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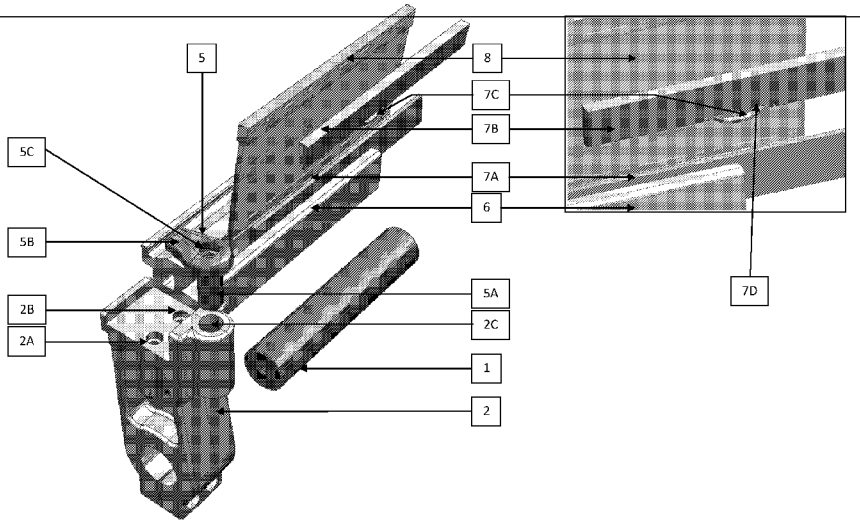
(54) **Title:** EASY AND EFFECTIVE REED CLAMPING ARRANGEMENT FOR WEAVING MACHINES



PATENT ILLUSTRATION 2 of 3: *(fasteners are not shown for simplicity)*
Diagram 2 : Detailing of Exploded view of reed holding arrangement.

(57) **Abstract:** This invention is about easy and effective reed clamping arrangement for weaving machines which consists of two counteracting wedges wherein a vertical clamping force of the fastener of point load type is converted in to a more or less uniformly distributed horizontal clamping force of the wedges on the reed, the wedge strip does not have any holes and hence the breakages of wedges in event of uneven clamping are totally avoided. Further the wedge strips always keep themselves afloat in event of de-clamping and even after removal of reed and no efforts are required to lift the wedge in event of inserting the reed again in the slot. The clamping arrangement is so devised that the clamping force of the fasteners is multiplied and transmitted transversely on the reed making it a highly rigid reed holding arrangement ever.

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[Continued on next page]

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Declarations under Rule 4.17:

— *as to the identity of the inventor (Rule 4.17(i))*
— *as to applicant's entitlement to apply for and be granted a patent (Rule 4.17(ii))*
— *as to the applicant's entitlement to claim the priority of the earlier application (Rule 4.17(iii))*

Published:

— *with international search report (Art. 21(3))*
— *with amended claims (Art. 19(1))*

TITLE OF INVENTION:

"EASY AND EFFECTIVE REED CLAMPING ARRANGEMENT FOR WEAVING MACHINES"

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21/1615, "Bhagyashree", Opp. Deccan Co-Op. Spinning Mills,
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The following specification particularly describes and ascertains the nature of this inventions and manner in which it is to be performed.

DESCRIPTION:

A. TECHNICAL FIELD OF INVENTION :

Present invention relates to **textile engineering field** and more particularly to reed clamping systems used on textile weaving machines.

B. PRIOR ART:

1. **Indian Patents –** No prior art with even the slightest resemblance in textile and weaving machine field.
2. **Overseas Patents** – No Prior art with even slightest resemblance in textile and weaving machine field.

Conventionally weaving machines are known to have reed clamping by a single wedge rod or strip which is clamped in a taper seat to create a clamping action. The major defect of these systems being

1. There are holes within the body of this clamping wedge and this creates a weak point and majority of breakages of this clamping wedge results at this place, and clamping forces of fasteners retain their point force nature, as they are at weakest point of the wedges.

2. Upon the loosening of this wedge and removal of reed, the wedge normally falls inside the tapered shape. Putting in new reed requires entire wedge to be lifted up and this being long part lifting throughout the width of the weaving machine is difficult and requires more than one person for the task.

3. The clamping element is normally a hex nut which sits above the wedge and access is restricted only at an angle which is very close to the reed. There are several instances that reed itself, being delicate, gets damaged during clamping and de-clamping instances.

C. WHAT'S NOVEL IN THIS INVENTION:

This invention eliminates holes in the wedge strip, thus making it stronger. Additionally a dedicated clamping system is provided within the specially devised sley support bracket and a special clamping element, the fastener is also placed away from reed which eliminates chances of damages to the reed. Furthermore provision of springs below the wedge keep the wedge afloat when the reed is removed and this eliminates the need to keep it lifted during insertion of new reed, all of these are amongst the most prominent achievements of this invention.

D. OBJECTIVES OF INVENTION :

1. Wherein the main objective of the invention is to art a clamping system for weaving reeds for weaving machines which increases life of the wedge strip.

2. Wherein the additional main objective of this invention is to art a wedge clamping system wherein the fasteners are away from the reed to avoid damages to the reed.

3. Wherein the secondary objective of the invention is to art a reed clamping system which will keep the wedge afloat in an event when reed is removed in such a manner that the wedge need not be lifted up every time while inserting a new reed.

4. Wherein another additional objective of the invention is to art a reed clamping system, the fasteners of the reed clamping system are easily accessible from the top and with minimum distortion of warp threads.

E. BRIEF DESCRIPTION OF DRAWINGS:

The invention will now be described with the help of a drawing accompanying this specification wherein salient features have been shown by suitable numerals and referred to appropriately in the following description.

The Patent Illustration comprises of 3 diagrams:

Description on Diagram 1: Back and Side views of reed holding on a sley bracket

Numbered 1 is shaft of weaving machine on which sley support brackets numbered 2 are fitted by means of at least one fastener at place 3. A boss numbered 4 is made integral with the bracket numbered 2, at the upper portion of it in such a manner that it can house a clamping part 5 within its bore as well as it keeps a distance from the extruded sley profile numbered 6 which is also mounted on the bracket numbered 2. Numbered 7A and 7B are the two wedges which fit inside a notch numbered 6A in the sley profile numbered 6 and serve the purpose of clamping the reed into the sley profile numbered 6 when part 5 is fastened on the sley support bracket numbered 2, which happens by counteracting geometry of the two wedges 7A and 7B. An isometric view of the same sley shaft, sley support bracket and reed in clamped position is shown for understanding. There can be several such brackets arranged across the width of the machine, furthermore the reed and beat up shaft are also longer in nature than what is shown in diagram with a view to simplify the explanation in this description. Longer nature of all these parts is shown in further diagram showing a detailed view of preferred example embodiment and of the best mode of this invention.

Diagram 2 : Detailing of Exploded view of reed holding arrangement.

As an exploded view of the reed clamping arrangement is shown in diagram 2. It shows all the parts explained above and additionally shows a view of wedge 7B in inset showing arrangement of springs numbered 7C, in a recess numbered 7D, which is intended to lift the wedge up when the fastener is loosened. In clamped condition the spring is compressed from its free position and when loosened it returns to its original shape lifting the wedge 7B upwards.

The diagram also shows details of special fastening part numbered 5 which comprises a cylindrical shank 5A which slides in bore numbered 2C of part numbered 2, top projection numbered 5B which is extended by about 10 to 40 mm towards the wedges from the bolt or fastener hole numbered 5C to get clamped over wedge 7B. Further shown are details on part numbered 2 in form of holes numbered 2A and 2B which are used to clamp the sley profile numbered 6.

WORKING: The assembly of parts begins with clamping plurality of sley brackets numbered 2 on a long shaft numbered 1, these are suitably aligned at angular positions along the shaft in such a manner that the resting slot for sley profile numbered 6 come in one straight line and the profile is fixed to the sley brackets numbered 2 by means of several fasteners at places numbered 2A and 2B. Next the wedges 7A and 7B are placed in the sley profile numbered 6 with their taper sides facing to each other and one of the wedge is placed in an inverse position in relation with the other, which is better seen in diagram 1. Wedge 7B houses several springs numbered 7C which are placed in several slots 7D made in the bottom portion of wedge 7B. Clamping parts numbered 5 are placed in each of

the holes 2C of the sley brackets numbered 2, and a fastener is placed in each of the position 5C of all clamping parts numbered 5 and engaged in threads made below bore 2C of the bracket. Now the springs are bearing the weight of wedge 7B, hence wedge 7A remains just touching the taper of wedge 7B as the springs have held the wedge 7B afloat. Reed is placed in front of this wedge assembly which goes freely inside the profile sley numbered 6, until it rests on the bottom surface of the profile. Fasteners at several places are lightly clamped at this position at all places on all brackets numbered 2 which compresses the springs 7C which are located at several places along the length of the wedge. This makes wedge 7B to get lowered a bit, which in turn makes the wedge 7A to get pressed against the reed as a counteracting action of wedge tapers i.e. vertical clamping force of fasteners converts itself in horizontal pressure on the reed which is now held firmly clamped inside the profile numbered 6, the horizontal force of clamping is proportional to the force applied by all fasteners at places 5C, when the reed is finally clamped to rated torque, depending on the variety of cloth woven on the weaving machine, which is applied on the fasteners by a torque wrench.

Here the fasteners are accessible from top and usage of socket head screws makes it easy to clamp or de-clamp the screws from top with minimum distortion of the warp threads, as the tools for de-clamping socket head screws are one of the sleekest tools known. In an event of de-clamping of reed, the springs 7C keep the wedge 7B afloat and wedge 7A moves back and gets de-pressurized and eventually reed also gets de-pressurized, even after removal of reed the space occupied by the reed remains free and empty as wedge 7A does not move in to that place. Thus only one person can install and de-install the reed from the sley and this is one of the highlight achievements of this invention.

Further the wedges do not have any drilled holes for fasteners and this makes them sturdier and unlike the conventional wedges having holes, the breakage of wedge strips is greatly eliminated.

Diagram 3 : Shows preferred embodiment example of the invention in form application of this technology on a Flexible rapier weaving machine.

From the description of diagrams and illustrative example of working clearly demonstrate that, all the main and supplementary objectives of this invention are thus achieved and this is a unique invention of its kind and achieved for the first time.

NOMENCLATURE

Diagram 1 : Back and Side views of reed holding on a sley bracket

Numbered 1 Shaft of weaving machine
Numbered 2 Sley Bracket
Numbered 3 Sley Bracket Clamping Fastener place
Numbered 4 Integral Boss for housing reed clamp element
Numbered 5 Reed clamp element
Numbered 6 Sley Profile Extruded section
Numbered 7A Reed facing Wedge
Numbered 7B Spring loaded Wedge

Diagram 2 : Detailing of Exploded view of reed holding arrangement.

Numbered 2A Screw for sley profile
Numbered 2B Screw for sley profile
Numbered 2C bore for mounting the Clamp 5
Numbered 5 Reed clamp element (complete)
Numbered 5A Shank of clamp element
Numbered 5B Top portion of clamp
Numbered 5C Fastener hole
Numbered 6 Sley Profile
Numbered 7C Springs Intended to Lift wedge up
Numbered 7D Place or recess or notch in wedge part 7B for the Springs 7C

Diagram 3 : Typical application of Reed Clamping System on a flexible rapier weaving machine.

Numeral 5 are several reed clamping elements diagram shows layout.

CLAIMS:

The embodiments of the invention in which an exclusive property or privilege is claimed in connection with articulations of this invention in textile weaving machines are specifically defined as follows:

1. It is claimed that the invention comprises a shaft 1 running across the length of weaving machine on which sley support brackets 2 are fitted securely by means of at least one fastener at place 3, a cylindrical boss 4 is made integral with the bracket 2, at the upper portion of it, in such a manner that it can house a clamping part 5 within its bore as well as it keeps a distance from the extruded sley profile 6 which is further mounted on the bracket 2, which houses two wedges 7A and 7B , which fit inside an integral notch 6A in the sley profile 6 and serve the purpose of clamping the reed into the sley profile 6 when clamping part 5 is fastened on the sley support bracket 2, clamping takes place by counteracting geometry of the two wedges 7A and 7B further explained below in claim 6 below.

2. Further it is also claimed that as shown in isometric view, the same sley shaft 1, sley support bracket 2 and reed is shown in clamped position for understanding, plurality of such brackets are arranged across the width of the machine, furthermore the reed and beat up shaft are also longer in nature than what is shown in diagram with a view to simplify the explanation in this description and claims, however the longer nature of all these parts is shown in further diagram 3 showing a detailed view of preferred embodiment example and of the best mode of enabling this invention.

3. It is further claimed in continuation of claim 2, in an exploded view of the reed clamping arrangement as shown in diagram 2, shows all the parts explained above and additionally shows a view of wedge 7B in inset showing arrangement of springs 7C, which are arranged in plurality across the machine length at places and notch 7D, and these are intended to lift the wedge 7B up when the fastener at place 5C is loosened, whereas in clamped condition the spring is compressed from its free position and when loosened it returns to its original shape lifting the wedge 7B upwards.

4. It is additionally claimed that as shown in diagram 2, are the details of special fastening part 5 which comprises a cylindrical shank 5A which slides in bore 2C of sley bracket part 2, and has a projection 5B towards its upper end, which is extended by about 5 to 40 mm away from the bolt hole or fastener hole 5C to enable it to get clamped over wedge 7B, by engaging the threads of the fastener in threaded portion at the bottom of bore 2C, further shown are details on part 2 in form of holes 2A and 2B which are used to clamp the sley profile 6 on to part 2.

5. It is significantly claimed that in normal position, the wedges 7A and 7B are placed in the sley profile 6 with their taper sides facing to each other and one of the wedge is placed in an inverse position in relation with the other, which is better shown in diagram 1, further wedge 7B houses several springs 7C which are placed in several slots 7D made in the bottom portion of wedge 7B, and the clamping parts which are placed in each of the holes 2C of the sley brackets 2, and a fastener is placed in each of the position 5C of all clamping parts numbered 5 and engaged in threads made below bore 2C of the bracket.

6. It is further claimed that the springs are bearing the weight of wedge 7B, hence wedge 7A remains in a position just touching the taper of wedge 7B as the springs have held the wedge 7B afloat, reed is placed in front of this wedge assembly which goes freely inside the profile sley 6, until it rests on the bottom surface of the profile, and fasteners at several places are clamped at this position at all places on all brackets 2 which compresses the springs 7C, this makes wedge 7B to get lowered a bit, which in turn makes the wedge 7A to get pressed against the reed as a counteracting action of wedge tapers i.e. vertical clamping force of fasteners converts itself in horizontal pressure on the reed which is now held firmly clamped inside the profile 6, the horizontal force of clamping is proportional to the force applied by all fasteners at places 5C, when the reed is finally clamped to rated torque, depending on the variety of cloth woven on the weaving machine, which is applied on the fasteners by a suitably rated torque wrench, thus an even and firm clamping of reed is attained.

7. In continuation with claim 6 above, further it is significantly claimed that the point loads of the fasteners at several places are multiplied by wedge taper counteraction and at the same time it is also converted from point forces in to a more or less uniformly distributed force across the length of the reed by the rigidity of wedges, thus reed is held more forcefully and uniformly instead of point forces, this is another very prominent and significant achievement of this invention.

8. It is typically claimed that although all the fasteners used for clamping the reed are accessible from top and at a safe distance from the reed itself, the usage of socket head screws makes it easy to clamp or de-clamp the screws from top with minimum distortion of the warp threads, as the tools for clamping and de-clamping socket head screws are one of the sleekest tools known, thus clamping and de-clamping of reed with minimum distortion to the warp threads, and additionally the damages to the reed itself by tools is totally eliminated and both of these are next best highlight achievements of this invention.

9. It is furthermore claimed that in an event of de-clamping of reed, the springs 7C keep the wedge 7B afloat and wedge 7A moves back and gets de-pressurized and eventually reed also gets de-pressurized and even after removal of reed from the machine, the space occupied by the reed remains free and empty as wedge 7A does not move in to that place, which otherwise happens in absence of springs 7C as wedge 7B always presses down and against wedge 7A, due to gravity, thus with this novel arrangement only one person can easily install and de-install the reed from the sley and this is one of the important achievements of this invention.

10. It is furthermore claimed that an articulation of this invention wherein instead of one piece wedge strips, they can also be made in several segments of suitable lengths, which will be easy to manufacture and install as well, and can be used to get the same clamping effect and we intend to protect exclusive privileges of usage of such segmental wedge strips as an alternative embodiment of this invention.

Dated – **04th July, 2016.** Inventor signature: **SANJAY ANANT KURKUTE.**

AMENDED CLAIMS
received by the International Bureau on 23 June 2017 (23.06.2017)

1. On a weaving machine, a reed clamping arrangement comprising two counteracting wedges 7A and 7B, clamping parts 5 with fasteners thereon, and a sley support bracket 2; wherein the fasteners of the reed clamping arrangement are placed away from the reed and are accessible from the top with minimum distortion of warp threads; and wherein the wedges do not have any drilled holes for fasteners so that the point loads of the fasteners on clamping part 5 at several places across the width of the machine are multiplied by wedge taper counteraction and are converted from point forces to a substantially uniformly distributed force across the length of the reed being mounted on the weaving machine.

2. The reed clamping arrangement of claim 1, wherein the reed clamping arrangement comprises a shaft 1 running across the length of weaving machine on which sley support brackets 2 are fitted securely by means of at least one fastener at place 3, a cylindrical boss 4 is made integral with the upper portion of bracket 2 in such a manner that it can house a clamping part 5 within its bore (2C) and also keeps a distance from the extruded sley profile 6 which is further mounted on the bracket 2, which houses the two wedges 7A and 7B, which fit inside an integral notch 6A in the sley profile 6 and serve the purpose of clamping the reed into the sley profile 6 when clamping part 5 is fastened on the sley support bracket 2, wherein the clamping takes place by the counteracting geometry of the two wedges 7A and 7B.

3. The reed clamping arrangement of claim 2, wherein a plurality of springs 7C are arranged across the machine length at notches 7D to lift the wedge 7B up when the fastener at place 5C is loosened, and wherein, in clamped condition, the springs are compressed from their free positions, and when loosened the springs return to their original shapes lifting the wedge 7B upwards.

4. The reed clamping arrangement of claim 3, comprising a fastening part 5 which comprises a cylindrical shank 5A which slides in bore 2C of sley bracket part 2, and has a projection 5B towards its upper end, which is extended by about 5 to 40 mm away from the bolt hole or fastener hole 5C to enable it to get clamped over wedge 7B, by engaging the threads of the fastener in threaded portion at the bottom of bore 2C, and wherein part 2 has holes 2A and 2B which are used to clamp the sley profile 6 on to part 2.

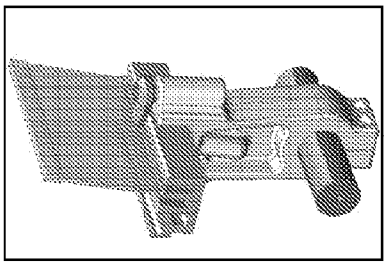
5. The reed clamping arrangement of any one of claims 1-4, wherein, in normal position, the wedges 7A and 7B are placed in the sley profile 6 with their taper sides facing

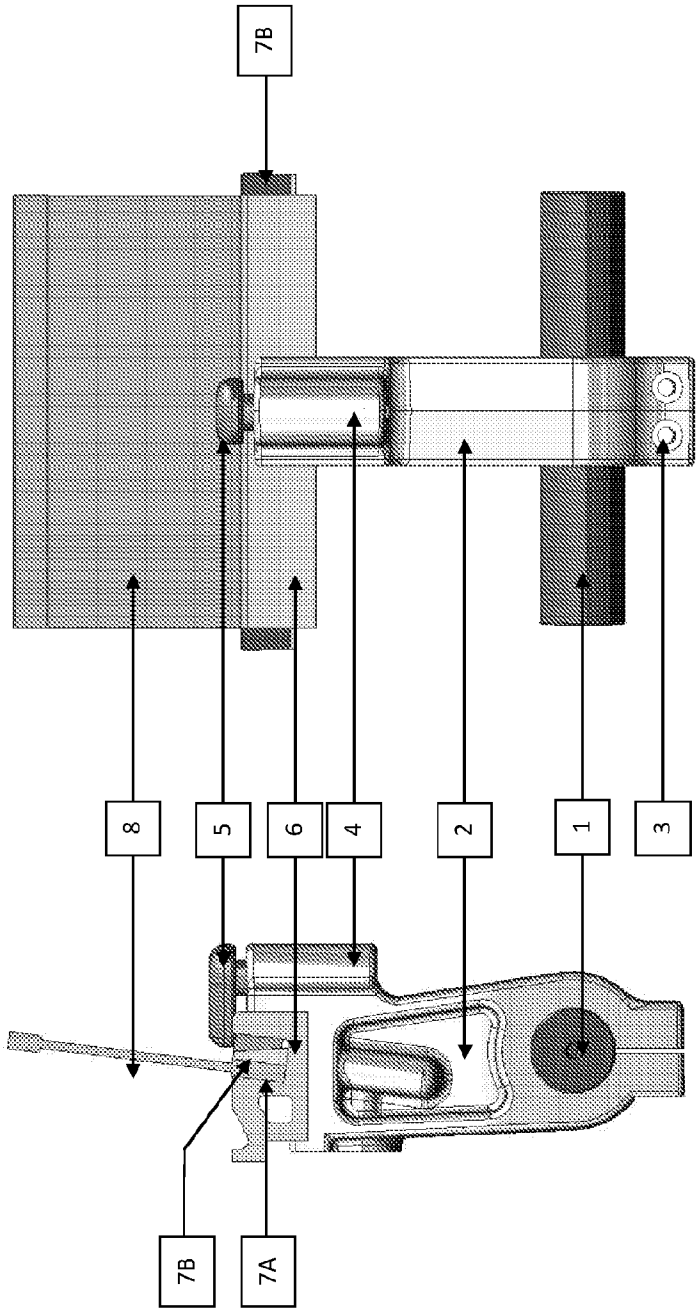
each other and one of the wedges is placed in an inverse position in relation with the other, wedge 7B houses several springs 7C which are placed in several slots 7D made in the bottom portion of wedge 7B, the clamping parts are placed in each of the holes 2C of the sley brackets 2, and a fastener is placed in each of the position 5C of all clamping parts numbered 5 and engaged in threads made below bore 2C of the bracket.

6. The reed clamping arrangement of any one of claims 1-5, wherein the springs bear the weight of wedge 7B, wedge 7A remains in a position just touching the taper of wedge 7B as the springs hold the wedge 7B afloat, the reed is placed in front of this wedge assembly which moves freely inside the profile sley 6, until it rests on the bottom surface of the profile, fasteners at several places are clamped at all places 2C on all brackets 2 which compresses the springs 7C thereby lowering wedge 7B, which in turn causes the wedge 7A to get pressed against the reed as a counteracting action of wedge tapers, such that the vertical clamping force of fasteners converts to horizontal pressure on the reed which is now held firmly clamped inside the profile 6, the horizontal force of clamping is proportional to the force applied by all fasteners at places 5C, and wherein when the reed is finally clamped to a rated torque, an even and firm clamping of reed is attained.

7. The reed clamping arrangement of any one of claims 1-6, wherein in an event of de-clamping of reed, the springs 7C keep the wedge 7B afloat and wedge 7A moves back and gets de-pressurized and eventually reed also gets de-pressurized and even after removal of reed from the machine, the space occupied by the reed remains free and empty as wedge 7A does not move in to that place, so that when the reed is removed or inserted, the wedge need not be lifted up during the removal or insertion.

8. The reed clamping arrangement of any one of claims 1-7, wherein the wedges 7A and 7B optionally comprise several segments of suitable lengths and the reed clamping arrangement provides the same clamping effect.

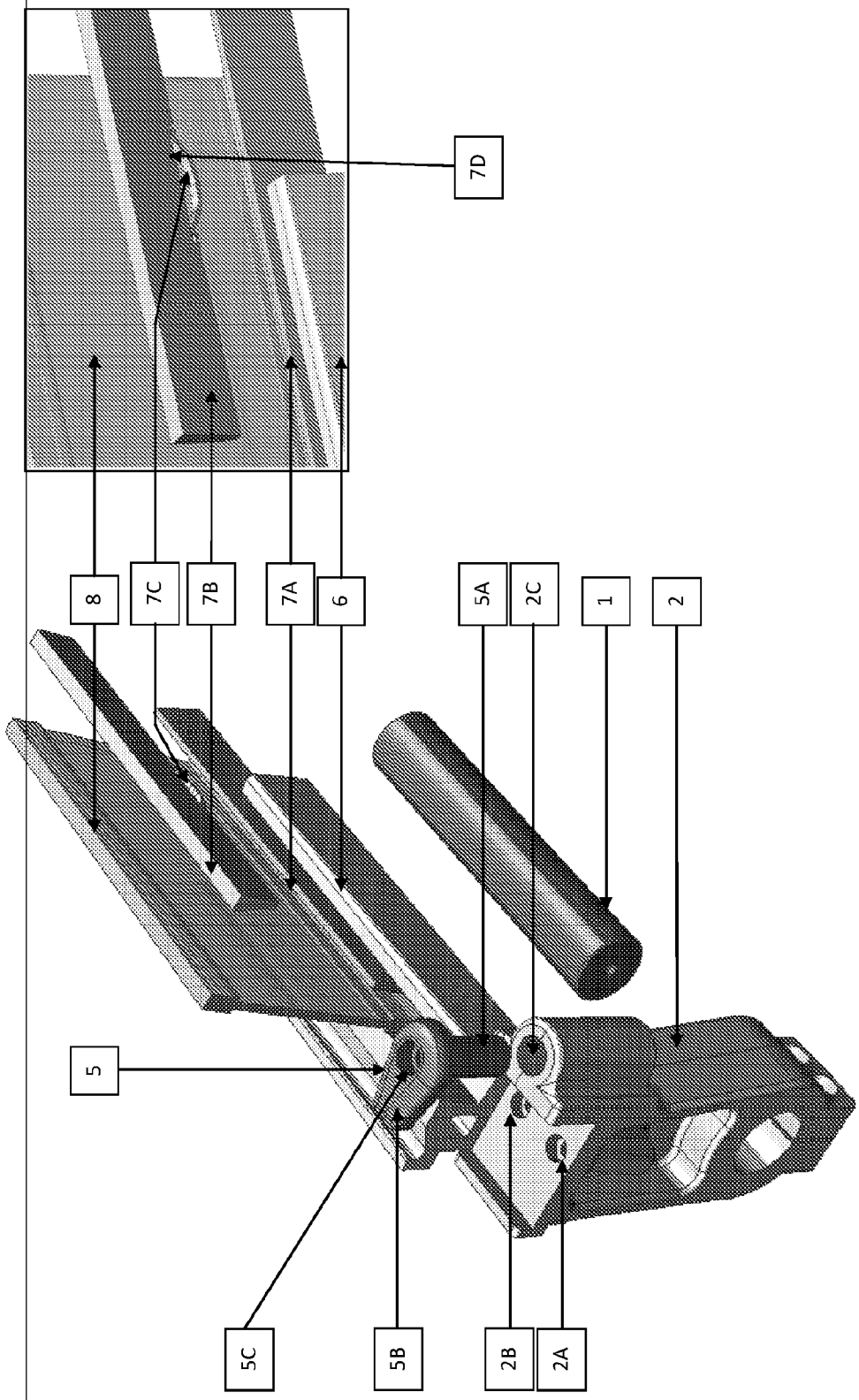




PATENT ILLUSTRATION 1 of 3:

Diagram 1 : Back and Side views of reed holding on a sley bracket *(Fasteners are not shown for simplicity)*

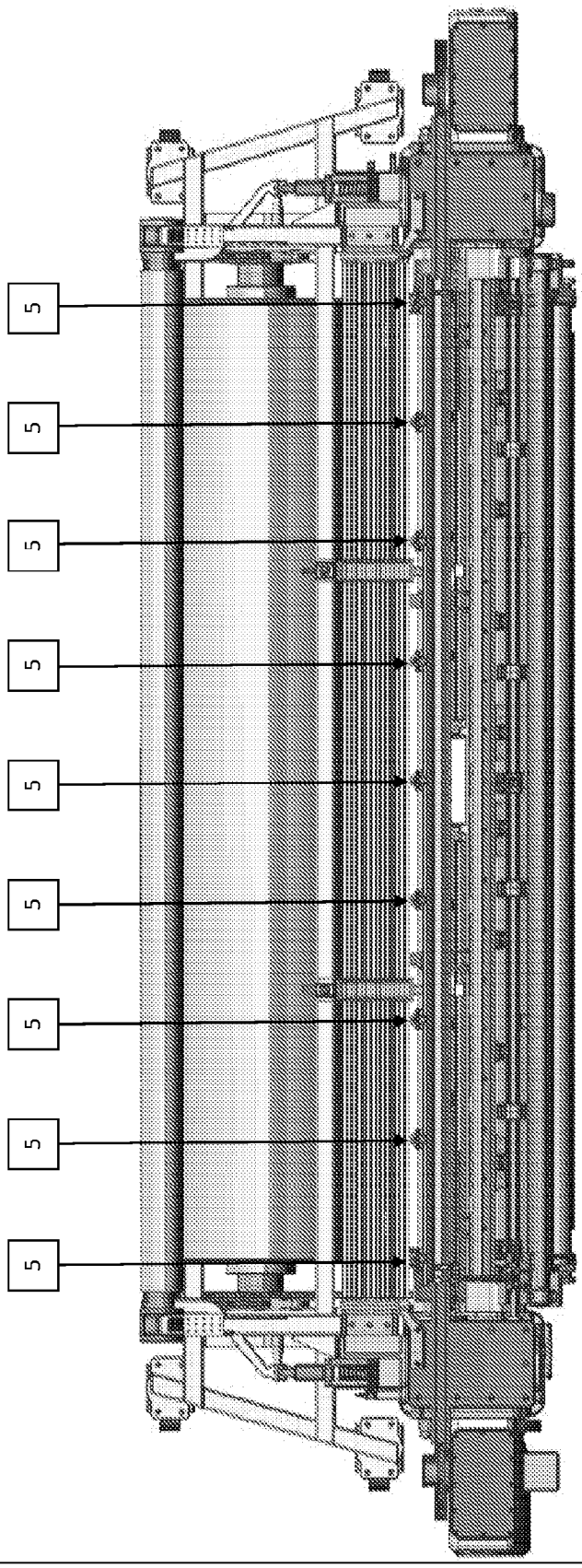
Inventor Signature : **SANJAY ANANT KURKUTE.**



Inventor Signature : SANJAY ANANT KURKUTE

PATENT ILLUSTRATION 2 of 3: *(fasteners are not shown for simplicity)*

Diagram 2 : Detailing of Exploded view of reed holding arrangement.



PATENT ILLUSTRATION 3 of 3: *(fasteners are not shown for simplicity)*
Diagram 3 : Typical application of Reed Clamping System on a flexible rapier weaving machine.

Inventor Signature : SANJAY ANANT KURKUTE

INTERNATIONAL SEARCH REPORT

International application No.
PCT/IB2017/051755

A. CLASSIFICATION OF SUBJECT MATTER
D03D49/62 Version=2017.01

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)

D03D

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)

Patseer, IPO Internal Database

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US6401762B1 (PICANOL NV) June 11, 2002. Fig 1 and 2; column 2, line 30-50.	1-10
Y	GB1360036A (SULZER AG) July 17, 1974. Page-1, column-1, line 12-34; Page-2, column-1, line 11-65; Fig 2 and 3.	1-10
Y	JPH10110359A (NISSAN TECSYS KK) April, 28, 1998. Whole Document.	1-10

☐ Further documents are listed in the continuation of Box C.

☒ See patent family annex.

* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

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

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"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

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
25-04-2017	25-04-2017

Name and mailing address of the ISA/	Authorized officer
Indian Patent Office Plot No.32, Sector 14,Dwarka,New Delhi-110075	Sagar B. Pol
Facsimile No.	Telephone No. +91-1125300200

International application No.
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Citation	Pub.Date	Family	Pub.Date
US 6401762 B1	11-06-2002	WO 9964654 A1	16-12-1999
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		DE 59907557 D1	04-12-2003
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