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(54) **WARP AND WEFT TYPE WEAVING MACHINE**

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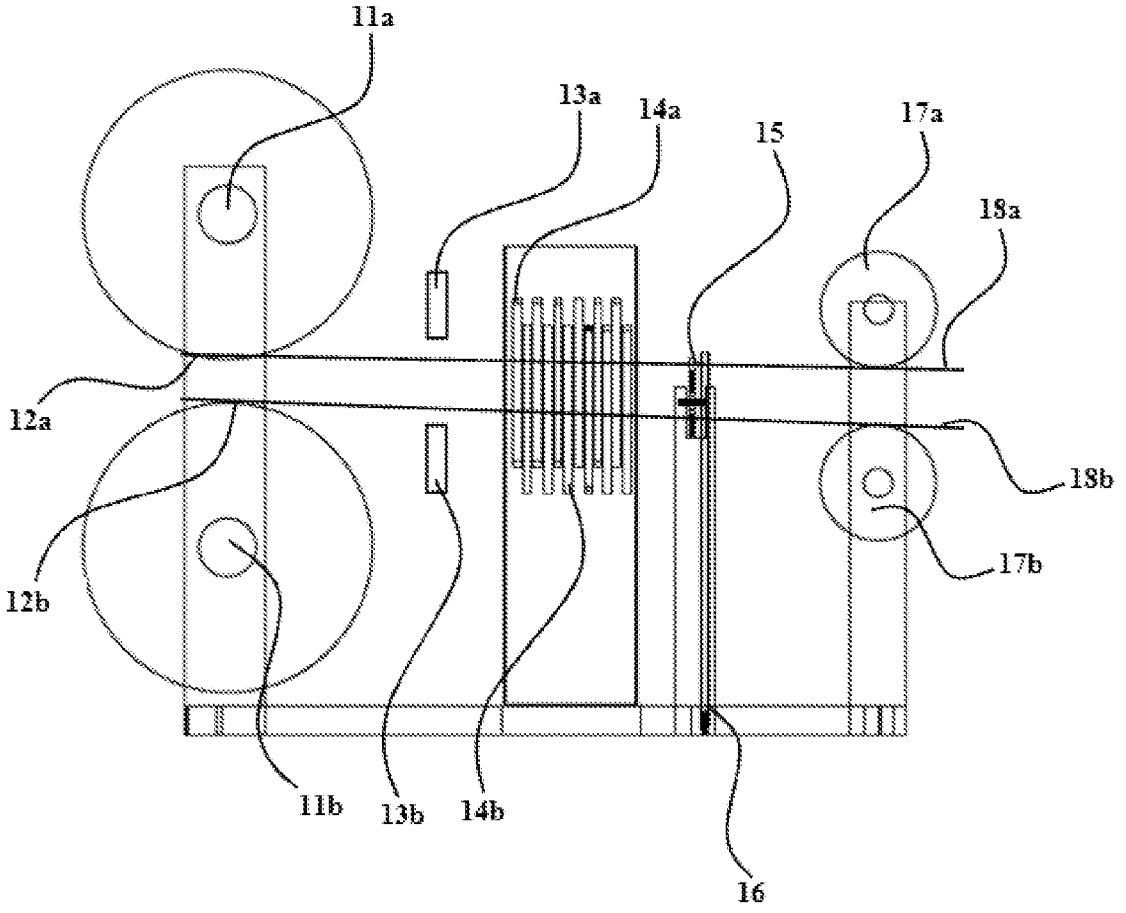
(57) **ABSTRACT**

The various embodiments herein provide a warp and weft type weaving machine for weaving at least two fabrics in a single weaving cycle. The weaving machine comprises a first weaving beam, a second weaving beam arranged opposite to the first beam, a first warp thread for weaving a first fabric, a second warp thread for weaving a second fabric, a pair of drapers, a plurality of frames, a slay and a shuttle. The weaving machine further comprises a weft insertion system which inserts the weft through the shuttle on an alternative mode with respect to a fabric shed for the first warp thread and the second warp thread to produce the first fabric and the second fabric. The first fabric and the second fabric are of at least one of a same pattern and different patterns.



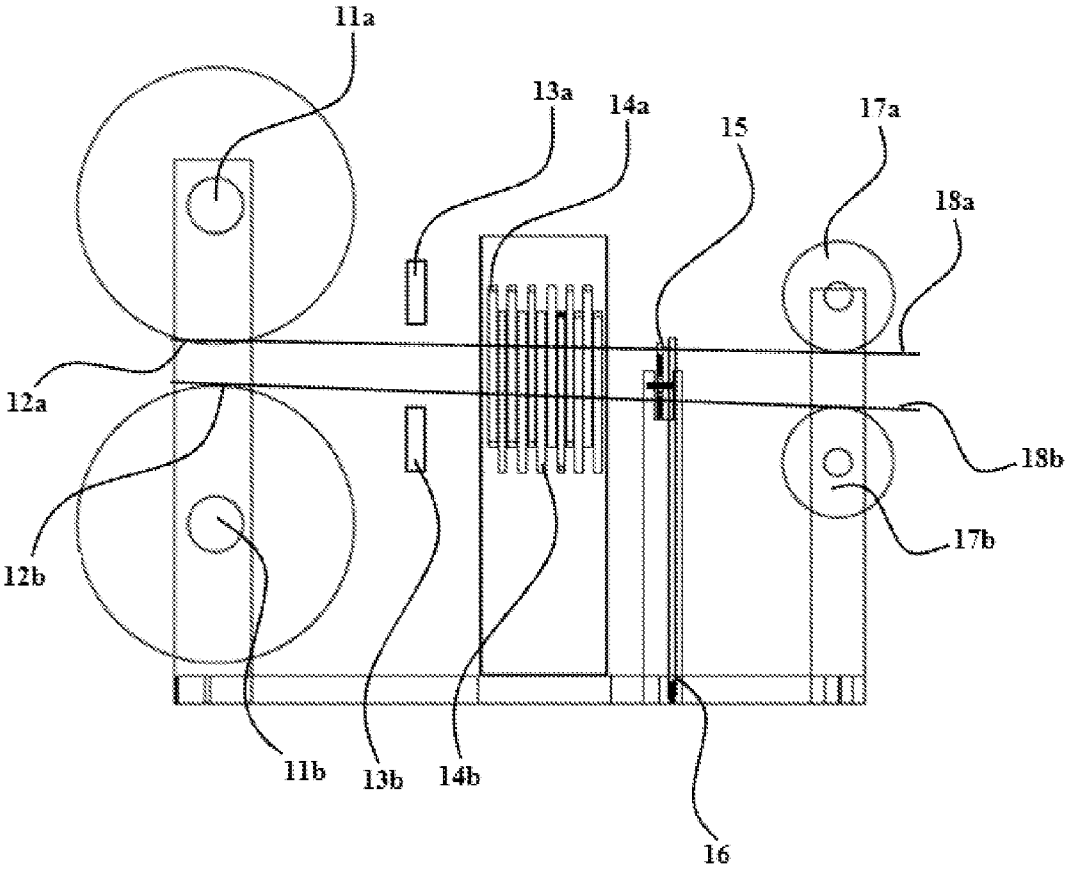


FIG. 1

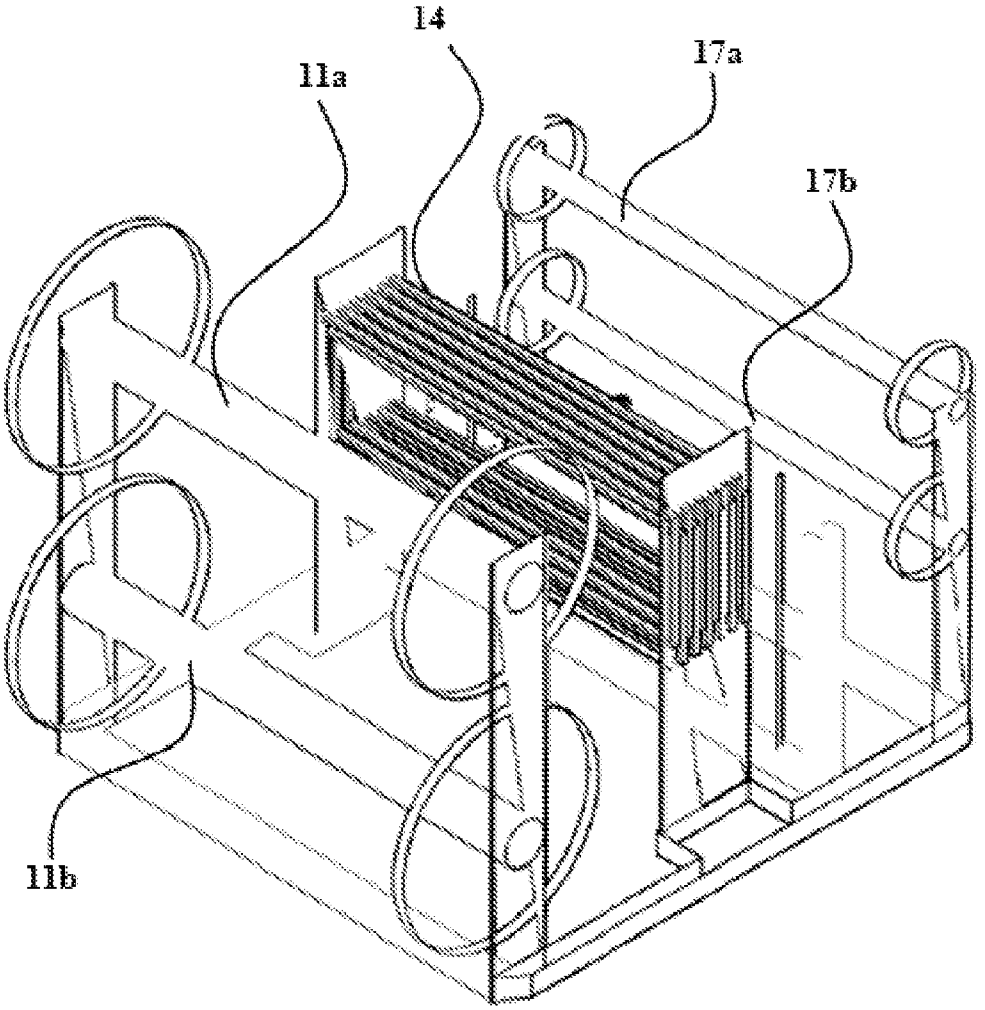


FIG. 2

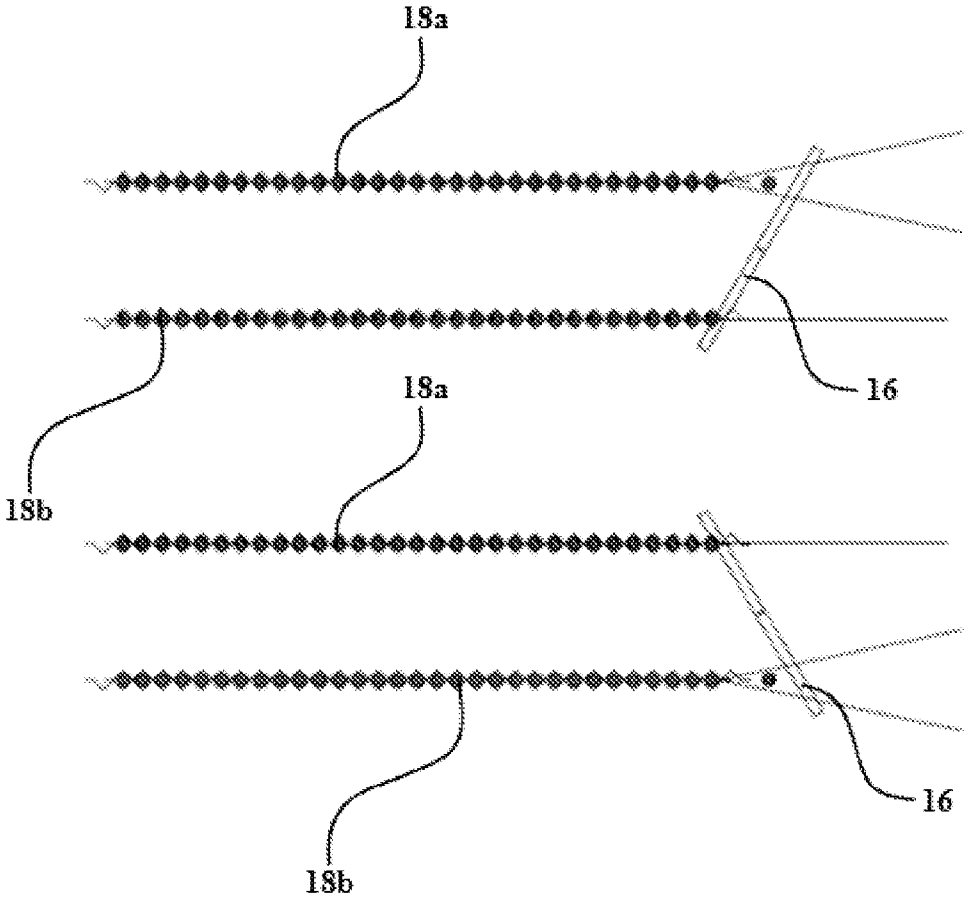


FIG. 3

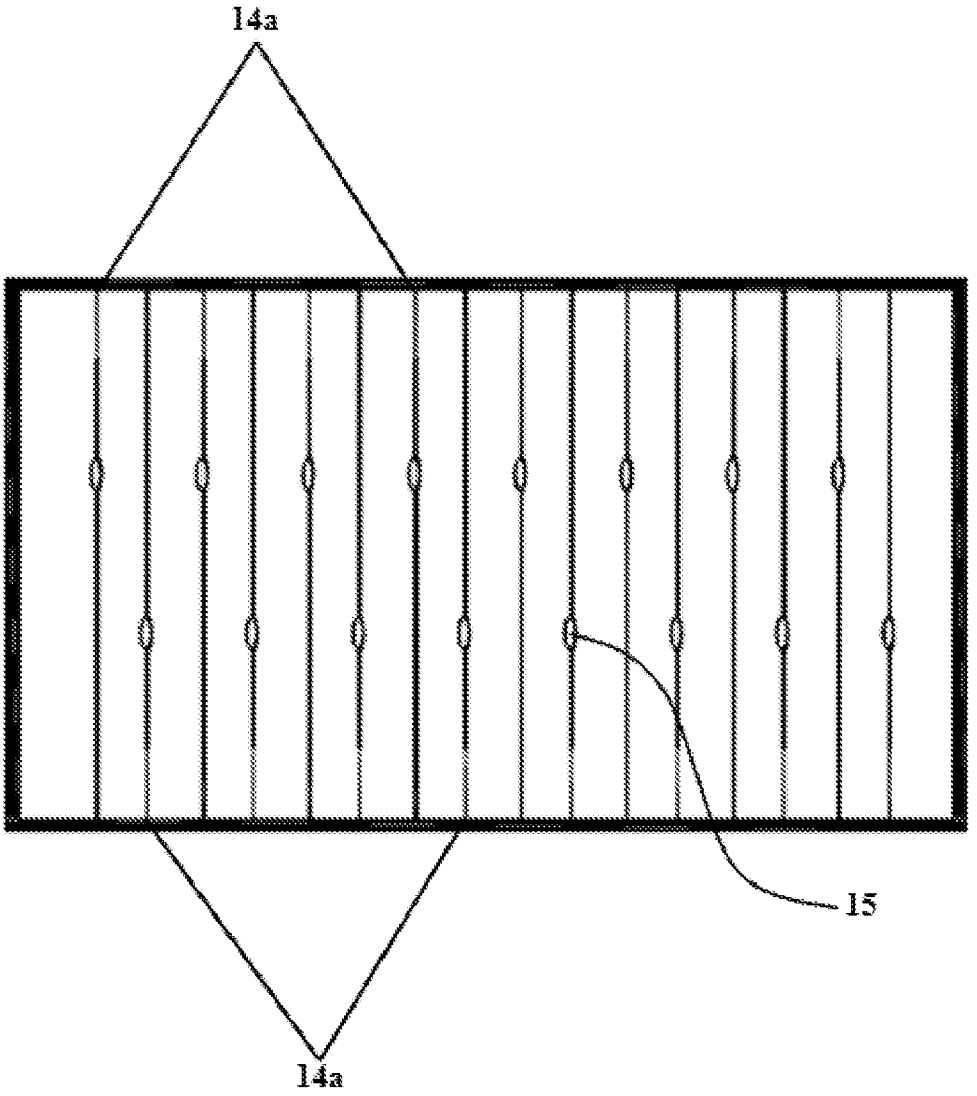


FIG. 4

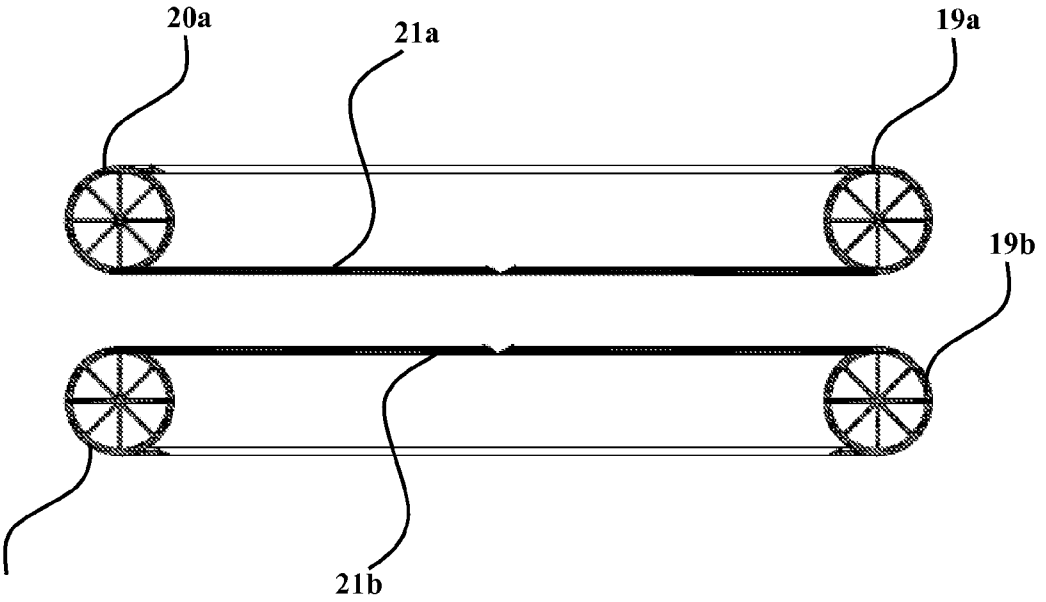


FIG. 5

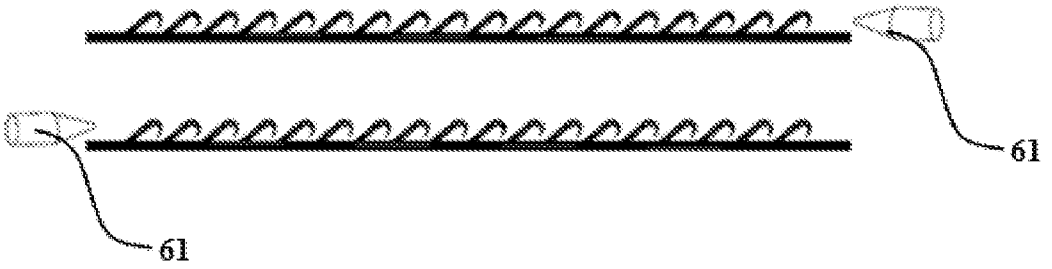


FIG. 6

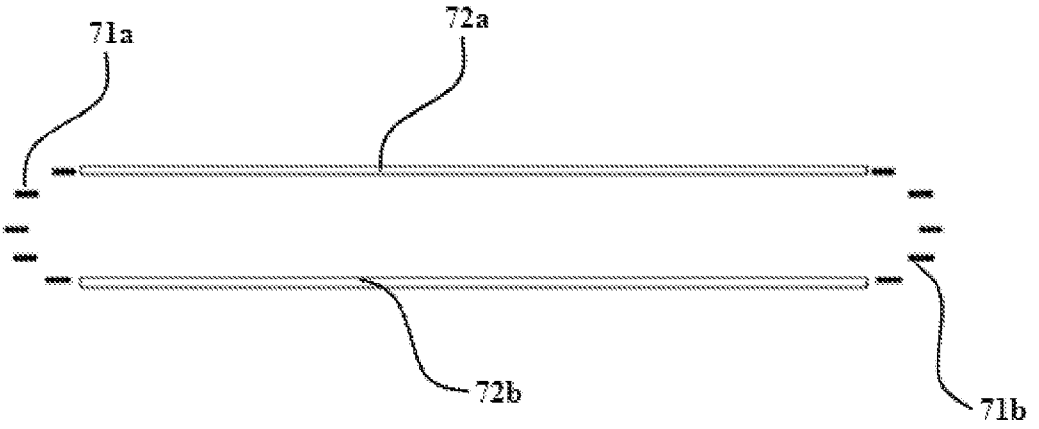


FIG. 7

WARP AND WEFT TYPE WEAVING MACHINE

CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] This application claims the benefit of Provisional Application No. 61/323,888 filed Apr. 14, 2010.

BACKGROUND

[0002] 1. Technical Field

[0003] The embodiments herein generally relate to weaving machines and particularly relates to a warp and weft type weaving machines. The embodiments herein more particularly relates to a warp and weft type weaving machine for weaving one or more fabrics in a single weaving cycle.

[0004] 2. Description of the Related Art

[0005] Weaving is a textile craft in which two distinct sets of yarns and threads are interlaced to form a fabric or cloth. The threads which run lengthways are called the warp and the threads which run across from side to side are termed as weft/filling threads. The cloth is woven on a loom, a device that holds the warp threads in place while filling threads are woven through the warp threads. The pattern by which the warp and filling threads interlace with each other is called as weave. The majority of woven products are created through one of three basic weaving methods including plain weave, satin weave, and twill. The woven cloth is at least one of plain (in one color/a simple pattern) and with artistic designs, including tapestries.

[0006] A known type of warp and weft weaving machine comprises a means for providing a warp of parallel threads, a means for holding the formed woven fabric and at least one continuous row of heddles between these two means, actuated in turn from one end of the row to the other end to form a continuous shed which moves between said two ends. These types of machines also incorporate a continuous row of drive plates for the weft-inserting means. These plates are adapted to form a supporting guide for an inserting means. The warp and weft type weaving machine further comprises at least one undulating unit for moving the inserting means across the continuous shed in synchronism therewith so as to tension the weft threads, which are connected to the warp threads by inversion of the relative positions of the tenters of the shed, the rows of heddles and drive plates being arranged in a straight line or in a closed circle.

[0007] However such type of weaving machines generally requires special means different from the conventional shuttles for inserting the weft. Further these weaving machines also require elements for actuating the shuttles and providing them with an adequate supply of thread. The results obtained in the many tests carried out in this connection have not been totally satisfactory from all points of view.

[0008] There exists a need for the warp and weft type weaving machine, which is adapted to increase the performance by at least two times with less manpower. There is also a need for the warp and weft type weaving machine which reduces space, energy and time consumption.

[0009] The abovementioned shortcomings, disadvantages and problems are addressed herein and which will be understood by reading and studying the following specification.

OBJECTS OF THE EMBODIMENTS

[0010] The primary object of the embodiments herein is to provide a warp and weft type weaving machine for producing at least two fabrics in a single complete weaving cycle.

[0011] Another object of the embodiments herein is to provide a warp and weft type weaving machine for producing two different fabrics in a single complete weaving cycle.

[0012] Yet another object of the embodiments is to provide a warp and weft type weaving machine with less time consumption and reduced manpower for producing two different fabrics.

[0013] Yet another object of the embodiments is to provide a warp and weft type weaving machine which is cost effective and with high production capacity and energy saving.

[0014] Yet another object of the embodiments is to provide a warp and weft type weaving machine which includes an alternative rapier, double gripper and projectile system for weaving.

[0015] Yet another object of the embodiments is to provide a warp and weft type weaving machine with pneumatic assembling mechanism.

[0016] These and other objects and advantages of the present disclosure will become readily apparent from the following detailed description taken in conjunction with the accompanying drawings.

SUMMARY

[0017] The various embodiments of the present disclosure provide a warp and weft type weaving machine for weaving two fabrics in a single complete weaving cycle. The weaving machine comprising a first beam, a second beam arranged opposite to the first beam, a first warp thread for weaving a first fabric, a second warp thread for weaving a second fabric, a pair of drapers, a plurality of frames, a slay and a shuttle. The weaving machine further comprises a weft insertion system which inserts the weft through the shuttle on an alternative mode with respect to a fabric shed for the first warp thread and the second warp thread to produce the first fabric and the second fabric.

[0018] According to one embodiment of the present disclosure, a pneumatic system moves the frames in an upward direction and downward directions according to commands provided by a dobby, where the dobby is a user of the weaving machine who manages the weaving process.

[0019] According to one embodiment of the present disclosure, the dobby issues commands based on a pre-defined design and weaving report of the fabric.

[0020] According to one embodiment of the present disclosure, after producing the first fabric and weft insertion through a shuttle, the process of beating on a fell of the first fabric is accomplished by an first slay and in the meantime the process of weft insertion for the second fabric is completed and beating of the second warp threads to a fell of the second fabric takes place by a second slay.

[0021] According to one embodiment of the present disclosure, the passing of the first warp thread and the second warp thread through the healds of the frames is carried out as per a weaving pattern, a weaving design and a reed plan of the weaving machine.

[0022] According to one embodiment of the present disclosure, the weft insertion takes place in an alternative mode.

[0023] According to one embodiment of the present disclosure, the first fabric and the second fabric are of same pattern.

[0024] According to one embodiment of the present disclosure, the first fabric and the second fabric are of different patterns.

[0025] According to one embodiment of the present disclosure, the reed rate and the type of reeds depends on the weaving rapport and the weaving density.

[0026] According to one embodiment of the present disclosure, the drapers controls a warp thread break separately for each set of the first fabric and the second fabric.

[0027] According to one embodiment of the present disclosure, the movement of the frames in an upward direction and downward direction is performed using a pneumatic system.

[0028] According to one embodiment of the present disclosure, a shuttle is provided for weft insertion in the fabric shed.

[0029] According to one embodiment of the present disclosure, a slay is adopted for compressing the weft on the fabric.

[0030] According to one embodiment of the present disclosure, the machine includes a rapier strap for weft insertion and transferring the shift alternatively to the first fabric and the second fabric.

[0031] According to one embodiment of the present disclosure, the odd frames and the even frames are equally distributed for weaving each of the first fabric and the second fabric.

[0032] According to one embodiment of the present disclosure, the odd set of frames belong to the first fabric and the even set of frames belong to the second fabric.

[0033] According to one embodiment of the present disclosure, the machine includes at-least three grippers wherein each gripper inserts weft for at-least one of the first fabric and the second fabric.

[0034] According to one embodiment of the present disclosure, the machine includes at-least three wherein each rapier inserts weft for at-least one of the first fabric and the second fabric.

[0035] According to one embodiment of the present disclosure, a plurality of nozzles and an air conductor fixed on the weaving comb for each set of the first warp and the second warp thread inserts the weft alternatively for the same fabric upon shed formation.

[0036] According to one embodiment of the present disclosure, the weaving machine includes a projectile weft insertion system comprising one or more projectiles projecting into the formed shed for the weft insertion and one or more torsion bars for support.

[0037] According to one embodiment of the present disclosure, the weaving machine further includes one or more cloth rollers, wherein at-least one cloth roller is used for taking out the first produced fabric and other cloth roller for taking up the second fabric.

BRIEF DESCRIPTION OF THE DRAWINGS

[0038] The other objects, features and advantages will occur to those skilled in the art from the following description of the preferred embodiment and the accompanying drawings in which:

[0039] FIG. **1** illustrates a front view of the warp and weft type weaving machine, according to one embodiment of the present disclosure.

[0040] FIG. **2** illustrates a perspective side view of the warp and weft type weaving machine, according to one embodiment of the present disclosure.

[0041] FIG. **3** illustrates a shed formation and slays beating in the warp and weft type weaving machine, according to one embodiment of the present disclosure.

[0042] FIG. **4** is a schematic diagram illustrating the arrangement of an even and odd frame drapers, according to one embodiment of the present disclosure.

[0043] FIG. **5** illustrates a weft insertion process for the first fabric and the second fabric by rapiers, according to one embodiment of the present disclosure.

[0044] FIG. **6** illustrates an air nozzle and air jet perspectives in the weft insertion system, according to one embodiment of the present disclosure.

[0045] FIG. **7** is a schematic diagram illustrating a weft insertion process on the first fabric and the second fabric by projectile, according to one embodiment of the present disclosure.

[0046] Although the specific features of the present disclosure are shown in some drawings and not in others. This is done for convenience only as each feature may be combined with any or all of the other features in accordance with the present disclosure.

DETAILED DESCRIPTION OF THE DRAWINGS

[0047] In the following detailed description, a reference is made to the accompanying drawings that form a part hereof, and in which the specific embodiments that may be practiced is shown by way of illustration. These embodiments are described in sufficient detail to enable those skilled in the art to practice the embodiments and it is to be understood that the logical, mechanical and other changes may be made without departing from the scope of the embodiments. The following detailed description is therefore not to be taken in a limiting sense.

[0048] The various embodiments of the present disclosure provide a system for weaving two fabrics in one single weaving cycle. The weaving machine includes two set of beams, a first beam fixed in a first part and a second beam fixed in a second part of the weaving machine. The first beam supplies and feeds a set of first warp threads to a first fabric and the second beam supplies and feeds a set of second warp threads to a second fabric. Then the set of warp threads are passed through respective drapers. One draper is provided for both the first fabric and the second fabric. The weaving machine includes two sets of healds, one to control the breakage of warp ends of the first fabric and the other for controlling the breakage of the warp end breaks of the second fabric and each of which sends the commands to the weaving machine independently and separately. In case of thread break in either set, the weaving machine remains in a complete halt condition until the problem is completely solved. The first warp threads are passed through healds of the plurality of odd frames forming a first fabric shed and the second warp threads are passed through healds of the plurality of even frames forming a second fabric shed. The weft insertion is then done to the first fabric shed and the second fabric shed through one or more rapier straps. The system includes a shuttle for storing and weaving weft in between the warps. Once the weft insertion is done on both the first fabric shed and the second fabric shed, the first fabric and the second fabric is produced.

[0049] The weaving machine further comprises an first slay for compressing a picks on the first fabric, a second slay for compressing a picks on the second fabric, an first cloth roller provided for taking up the first fabric and a second cloth roller provided for taking up the second fabric.

[0050] According to one embodiment of the present disclosure, a pneumatic system is provided to move the frames in an upward direction and downward directions according to commands provided by a dobby, where the dobby is a user of the weaving machine who manages the weaving process.

[0051] According to one embodiment of the present disclosure, the dobby issues commands based on a pre-defined design and weaving report of the fabric.

[0052] According to one embodiment of the present disclosure, after producing the first fabric and weft insertion through a shuttle, the process of beating on a fell of the first fabric is accomplished by an first slay and in the meantime the process of weft insertion for the second fabric is completed and beating of the second warp threads to a fell of the second fabric takes place by a second slay.

[0053] According to one embodiment of the present disclosure, the passing of the first warp thread and the second warp thread through the healds of the frames are carried out as per a weaving pattern, a weaving design and a reed plan of the weaving machine.

[0054] According to one embodiment of the present disclosure, the weft insertion takes place in an alternative mode.

[0055] According to one embodiment of the present disclosure, the first fabric and the second fabric are of same pattern.

[0056] According to one embodiment of the present disclosure, the first fabric and the second fabric are of different patterns.

[0057] According to one embodiment of the present disclosure, the reed rate and the type of reeds depends on the weaving rapport and the weaving density.

[0058] According to one embodiment of the present disclosure, the drapers controls a warp thread break separately for each set of the first fabric and the second fabric.

[0059] According to one embodiment of the present disclosure, the movement of the frames in an upward direction and downward direction is performed using a pneumatic system.

[0060] According to one embodiment of the present disclosure, a shuttle is provided for weft insertion in the fabric shed.

[0061] According to one embodiment of the present disclosure, a slay is adopted for compressing the weft on the fabric.

[0062] According to one embodiment of the present disclosure, the machine includes a rapier strap for weft insertion and transferring the shift alternatively to the first fabric and the second fabric.

[0063] According to one embodiment of the present disclosure, the odd set of frames belong to the first fabric and the even set of frames belong to the second fabric.

[0064] According to one embodiment of the present disclosure, the machine includes at-least three grippers wherein each gripper inserts weft for at-least one of the first fabric and the second fabric.

[0065] According to one embodiment of the present disclosure, the machine includes at-least three wherein each rapier inserts weft for at-least one of the first fabric and the second fabric.

[0066] According to one embodiment of the present disclosure, a plurality of nozzles and an air conductor fixed on the weaving comb for each set of the first warp and the second warp thread inserts the weft alternatively for the same fabric upon shed formation.

[0067] According to one embodiment of the present disclosure, the weaving machine includes a projectile weft insertion system comprising one or more projectiles projecting into the formed shed for the weft insertion and one or more torsion bars for support.

[0068] According to one embodiment of the present disclosure, the weaving machine further includes one or more cloth rollers, wherein at-least one cloth roller is used for taking out the first produced fabric and other cloth roller for taking up the second fabric.

[0069] The warp threads will be opened from the upper and lower weaving beam and after passing through drappers, they will be lead towards the healds. The warp thread break which is controlled by drapers is being done separately for each set of upper and lower fabrics. After the passing of each set of warp thread through the respective drapers, the threads are passed through the healds. The passing of the warp threads through the healds shall take place as per the weaving pattern, design and the reed plan of the machine.

[0070] The warp threads belonging to the upper fabric passes through the odd heald frames and the warp threads belonging to the lower fabric moves through the healds of the even frames. Thus the odd frames form the shed for the upper fabric and the even frames form the sheds for the lower fabric.

[0071] Dobby outputs the commands based on the design and the weaving rapport provided earlier, and the moving of the frames up or down takes place by the pneumatic system.

[0072] The advantage of this system is to prevent the commands interference and the system distinguishes between even and odd frames in a way that the appropriate time at which the odd frames are active and form the sheds for the weaving of the upper fabric is mutually different for the time at which the even frames are active. Moreover, the usage of the pneumatic systems avoids the problems of mechanical systems such as cycles and obligatory alternatives which cause waste of time and reduces the quality of the fabric.

[0073] As per the weaving rapport, the movement of some of the odd frames is not stopped and the shed is formed for weaving the upper fabric. After the shed formation, it is time for inserting weft in the shed formed. The weft insertion in this machine takes place through different systems such as soft rapier, air jet loom and projectile which shall be explained in detail.

[0074] The Rapier weft insertion system includes two rapiers and two grippers, two rapier straps and two rapier cycles and in comparison with the regular weaving machines, this system has one extra rapier and gripper.

[0075] Each rapier and gripper has got to do the function for weft inserting for one fabric (upper or lower) and the other one's function is to do the weft insertion for the other fabric (upper or lower).

[0076] In the regular weaving machines, the end of the rapier strap is placed inside the frame of the rapier strap and is collected under the machine and during the weft insertion process, it will get out of the rapier strap frame as much as necessary meaning that the end of the rapier cycle shall not be active during the weft insertion and getting ready for the following weft insertion.

[0077] Yet, in this system, there has been a rapier and or a gripper installed at the end of rapier strap cycle to do the weft insertion for the lower or the upper fabric meaning that any movement of the rapier strap, i.e., whether weft insertion or getting out of the shed for the next weft insertion, is quite useful and practical. Since the rapier is getting ready for the weft insertion process on the upper fabric, the process of weft insertion takes place for the lower fabric and vice versa. In this case, the process of weft insertion for the upper and the lower fabrics takes place alternatively.

[0078] In the Air-jet weft insertion system, there is a set of nuzzles and air conductor for each set of the upper and the lower warp thread. The set of nuzzles and air conductor are

fixed on the weaving comb which alternatively does the weft insertion for the same fabric upon the shed formation.

[0079] In Projectile Weft Insertion System, two projectiles and two torsion bars are used. After the weft insertion for the upper fabric happens by the projectile, then the projectile is placed a little lower than the fabric. After the fabric shed is formed, the projectile is projected into the formed shed and the weft insertion for the lower fabric is also accomplished. In the same manner, after reaching the end of the shed, the lower fabric is transferred towards the upper part of the machine, exactly the same level as the upper fabric and gets ready for the projection.

[0080] In this system the process of projectile transfer from one end to the other end of the fabric, which is regular in the weaving machines, is changed into a useful and practical job.

[0081] When the upper fabric warp threads are passed through the special healds, they are also passed through the reed. The reed rate and type of reed depends on the weaving rapport and the weaving density, which has got no restriction in this system.

[0082] Yet, the major difference in this system is the loom width compared to the current weaving machines. The reason is that two sets of warp threads pass through separately and therefore this loom width is a little wider and more, when compared to other regular weaving machines.

[0083] The slay upon which the reed sits, does its movement in the alternative and fan-like mode in a way that after weft insertion for the upper fabric, by beating the slay on the last weft inserted, the weft is beaten on the fabric and causes compression, and once the weft insertion for the lower fabric is completed the slay is beaten upon the lower weft and causes compression upon the lower fabric in this way the process of the word for moving backward for saving energy and getting ready for beating again to the last weft of the fabric is turned to be useful for beating the lower fabric and causing compression in the lower fabric.

[0084] Eventually, each of the fabrics produced shall be collected by the special cloth rollers placed—one up and one down in the machine.

[0085] Now the machine works in a full cycle is as follows: After turning the beam thread on the beam with the help of the tying in machine, the thread is removed and moved it through the drapers is to keep end—breakage under control. As soon as a single warp breaks, the machine stops functioning so that the user can tie it back.

[0086] After putting the warp through the droppers, the warp threads are put through the healds according to the pattern and rapport in such a way that each heald is fixed inside the heddle frame and moved up and down as a result of the heddle frame's up and down movement which is controlled by the machine's dobby, thus forming the warp shed.

[0087] Then each warp thread is put through the reed fixed on the slay according to the fabric count and how many threads are to pass through each comb. The warp thread is then guided to the roller.

[0088] Now, the weaving machine is ready to work. When the start button is pushed, the engine of the machine is driven to operate. With the part (such as strap, pulley, gears) intended to convey the force, there is a balanced force for each machine part.

[0089] At this point, the beams turn slowly and open up the warp thread a bit. At the same time, according to the weaving rapport, the machine's dobby moves up or down (being fixed). Thus some heddles go up. Since heddles carry the healds and the warp threads pass through the healds, with the heddle's upward movement, some warp threads too go up and some others stay where they are down. Now that we have two sets of warp threads which move up and down, and the shed is formed. At this point the top portion of the slay is positioned at the back. After forming the shed by fully raising the heddles controlled by the dobby, the weft insertion is done via the rapier and the top gripper tied to the rapier strap. At this point, the top rapier grips the weft and passes it through the shed up to the middle of the fabric, during the movement of the warp threads in the up and down mode, the weft is conveyed by the rapier and delivered to the gripper. At the same time, the rapier and gripper are moved apart and the weft is conveyed to the end of the fell. Once the rapier and the gripper are fully moved out of the shed, the slay secured from the middle on a shaft and moving like a fan gains force, and its top, seen from the side, moves from left to right, or rather from the rear to the front and beats up the weft at the shed against the fabric end thereby serving the purpose of pick density.

[0090] When the above mechanism is at work for the fabric on top, the single heddles follow the order from the dobby and move up and down. For weaving the fabric underneath, the paired heddles are started to move. As for the fabric on top, the working parts are the rapier, gripper and the rapier's strap. As for the one underneath, the same parts function at a separate, lower point.

[0091] The beam is made of hard aluminum or cast—iron and the tube on which the warp threads are tied and carries the two parts on the slides, is made of aluminum or hard aluminum alloys.

[0092] The chassis on which all the parts are secured is made of very hard iron which absorbs the weight, vibration and the machine's mechanical tension. The drapers are made of fine, hard steel. The heddles are made of light, hard aluminum and the healds placed inside the heddles are made of hard steel. The reed is made of hard steel and the slay is made of iron. The rapier is a mixture of iron, steel and PVC. This is the case with the gripper also. The rapier strap is made of PVC, highly resistant to mechanical tensions and rapid back and forth movements. The cloth roller is made of PVC tubes or light hard aluminum.

[0093] FIG. **1** illustrates a front view of the warp and weft type weaving machine, according to one embodiment of the present disclosure. The weaving machine for weaving two fabrics **18** in one weaving cycle comprises a first beam **1***a* for feeding a first warp thread **12***a* for weaving the first fabric **18***a*, a second beam **1***b* for feeding a second warp thread **12***b* for weaving the second fabric **18***b* and a plurality of drapers for controlling the first warp thread **12***a* and second warp thread **12***b* break. The weaving machine further comprises a first heald **13***a*, a second heald **13***b*, a plurality of first heald frames **14***a* for weaving the first fabric **18***a*, a plurality of second heald frames **14***b* for weaving the second fabric **18***b*, a slay **16** for compressing picks on the first fabric **18***a* and the second fabric **18***b* and a rapier strap **15** for a weft insertion. The weaving machine further includes a first cloth roller **17***a* provided for taking up the woven first fabric **18***a*, a second cloth roller **17***b* provided for taking up the woven second fabric **18***b* and a shuttle for storing and weaving weft in between a warps as shown in FIG. **1**.

[0094] FIG. **2** illustrates a side perspective view of the warp and weft type weaving machine, according to one embodiment of the present disclosure. With respect to FIG. **2**, the first warp thread **12***a* and the second warp thread **12***b* are opened

from the first weaving beam **11***a* and the second weaving beam **11***b*. The first warp thread **12***a* and the second warp thread **12***b* are passed through the plurality of drapers and are further directed towards the first heald **13** and the second heald **13***b*. The warp thread break is controlled by the plurality drapers and is performed separately for each set of first fabric **14***a* and second fabric **14***b*. The passing of the first warp thread **12***a* and the second warp thread **12***b* through the first heald **13***a* and the second heald **13***b* is performed in accordance with the weaving pattern, design and the reed plan of the weaving machine.

[0095] The first warp threads **12***a* belonging to the first fabric **18***a* are passed through the first heald **13***a* such that the warp threads **12***a* passes only through the healds of the odd frames **14***a* and the warp threads **12***b* belonging to the second fabric **18***a* only move through the healds of the even frames **14***b*. Thus the odd frames **14***a* forms the shed for the first fabric **18***a* and the even frames **14***b* forms the shed for the second fabric **18***b*.

[0096] A dobby provides commands as per the design and the weaving rapport of the weaving machine during the weaving process. This prevents the interference of commands and the machine distinguishes even frames **14***b* and odd frames **14***a* in such a way that for weaving the first fabric **18***a*, the odd frames **14***a* are made active to form the sheds and for weaving the second fabric **18***b* the even frames **14***b* are made active to form the sheds. The movement of the frames **14** in an upward direction and downward direction is controlled by a pneumatic system. The pneumatic systems avoid the problems of conventional mechanical systems such as cycle repetitions and obligatory alternatives which cause waste of time and reduce the quality of the fabric.

[0097] As per the weaving rapport, the shed is formed for weaving the first fabric **18***a* by moving some of the odd frames **14***a* in a defined direction. After the shed formation, the weft is inserted in the shed formed. The weft insertion is performed through at least one of a rapier weft insertion system, air-jet weft insertion system and projectile weft insertion system.

[0098] FIG. **3** illustrates a shed formation and slay beating in the warp and weft type weaving machine, according to one embodiment of the present disclosure. The first warp threads **12***a* for the first fabric **18***a* passes through the healds of the odd frames **14***a*. The second warp threads **12***b* belonging to the second fabric **18***a* passes through the healds of the even frames **14***b*. The odd frames **14***a* thus form the shed for the first fabric **18***a* and the even frames **14***b* form the sheds for the second fabric **18***b*. The shed formation and slay **16** beating in the warp and weft type weaving machine is as shown in FIG. **3**. The slay **16** beating is done for both first fabric shed and the second fabric shed alternatively.

[0099] FIG. **4** is a schematic diagram illustrating the arrangement of an even and odd frame drappers, according to one embodiment of the present disclosure. The first warp threads **12***a* for the first fabric **18***a* passes through the healds of the odd frames **14***a*. The second warp threads **12***b* belonging to the second fabric **18***a* passes through the healds of the even frames **14***b*. The odd frames **14***a* thus form the shed for the first fabric **18***a* and the even frames **14***b* form the sheds for the second fabric **18***b*. The set includes a 32-set frame, wherein 16 frame sets are categorized as odd frames **14***a* for weaving the first fabric **18***a* and 16 frame sets are defined as even frames **14***b* for weaving the second fabric **18***b*. The healds of the odd frames **14***a* and healds of the even frames **14***b* are regular healds.

[0100] FIG. **5** illustrates a weft insertion process for the first fabric and the second fabric by rapiers, according to one embodiment of the present disclosure. The weaving machine herein includes four weft inserters including two rapiers **19***a*, **19***b* and two grippers **20***a*, **20***b* and two rapier straps **21***a*, **21***b*. The first rapier **19***a* and the first gripper **20***a* provides for weft inserting for the first fabric **18***a* and the second rapier **19***b* and the second gripper **20***b* provides for weft inserting for the second fabric **18***b*.

[0101] At the end of the rapier strap cycle, at least one rapier and/or gripper is installed to do the weft insertion for at least one of the first fabric **18***a* and the second fabric **18***b*. The movement of the first rapier strap **21***a* and the second rapier **21***b* either during weft insertion or during getting out of the shed for the next weft insertion is practical since when getting ready for the weft insertion process on the first fabric **18***a*, the process of weft insertion takes place for the second fabric **18***b* and vice versa. Here, the process of weft insertion for the first fabric **18***a* and the second fabric **18***b* takes place alternatively.

[0102] FIG. **6** illustrates an air nozzle and air jet perspectives in the weft insertion system, according to another embodiment of the present disclosure. The weaving machine disclosed herein uses an air jet weft insertion system. In the air-jet weft insertion system, for each set of the first warp thread **12***a* and the second warp thread **12***b*, there are a plurality of nozzles **61** and air conductors which have been fixed on the weaving comb. The plurality of nozzles **61** and air conductors alternatively performs weft insertion for the at least one of the first fabric **18***a* and the second fabric **18***b* based upon the shed formation.

[0103] FIG. **7** illustrates a weft insertion process for the first fabric and second fabric through a projectile weft insertion system, according to another embodiment of the present disclosure. The projectile weft insertion system includes at least two projectiles **71***a*, **71***b* and two torsion bars **72***a*, **72***b*. After the weft insertion for the first fabric **18***a* is provided by the projectile **71**, then the projectile **71** is placed at a lower level than the first fabric **18***a* and after the fabric shed is formed, the projectile **71** is projected into the formed shed and the weft insertion for the second fabric **18***b* is also accomplished. Similarly, after reaching the end of the shed, the second fabric **18***b* is transferred towards the first part of the weaving machine, exactly the same level as the first fabric and gets ready for the projection.

[0104] After the first warp threads **12***a* are passed through the healds, then the first warp threads **12***a* are also passed through the reed. The reed rate and type of reed depends on the weaving rapport and the weaving density which is not restricted by the weft insertion system.

[0105] The weaving machines include a wider loom width as two sets of warp threads pass through separately. The slay upon the reed is arranged to moves in an alternative and fan-like mode in such a way that after weft insertion for the first fabric, by beating the slay on the last weft inserted, the weft is beaten on the fabric and causes compression and once the weft insertion for the second fabric is completed, the slay is beaten upon the second weft and causes compression upon the second fabric. This process provides for moving backward for saving energy and getting ready for beating again to the last weft of the fabric is turned to be useful for beating the second fabric and causing compression in the second fabric.

Eventually, each of the fabrics produced is collected by the cloth rollers placed on the upper section and the lower section of the weaving machine.

[0106] The weaving machine according to the present disclosure is adapted to produce different types of fabrics such as serge, woven, satin, crepe, panama and the like and all the weavings use at least one of a warp system and a weft system. In addition, the pattern of the first fabric is different from that of the second fabric. For instance, the first fabric could be woven whereas the second fabric could be Serge or any other pattern.

[0107] The weaving machine according to the embodiment herein use alternative rapier, double gripper and the projectile weft insertion system and a pneumatic assembling mechanism, all of which have caused a positive in the field of weaving. Further the weaving machine provides for reduced spatial occupation, reduced human intervention, reduced energy consumption in proportion to the production and increase in productivity.

[0108] The foregoing description of the specific embodiments will so fully reveal the general nature of the embodiments herein that others can, by applying current knowledge, readily modify and/or adapt for various applications such specific embodiments without departing from the generic concept, and, therefore, such adaptations and modifications should and are intended to be comprehended within the meaning and range of equivalents of the disclosed embodiments. It is to be understood that the phraseology or terminology employed herein is for the purpose of description and not of limitation. Therefore, while the embodiments herein have been described in terms of preferred embodiments, those skilled in the art will recognize that the embodiments herein can be practiced with modification within the spirit and scope of the appended claims.

[0109] Although the embodiments herein are described with various specific embodiments, it will be obvious for a person skilled in the art to practice the disclosure with modifications. However, all such modifications are deemed to be within the scope of the claims.

[0110] It is also to be understood that the following claims are intended to cover all of the generic and specific features of the embodiments described herein and all the statements of the scope of the embodiments which as a matter of language might be said to fall there between.

What is claimed is:

1. A weaving machine comprising;

a first weaving beam;

a second weaving beam arranged opposite to the first beam;

a first warp thread for weaving a first fabric;

a second warp thread for weaving a second fabric;

a pair of drapers;

a plurality of frames;

a slay; and

a shuttle;

wherein a weft is inserted through the shuttle on an alternative mode with respect to a fabric shed for the first warp thread and the second warp thread to produce the first fabric and the second fabric.

2. The weaving machine according to claim **1**, wherein the first weaving beam is adapted to provide the warp thread for weaving the first fabric.

3. The weaving machine according to claim **1**, wherein the second weaving beam is adapted to provide the warp thread for weaving the second fabric.

4. The weaving machine according to claim **1**, wherein the plurality of frames is equally divided into at least two sets for weaving each of the first fabric and the second fabric.

5. The weaving machine according to claim **1**, wherein the plurality of frames includes 32 set of frame.

6. The weaving machine according to claim **1**, wherein the plurality of frames is arranged such that an odd set of frames form a shed for the first fabric.

7. The weaving machine according to claim **1**, wherein the plurality of frames is arranged such that an even set of frames form a shed for the second fabric.

8. The weaving machine according to claim **1**, wherein the drapers includes at least two sets of healds and wherein each of the at least two sets of heald is adapted to control the warp thread end breaks of the first fabric and the second fabric.

9. The weaving machine according to claim **1**, wherein the first warp thread and the second warp thread are passed through the healds based on a weaving pattern, design and the reed plan of the weaving machine.

10. The weaving machine according to claim **1**, further comprises at-least two grippers, wherein each of the two at least gripper inserts weft for at-least one of the first fabric and the second fabric.

11. The weaving machine according to claim **1**, further comprises at least two rapiers, wherein each of the at least two rapiers is adapted to insert the weft for at-least one of the first fabric and the second fabric.

12. The weaving machine according to claim **1**, wherein the slay is adapted to provide for beating of the warp thread to the fell of a first fabric.

13. The weaving machine according to claim **1**, wherein the slay is adapted to provide for beating of the warp thread to the fell of a second fabric.

14. The weaving machine according to claim **1**, further comprises a dobby loom to send commands to define a design and weaving rapport.

15. The weaving machine according to claim **1**, further comprises a pneumatic system to provide for a movement of the plurality of frames in an upward direction and a downward direction.

16. The weaving machine according to claim **1**, further comprises a the set of nozzles and an air conductor fixed on a weaving comb for each set of the warp thread for inserting weft alternatively for the first fabric and the second fabric upon shed formation.

17. The weaving machine according to claim **1**, further comprises at least two cloth rollers to take up each of the first fabric and the second fabric.

18. The weaving machine according to claim **1**, wherein the first fabric and the second fabric are of same pattern.

19. The weaving machine according to claim **1**, wherein the first fabric and the second fabric are of different patterns.

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