. The boarding machine (100) according to Claim 18, characterized in that upon completion of the steam application period, the compressed steam in the autoclave unit (150) is discharged by the steam discharge pneumatic valves.

30. The boarding machine (100) according to Claim 18, characterized in that upon discharge of the steam, the autoclave unit lock piston mechanism (156) is

pneumatically driven and the locks are switched to the open position by moving the autoclave unit lock system (154) to the opening direction.

31. The boarding machine (100) according to Claim 18, characterized in that as a result of being driven by the autoclave unit drive moto-reducer (151) and transferred to the autoclave body through the autoclave unit drive actuator system (152), the autoclave unit (150) moves on the autoclave system drive pulley system (153) to switch to closed position.

32. The boarding machine (100) according to Claim 18, characterized in that the drying unit (160) is heated to the temperature adjusted according to the type of the socks processed as a result of the directing the air heated by the steam heat exchangers through the circulation fan.

33. The boarding machine (100) according to Claim 18, characterized in that the dried socks from the said drying unit (160) are transferred under the automatic remover system (170) on the path followed by the carrier chain system (110).

34. The boarding machine (100) according to Claim 18, characterized in that the socks removed from the aluminum forms (120) by the automatic unloading system (170) are transferred on the conveyor carrying system (190) as a result of movement of the racket system (180) from vertical position to horizontal position by 90^0 and transferred outside the machine to be packed.

35. The boarding machine (100) according to Claim 18, characterized in that while the operations are performed according to the settings made by the operator using the controller, the operations are controlled and monitored automatically and in a synchronized manner by PLC controllers, speed drivers, sensors, pneumatic cylinders, motors, temperature measuring units, pneumatic valves, pressure control systems and servo systems.

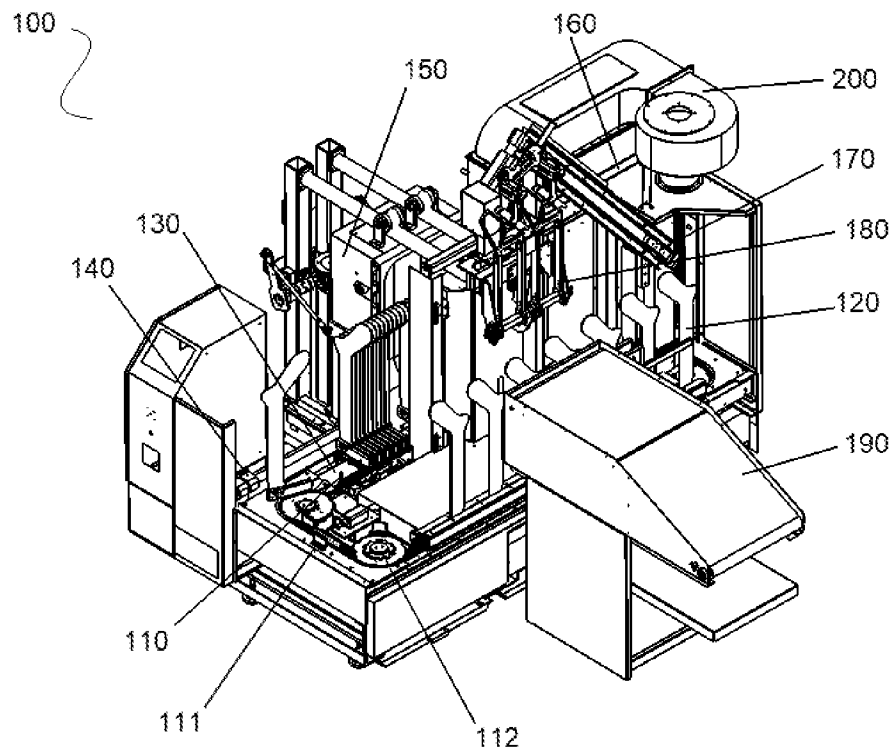


Figure-1

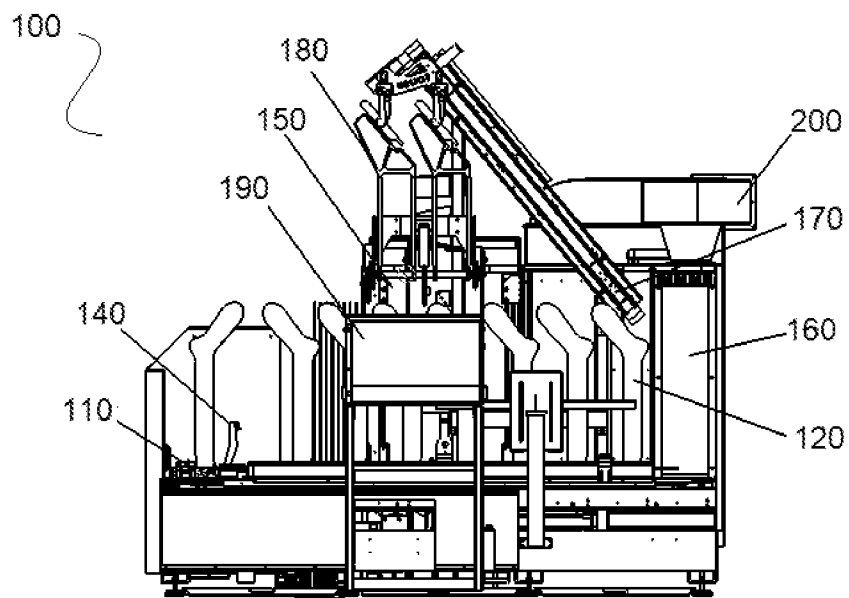


Figure-2

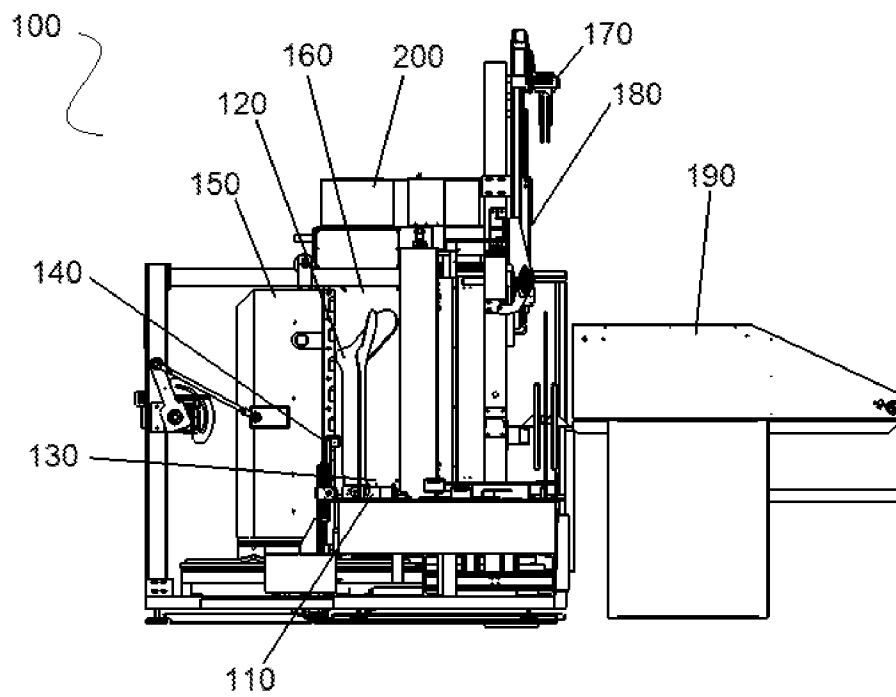


Figure-3

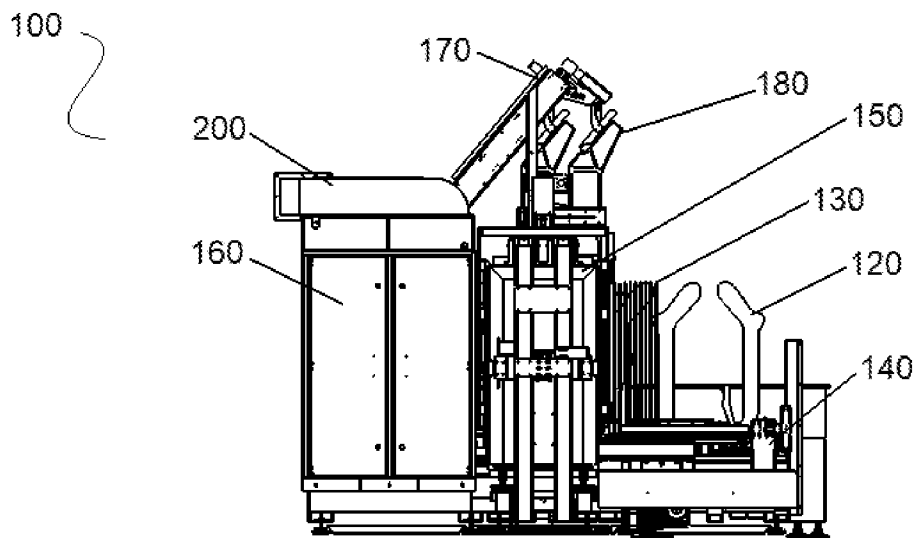


Figure-4

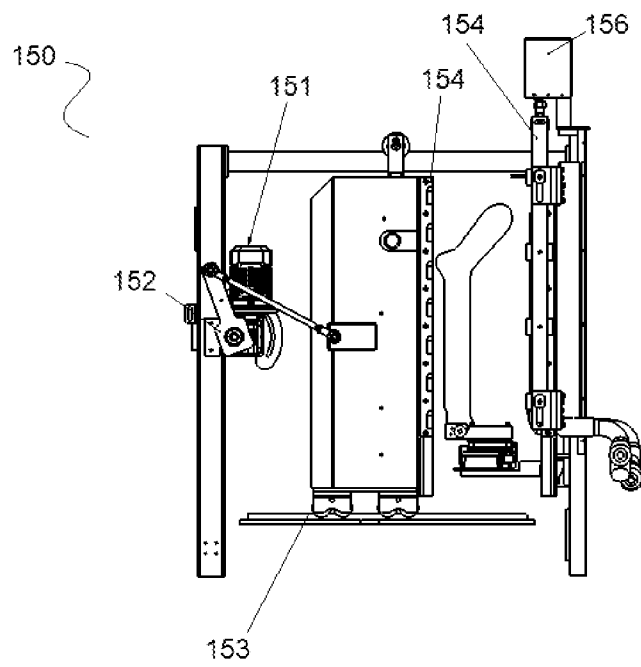


Figure-5

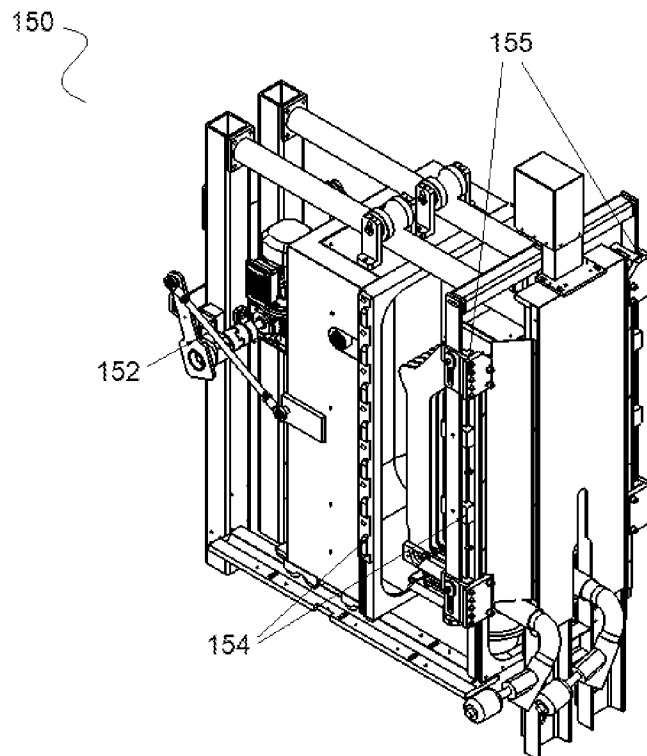


Figure-6

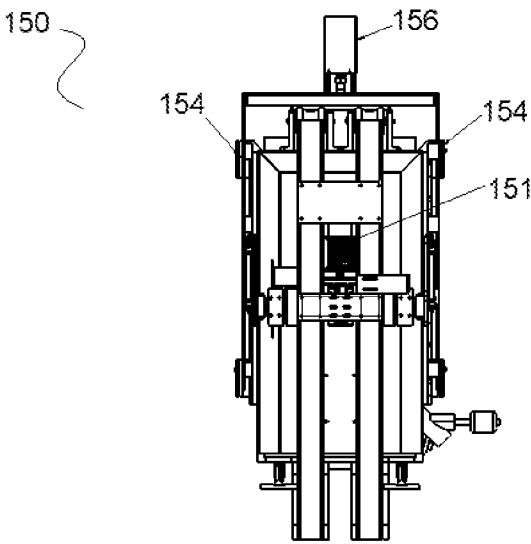


Figure-7

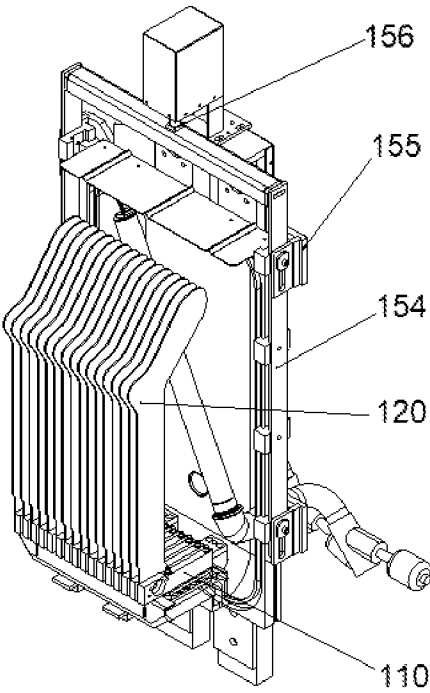


Figure-8

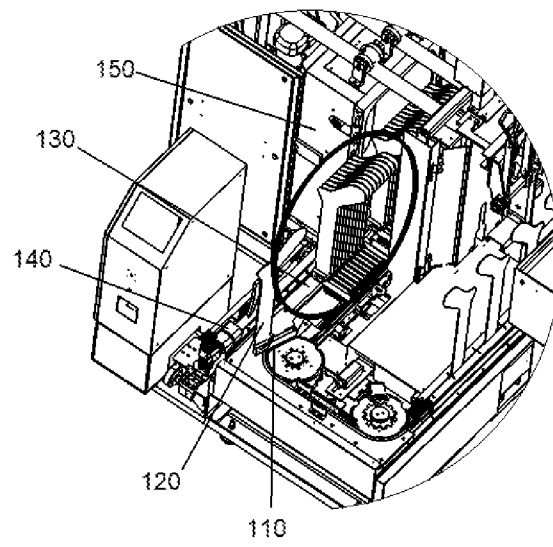


Figure-9

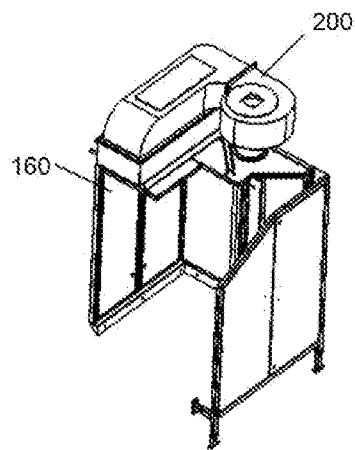


Figure-10

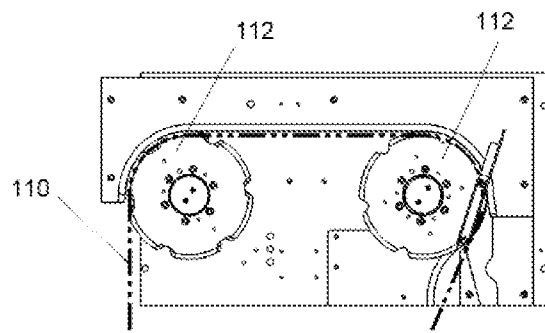


Figure-11

INTERNATIONAL SEARCH REPORT

International application No.

PCT/TR2019/050214

A. CLASSIFICATION OF SUBJECT MATTER

D06C 5/00 (2006.01)i; D06F 59/06 (2006.01)i; D06F 69/04 (2006.01)i

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

D06C; D06F

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	ES 8700709 A3 (TUBERT TUBERT RAMON [ES]) 16 November 1986 (1986-11-16) Summary and Figures	1-35
Y	GB 702626 A (DEXDALE HOSIERY MILLS) 20 January 1954 (1954-01-20) Summary, page 2 line 6-52; page 3 column 110-124; claims.	1-35
Y	CN 107503063 A (WENG XIAOFENG) 22 December 2017 (2017-12-22) Translation of whole document	1-35
A	EP 2886695 A1 (PRIMA TECH S R L [IT]) 24 June 2015 (2015-06-24) Whole Document	1-35
A	CN 102251366 A (A)GUOXUAN YE (B)YE GUOXUAN 23 November 2011 (2011-11-23) Translation of whole document	1-35
A	CN 204311235U U (CN201420620392U 20141025) 06 May 2015 (2015-05-06) Translation of whole document	1-35

☐ Further documents are listed in the continuation of Box C.☒ See patent family annex.

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“P” document published prior to the international filing date but later than the priority date claimed

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“X” document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

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Date of the actual completion of the international search

13 March 2020

Date of mailing of the international search report

13 March 2020

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INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.

PCT/TR2019/050214

Patent document cited in search report			Publication date (day/month/year)	Patent family member(s)	Publication date (day/month/year)
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CN	107503063	A	22 December 2017	CN 107503063	A 02 November 2016
EP	2886695	A1	24 June 2015	EP 2886695	A1 06 December 2014
				EP 2886695	B1 03 December 2015
CN	102251366	A	23 November 2011	CN 102251366	A 01 November 2010
				CN 102251366B	B 01 December 2012
CN	204311235U	U	06 May 2015	CN 204311235U	U 05 December 2014
ES	8700709	A3	16 November 1986	NONE	