

Aug. 19, 1952

L. M. COTCHETT ET AL

2,607,084

SADDLE FOR SPINNING FRAMES OR THE LIKE

Filed Jan. 27, 1948

2 SHEETS—SHEET 1

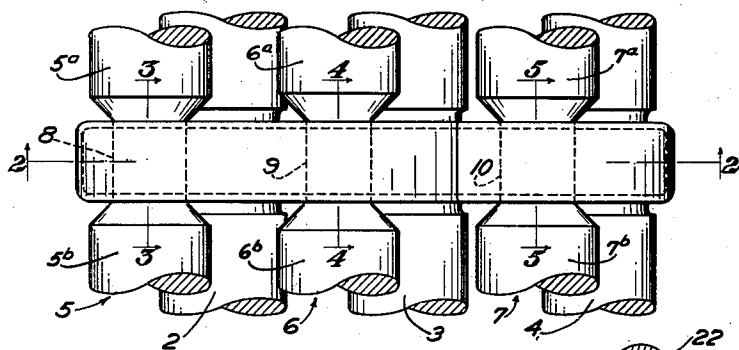


Fig. 1.

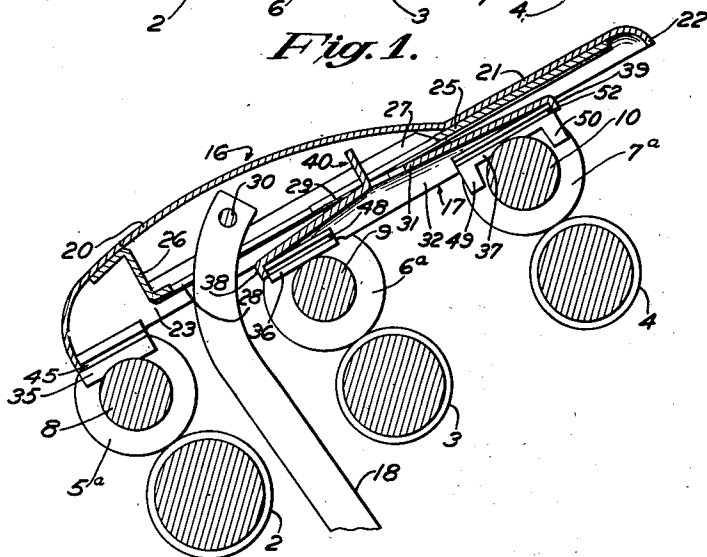


Fig. 2.

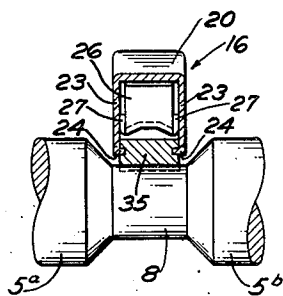


Fig. 3.

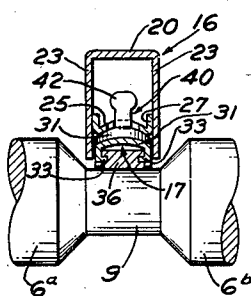


Fig. 4.

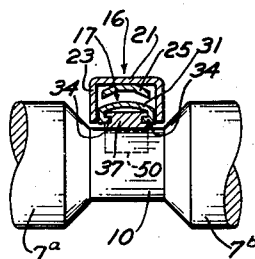


Fig. 5.

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Fig. 6.

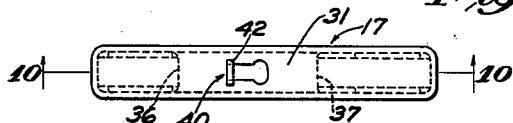


Fig. 7.

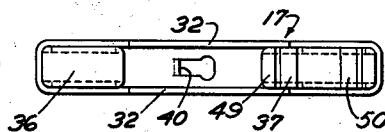


Fig. 8.

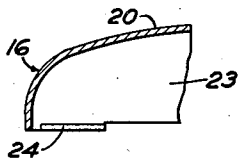


Fig. 9.

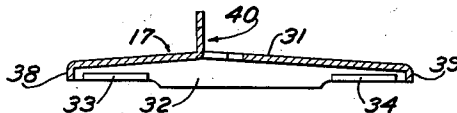


Fig. 10.

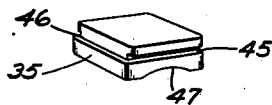


Fig. 11.



Fig. 12.

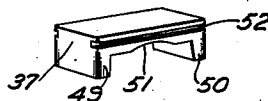


Fig. 13.

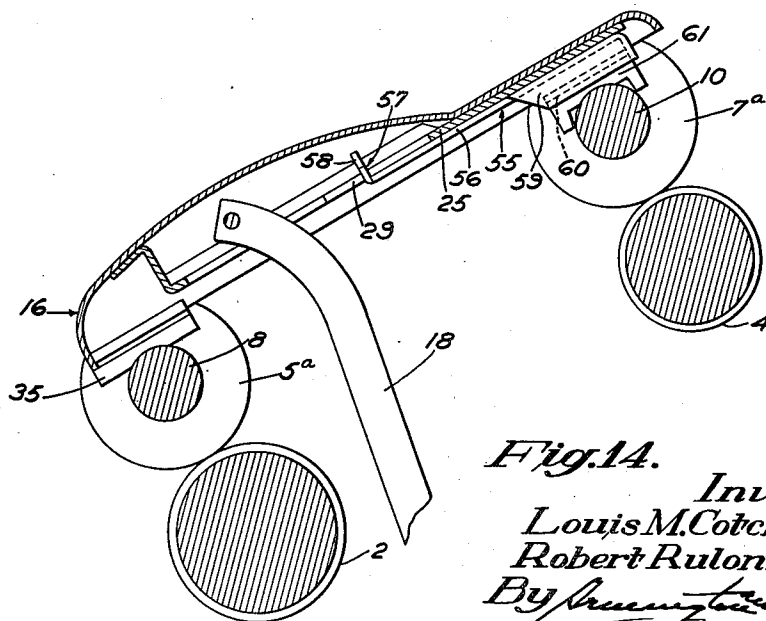


Fig. 14.

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## UNITED STATES PATENT OFFICE

2,607,084

SADDLE FOR SPINNING FRAMES  
OR THE LIKE

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Application January 27, 1948, Serial No. 4,678

6 Claims. (Cl. 19-137)

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This invention relates to saddles for weighting the top rolls of machines for treating textile fibers, such as spinning and drawing frames, and consists in improvements in the construction and arrangement thereof, particularly to provide replaceable oilless bearings having friction-reducing and wear-resisting characteristics.

One object of the invention is to provide a saddle assembly having a smooth, polished upper surface without indentations for oil holes, cups or the like whereby to prevent lint from depositing thereon and adhering thereto.

Another object is to provide an adjustable saddle for practically universal use and adapted to accommodate the setting of the rolls for a maximum range of staple lengths of fiber from the shortest to the longest.

Another object is to provide a saddle assembly constructed from sheet-metal having the point of contact between the front saddle and the back saddle of novel design to permit free play therebetween without binding or cramping.

Another object is to provide a saddle assembly in which the back saddle is completely nested within and shielded by the front saddle to prevent lint and dust from collecting on the bearings.

Another object is to provide means on the saddle for readily and conveniently attaching improved bearing elements which may be removed when worn and replaced by others of the same type with the substitution easily accomplished in the mill without the use of tools.

Another object is to provide improved bearing elements of novel form constructed from anti-friction material requiring no lubrication and resistant to wear to render them durable for long periods of use.

Another object is to provide an improved type of open bearing to prevent heating at the bearing surfaces on the arbors of the rolls.

Another object is to provide a saddle assembly having interchangeable parts to adapt it for use with either the "Roth" or Casablancas system of spinning.

Another object is to provide a saddle assembly comprising sheet-metal elements which may be stamped out and shaped in dies to render the parts economical to manufacture.

Further objects of the invention are set forth in the following specification which describes a preferred form of construction of the parts of the saddle assembly with two alternative arrangements thereof as illustrated by the accompanying drawings. In the drawings:

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Fig. 1 is a plan view of a set of top and bottom drafting rolls shown as partly broken away and illustrating the present improved saddle as applied to use therewith;

5 Fig. 2 is a side elevational view of the same, part-sectional on line 2-2 of Fig. 1;

Fig. 3 is a transverse sectional view of the forward end of the front saddle taken on line 3-3 of Fig. 1 and showing the removable bearing element attached thereto for engagement with the arbor of the front roll;

10 Fig. 4 is a similar transverse sectional view of both the front and back saddle taken on line 4-4 of Fig. 1 and showing the removable bearing element for the middle roll in contact with the arbor of said roll;

15 Fig. 5 is a similar transverse sectional view of the rearward end of the back saddle taken on line 5-5 of Fig. 1 and showing the removable bearing element for the arbor of the back roll in contact therewith;

20 Fig. 6 is a bottom plan view of the front saddle showing the weight-plate housed therein and connected thereto;

25 Fig. 7 is a top plan view of the back saddle;

Fig. 8 is a bottom plan view of the back saddle;

30 Fig. 9 is a fragmentary longitudinal sectional view of the forepart of the front saddle showing one of the flanges for attaching the front top roll bearing element thereto;

Fig. 10 is a transverse sectional view of the back saddle taken on line 10-10 of Fig. 7;

Fig. 11 is a perspective view of the attachable bearing element for the front roll;

35 Fig. 12 is a perspective view of the attachable bearing element for the middle roll;

Fig. 13 is a perspective view of the attachable bearing for the back roll; and

40 Fig. 14 is a side elevation in longitudinal section of an alternative arrangement of the saddle assembly for use without the middle roll.

Heretofore it has been the general practice to employ saddles for weighting the top rolls of machines for treating textile fibers, for example, spinning and drawing frames, with the parts constructed of malleable or cast iron. In most cases the bearings for the arbors of the top rolls comprise either recessed or flat portions of the metal and the saddle is formed on the top with oil-pockets or cups and ducts leading therefrom to lubricate these bearings. Such saddles are open to the disadvantage of collecting dust and lint in the oil pockets and oil holes which collection interferes with the proper lubrication of the bearings and results in increased friction and severe

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wear at the bearing surfaces. It is, therefore, a particular object of the present invention to provide an improved saddle assembly comprising a front saddle having a smooth, polished upper surface devoid of depressions or pockets and constituting a cover and shield for the back saddle to prevent dust and lint from accumulating on the bearings and other parts; and to further improve the construction of the saddle by providing it with what may be termed "slip on" bearings for convenient attachment thereto and removal therefrom for replacement to extend the life of the saddle practically indefinitely.

In accordance with the present invention the removable bearings for the saddle are constructed from a distinctive type of material having friction-reducing and extraordinary wear-resisting characteristics. For this purpose the invention contemplates the use of attachable bearing elements made wholly or in part of a material having a hardness substantially that of a Rockwell hardness of 90-95 on the M scale. One such material, for example, is a synthetic linear super polymer or synthetic linear polyamide described in United States Letters Patent No. 2,130,948, issued September 20, 1938, to Carothers. No claim is made herein to the polymer per se, the present invention being directed to a bearing element made in whole or in part from said polymer identified by the trade-name nylon. The bearing elements may be cast, molded or cut from a strip of the material, the details of such method of manufacture being well known and therefore not herein described.

Referring to Figs. 1 to 10, inclusive, the present improved saddle and its attachable bearings are herein shown as applied to a set of drafting rolls for spinning frames such as illustrated in Figs. 1 and 2. The set of rolls comprises a bottom front roll 2, a middle roll 3, and a back roll 4, with corresponding top rolls arranged thereabove for cooperation with the peripheries of the bottom rolls. Fig. 1 shows a front top roll 5, a middle top roll 6 and a back top roll 7, and in accordance with the usual arrangement the bottom rolls are journaled in fixed bearings while the top rolls have end gudgeons slidably journaled in spaced slots in cap-bars. A representation of the cap-bars and journals for the rolls is eliminated from the present drawings for the sake of simplicity and clarity in the showing of the essential parts of the invention. The top rolls 5, 6 and 7 comprise axially-aligned cylindrical hubs, 5<sup>a</sup>-5<sup>b</sup>, 6<sup>a</sup>-6<sup>b</sup> and 7<sup>a</sup>-7<sup>b</sup>, respectively, constituting the rolls proper, with the hubs of each pair connected by arbors 8, 9 and 10, respectively, that may be constructed integral with the hubs or formed by spindles or shafts extending through axial bores in the hubs. The saddle assembly is arranged above the top rolls and provided with bearings engaging the arbors 8, 9 and 10. The saddle assembly is constituted by a front saddle 16 and a back saddle 17 connected thereto for movement therewith and both saddles are weighted to cause the rolls to bear on the fibers feeding between the peripheries of the opposed top and bottom rolls. The saddle assembly is weighted by means of a stirrup 18 depending from the front saddle and connected to a lever carrying a weight hook at its ends with weights suspended thereon.

One feature of the present invention consists in constructing the saddle assembly from sheet-metal to adapt the parts to be stamped out and struck up in dies for the sake of economy in manufacture and to further provide a construc-

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tion for enclosing and shielding the operative parts of the device from lint and dust. For this purpose the front saddle 16 is of hollow form having a substantially convex or dome-shaped top wall 20 reaching from the front throughout the greater portion of its length and extended at its rear in a relatively flat wall portion 21 terminating in a downwardly-curved end 22. The interior of the front saddle 16 is enclosed by depending side walls or skirts 23 thus forming a hollow shell with its under side open and adapted to overlie and enclose the back saddle 17 as a protecting shield to prevent the accumulation of lint and dust on the bearings and other parts. The top of the front saddle 16 may be polished, plated, enameled or otherwise finished with a smooth surface not attractive to the lodgement of lint and dust thereon. At the forward end of the side walls 23 the metal is bent or folded inwardly to form relatively narrow fins or flanges 24 for attaching the front bearing element 35 thereto by engagement with its grooved sides in the manner as later explained.

Fastened within the interior of the front saddle 16 and extending longitudinally thereof is a weight-pressure plate 25 constructed from sheet-metal and arranged to bear on the back saddle 17 to apply pressure thereto for weighting the bearings for the middle and back top rolls. As shown more particularly in Figs. 2 and 5, the weight-plate 25 may be slightly crowned laterally with its rearward portion welded or otherwise secured to the flat top wall extension 21 of the front saddle 16 and its forward end is bent upwardly at 26 and then forwardly to underlie the crowned wall 20 of the front saddle to which it is suitably fastened by welding or otherwise. Referring to Fig. 2 the weight-plate 25 is provided with upstanding flanges 27 at its sides arranged in abutting relation to the side walls 23 of the front saddle 16 to locate the weight-plate laterally therein and reinforce the whole structure. The weight-plate 25 is formed with a longitudinally-extending slot comprising a wide portion 28 towards its front end and extended in a narrow portion 29 at the rear as shown more particularly in Fig. 6. The forward wider slot-portion 28 provides an opening for receiving the end of the stirrup 18, shown in Fig. 2 as having a curved upper end and pivotally attached to the front saddle 16 by a cross-pin 30 extending between the sides thereof and suitably secured thereto. The rearward, narrower slot-portion 29 is designed to receive the connecting means for the back saddle 17 as later explained in detail.

The back saddle 17 is also constructed from sheet-metal with a top wall 31, slightly crowned laterally as shown in Figs. 4 and 5, and vertical side walls 32 depending therefrom. At their lower edges the side walls 32 are bent or folded inwardly to provide longitudinally-extending fins or flanges 33 and 34 for engagement with the grooved sides of bearing elements 36 and 37 for the middle and back rolls 6 and 7, respectively. Referring to Fig. 2, the top wall 31 has downwardly-extended flanges 38 and 39 at its opposite ends for engaging the ends of the two bearing elements 36 and 37, all as more fully explained hereinafter. It is to be noted by reference to Fig. 2 that the top wall 31 of the back saddle 17 is sloped downwardly from its center toward its opposite ends and at its approximate center the metal is sheared or cut away to form an upstanding projection or key 40. The key 40 is of a width throughout its main length to

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adapt it to engage through the narrower slot-portion 29 in the weight-plate 25, being swelled outwardly at the top in a rounded protuberance 42 wider than the slot and forming a head to prevent the withdrawal of the key therefrom unless or until it is turned at ninety degrees to align it with the slot. Through this last-described construction of the back saddle 17 a novel and ingenious form of coupling is provided for connecting it with the front saddle 16 to permit play therebetween. That is to say, the back saddle 17 is connected to the front saddle 16 to provide free play therebetween and allow relative rocking motion of the back saddle laterally and longitudinally about its connection therewith without any tendency to cramp or bind. Through this means the front saddle 16 and back saddle 17 are connected for relative adjustment to conform to variations in the location of the middle top roll 6 and the back top roll 7 and insure proper contact of the bearings on their arbors 9 and 10, respectively.

Referring to Figs. 11, 12 and 13, the bearing elements 35, 36 and 37 shown in perspective in these views are preferably constructed from a material having a hardness substantially that of a Rockwell hardness of 90-95 on the M scale, for example, nylon, as previously indicated, but they may be made of other self-lubricating materials if desired while retaining the advantage of easy attachment to the saddle. It has been demonstrated, however, that material having substantially the hardness specified above is preferable since it has the most satisfactory bearing characteristics and is extraordinarily resistant to wear, either of itself or as regards the roll arbor with which it engages. The phenomena of wear may be explained in theory as actually due in large part to the impact and consequent breaking off of minute protuberances at the interface of any bearing. Nylon, however, being elastic and tough, and relatively soft, tends to spring away from the metallic protuberances on the arbor or shaft with which it engages instead of the protuberances being sheared off, thus resisting wear from the abrasive action.

Referring to Figs. 11, 12 and 13, the present improved bearing elements 35, 36 and 37 are preferably constructed in the form of flat pads or rectangular blocks of somewhat different shapes and dimensions to adapt them for appropriate location on the saddle in accordance with the arrangement of the several top rolls. The front bearing element 35 may be of generally rectangular shape and formed on its sides with narrow longitudinal grooves 45, see Fig. 11, for receiving the flanges 24 which project inwardly from the side walls 23 of the front saddle 16, see Figs. 3 and 9. It will be observed that the upper portion of the bearing element 35 is cut back or recessed at 46 to adapt it to receive the lower end of the downwardly-curved forward wall of the front saddle 16 as shown more particularly in Fig. 2 of the drawings. As shown in this view and Fig. 11 the under face of the bearing element 35 is formed with an arcuate concavity 47 of a radius corresponding to the radius of the arbor 8 of the front roll 3 to provide for the interfitting engagement of the bearing element therewith.

The bearing element 36 for the middle top roll 6 may be a plain pad or block of rectangular shape as shown in Fig. 12 with longitudinally-extending grooves 48 on its sides for engagement with the flanges 33 that project inwardly from

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the sides of the back saddle 17 at its forward end, see Fig. 4. The bearing element 36 preferably has a plane under surface without any concavity therein for engagement with the arbor 9 of the middle roll 6, thus adapting it for variations in the spacing between the back roll 7 and the middle roll.

The bearing element 37 for the back top roll may take a still different form such as shown in Fig. 13, being rectangular in outline and undercut at the bottom to provide two depending lugs 49 and 50 adapted to straddle the arbor 10 of the back top roll 7 as shown in Fig. 2. The lugs 49 and 50 serve as means for preventing longitudinal displacement of the back saddle 17 as is a usual arrangement in the prior art. Between the lugs 49 and 50 the under side of the bearing element 37 is formed with a concavity 51 conforming to the peripheral surface of the arbor 10 of the back roll 7. The bearing element 37 is provided with grooves 52 on its sides for receiving the inwardly-bent flanges 34 at the rearward end of the back saddle 17, see Fig. 5; it being noted by reference to Fig. 2 that the downwardly-extending end walls 38 and 39 on the saddle overlap the ends of the two bearing elements 35 and 37 to locate them in position thereon.

As before stated, the bearing elements 35, 36 and 37 may be constructed from nylon and be either cast, molded or machined from flat stock. Instead of making each bearing element entirely from the polymer it may be of composite construction, that is, partly of metal or other material. For example, each bearing element may have its upper part of brass or other metal with a layer or relatively thin pad of nylon secured to its under side by cementing or otherwise.

It will be understood that with bearing elements constructed of the preferred specified material they are attachable to the saddle by merely placing them between the side walls thereof and sliding them into position to engage the flanges with their lateral grooves. More specifically, the front bearing element 35 is simply placed between the side walls 23 of the front saddle 16 and slid forwardly to engage the flanges 24 in its grooves 45. Likewise, the middle bearing element 36 is placed between the side walls of the back saddle 17 approximately centrally thereof and slid forwardly to engage the flanges 33 with its grooves 48; and the bearing element 37 is similarly placed between the side walls of the back saddle 17 and slid rearwardly to engage the flanges 34 with its grooves 52. The grooves in the bearing elements are preferably of such width as to provide for their frictional engagement with the flanges on the saddles so that the elements will be held in secure engagement therewith. In some cases the grooves may be tapered slightly from back to front to prevent the bearing elements from sliding forward under the turning stress of the roll arbors. In this way the bearing elements may be securely fastened to the saddle assembly and positioned to cooperate with the arbors of the several top rolls whereof to provide oilless bearings having friction-reducing and wear-resisting characteristics to adapt them for continuous use over long periods of time. Should any of the bearing elements become worn to an appreciable extent they may be removed readily by sliding them out of engagement with the flanges which hold them in place and thereafter be replaced by substitution of new ones. Due to this feature of improvement the

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saddle assembly becomes practically indestructible to provide continuous service indefinitely.

With the bearing elements incorporated in the saddle assembly as shown in Fig. 2 of the drawings the top rolls are weighted by means of the stirrup 18 with a weight-lever and weights, not shown, cooperating in the usual manner. The bearings are protected by the cover or shield formed by the overlying front saddle 16 within which the back saddle 17 is nested. Consequently, lint, dust or other extraneous matter is prevented from insinuating into the bearings or from collecting on other parts to interfere with their functioning. Due to the novel form of joint between the front saddle and back saddle, particularly as regards the angularly-related parts of the back saddle 17 and its key-and-slot connection with the front saddle 16, the two saddle parts are free to rock relatively of each other both longitudinally and laterally to adjust their bearings for proper engagement with the arbors of the several rolls. As before noted, the lateral rocking action between the saddle parts is accommodated by the crowned form of the top wall 31 of the saddle 17 which underlies the crowned weight-plate 25 in the saddle 16, see Fig. 4 of the drawings. The weight applied through the stirrup 18 to the front saddle 16 is thus transmitted through the universal joint between the front saddle 16 and back saddle 17 to distribute it over the several top rolls as required for their proper cooperation with the bottom rolls.

Referring to Fig. 14, this view illustrates a saddle assembly adapted for use with two sets of rolls without a middle set. For this purpose the same front saddle 16 may be employed with a simpler form of back saddle 55. The front saddle 16 is provided with the front bearing element 35 constructed as previously described and also embodying the same type of weight-plate 25. The back saddle 55 consists of a flat plate portion 56 having an upwardly-extending key 57 formed with a rounded head 58 for holding it in connection with the front saddle by its engagement through the narrow portion 29 of the slot in the weight-plate. The rearward portion of the back saddle 55 is formed with side walls 59 folded downwardly therefrom and embodying inwardly-projecting flanges 60, indicated by dotted lines in Fig. 14, for engagement with a back bearing element 61 which is of substantially the same form as the bearing element 37 previously described but may be of shorter length. As herein shown the weight is applied to the front saddle 16 by the stirrup 18 which is reversed in position so that its upper curved end bows outwardly at the rear. It will be observed that the present improvements provide a saddle construction for use with different roll arrangements, that is with the front saddle adapted interchangeably for all uses. Thus, a change from one system to another may be made by simply substituting a different type of back saddle for use with the same front saddle.

It has been explained that the smooth exterior surface of the front saddle guards against the lodgement thereon of lint and dust the nested arrangement of the back saddle therein shields the bearings to prevent the insinuation of lint and dust therein and its collection on the parts to interfere with their proper functioning. The sheet-metal form of construction of the parts of the saddle assembly provides for economical cost of manufacture by the employment of stamping and forming operations in dies. As a most important advantage, the provision of

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bearing elements of the present type on the saddle avoids the need for lubrication and reduces friction and wear to prolong the life of the saddle and the roll bearings practically indefinitely. The novel means for ready and convenient attachment of the bearing elements on the saddle and their removal therefrom adapts them for replacement to further extend the life of the whole saddle assembly for indefinite periods.

The present plain or open type bearing, such as herein described, is preferable for the use of nylon due to the fact that this material of itself is a poor conductor of heat. With the open nylon bearing applied to the saddle the greater portion of the rotating arbor of the roll is exposed to the atmosphere and thus will run cool.

While the invention is herein shown as embodied in a preferred form of construction and adapted for use with two different systems of spinning, it is to be understood that other variations may be made in the form and arrangement of the parts and the type of material used in the construction of the saddle and its bearings without departing from the spirit of the invention or the scope of the appended claims. Therefore, without limiting ourselves in this respect, we claim:

1. A saddle assembly for weighting the top rolls of textile machines comprising a front saddle formed with a crowned top wall at its forward portion and a relatively flat portion extending rearwardly therefrom, a pressure-plate extending longitudinally within the front saddle with its forward end engageable with the crowned top wall thereof and its rearward end engaging the rearward extension thereof, said pressure-plate formed with a longitudinal slot, a back saddle formed of sheet-metal with its top wall inclined downwardly from the center towards its ends, and a key projecting upwardly from the center of the back saddle through said slot in the pressure-plate with an enlargement at its upper end for connecting the back saddle to the front saddle to allow play therebetween, said saddles provided with bearings engageable with the arbors of the several top rolls.

2. A saddle assembly for weighting the top rolls of textile machines comprising a front saddle constructed of sheet-metal in hollow form open on its under side, a slotted pressure-plate fastened within the front saddle extending longitudinally thereof and of concavo-convex form in cross-section, a back saddle having a top wall of concavo-convex form in cross-section engageable with the concaved bottom of the pressure-plate, and a key projecting upwardly from said back saddle through the slot in the pressure-plate and formed with an enlargement at its upper end to normally prevent its release from the slot in the pressure-plate, said front and back saddles provided with bearings for engagement with the arbors of the several top rolls.

3. A saddle assembly for weighting the top rolls of textile machines comprising a front saddle of hollow sheet-metal construction having a crowned top and depending sides, a separate sheet-metal pressure-plate positioned within said hollow front saddle extending longitudinally thereof and having an upwardly-projecting portion at its forward end engaging against the under side of the crowned top of the front saddle, a back saddle having a top wall inclined downwardly from its center towards its ends, said back saddle located beneath the pressure-plate with

its central raised portion bearing against the under side thereof, bearings on the front and back saddle for engaging the arbors of the several top rolls, and a stirrup connected to the front saddle to weight the latter and transmit pressure to the pressure-plate to weight the back saddle.

4. A saddle assembly for weighting the top rolls of textile machines comprising a front saddle of hollow sheet-metal construction having a crowned top and depending sides, a separate sheet-metal pressure-plate positioned within said front saddle extending longitudinally thereof and having an upwardly-projecting portion at its forward end in contact with the under side of the crowned top of the front saddle, and a back saddle having a top wall inclined downwardly from its center towards its ends with its central raised portion bearing against the under side of the pressure-plate, said back saddle having a key projecting upwardly through an opening in the pressure-plate to hingedly connect it thereto.

5. A saddle assembly for weighting the top rolls of textile machines comprising a front saddle constructed of sheet-metal in hollow form having a top wall with spaced parallel walls extending downwardly at its sides and provided with relatively short portions of the metal at the front folded inwardly therefrom to project toward each other in the form of flanges, and a bearing element consisting in a block of friction-reducing material scored on its opposite sides with longitudinal grooves for engagement with said flanges to support said bearing element fixedly on the saddle embraced between the side walls thereof, said grooves in the bearing element being of a width to cause the flanges to frictionally engage the sides thereof to adapt said element to be slid into place on the saddle while permitting its slidable removal therefrom for repair or replacement without the use of tools.

6. A saddle assembly for the top rolls of textile machines comprising a front saddle constructed of sheet-metal shaped to provide a top

wall with vertical side walls depending therefrom, said side walls formed at the bottom with relatively short flanges folded inwardly to project toward each other, a bearing element consisting in a block of friction-reducing material scored on its sides to form narrow grooves dimensioned to engage frictionally with the inturned flanges on the side walls of the front saddle by sliding said bearing element between said side walls, a sheet-metal back saddle hingedly connected to said front saddle and shaped with a top wall and depending side walls, said last-named side walls formed at the bottom with relatively short flanges folded inwardly to project toward each other, and a block-like bearing element constructed of friction-reducing material with narrow grooves in its sides frictionally engageable with the flanges on the sides of the back saddle to adapt said bearing element to be slidably mounted thereon and readily removable therefrom for repair or replacement without the use of tools.

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ROBERT RULON-MILLER.

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