May 23, 1933. I. R. METCALF 1,911,159

STITCHING MACHINE

Filed Jan. 15, 1931 4 Sheets-Sheet 1

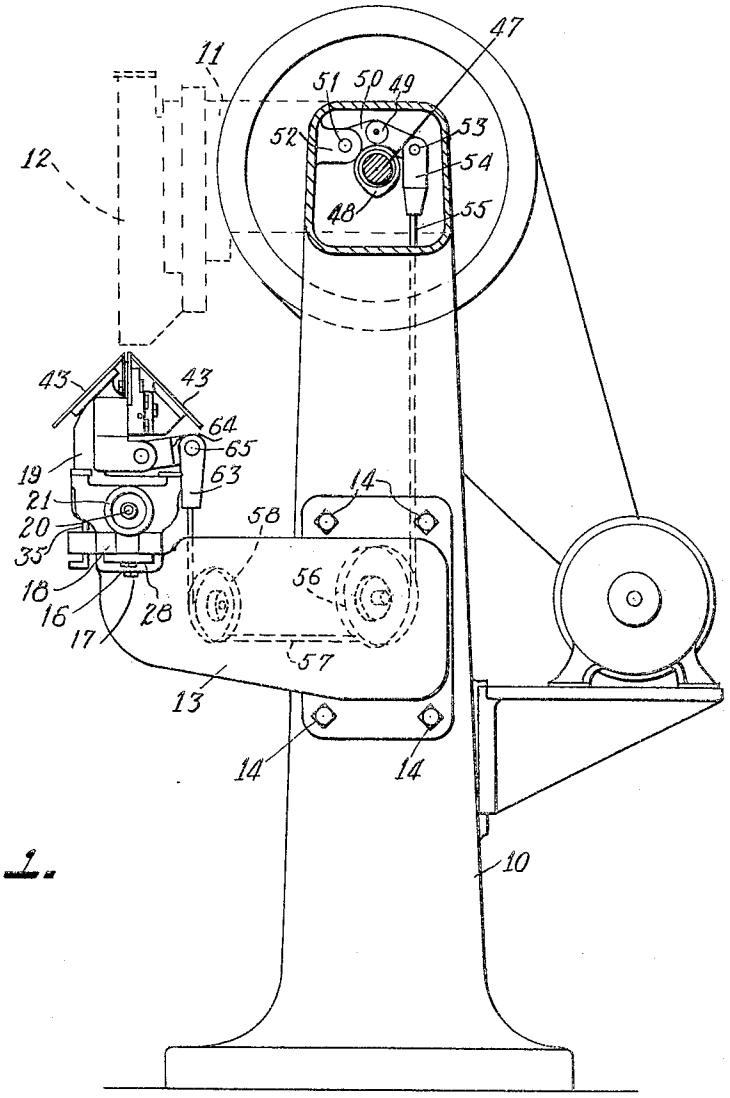


Fig. 1.

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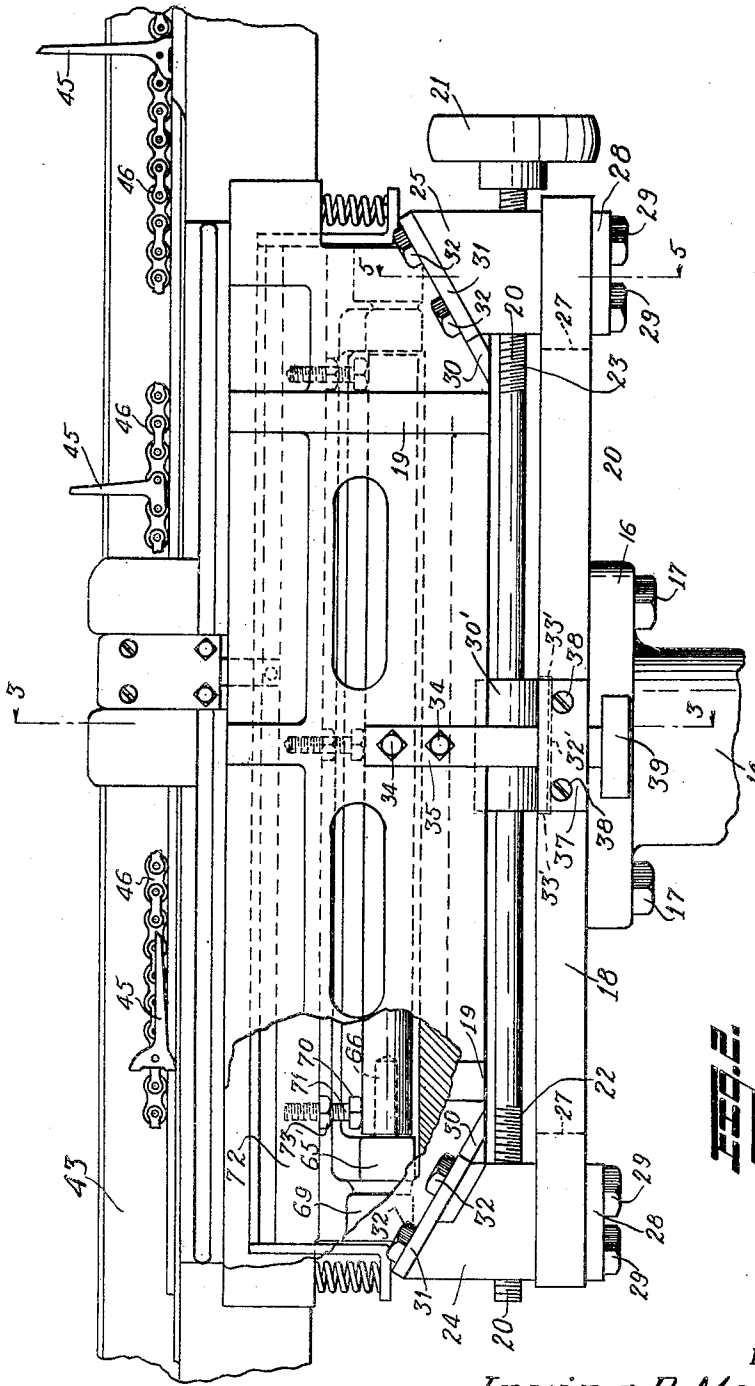


FIG. 2.

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STITCHING MACHINE

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Fig. 6.

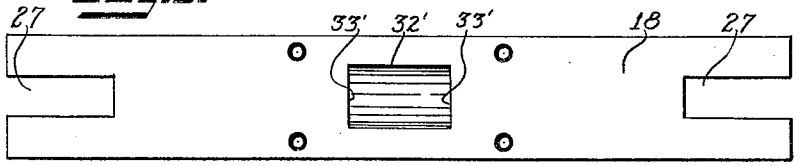


Fig. 7.

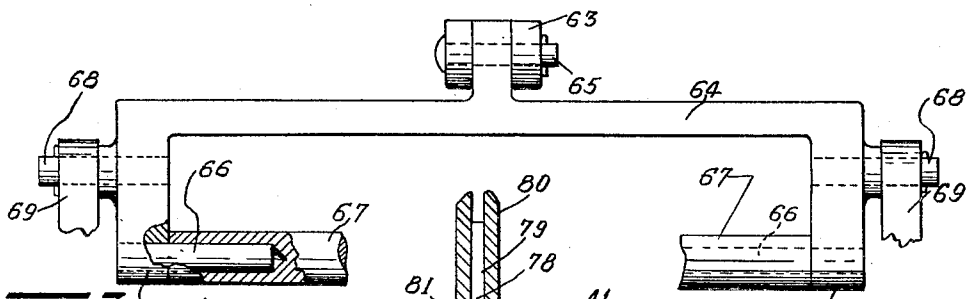
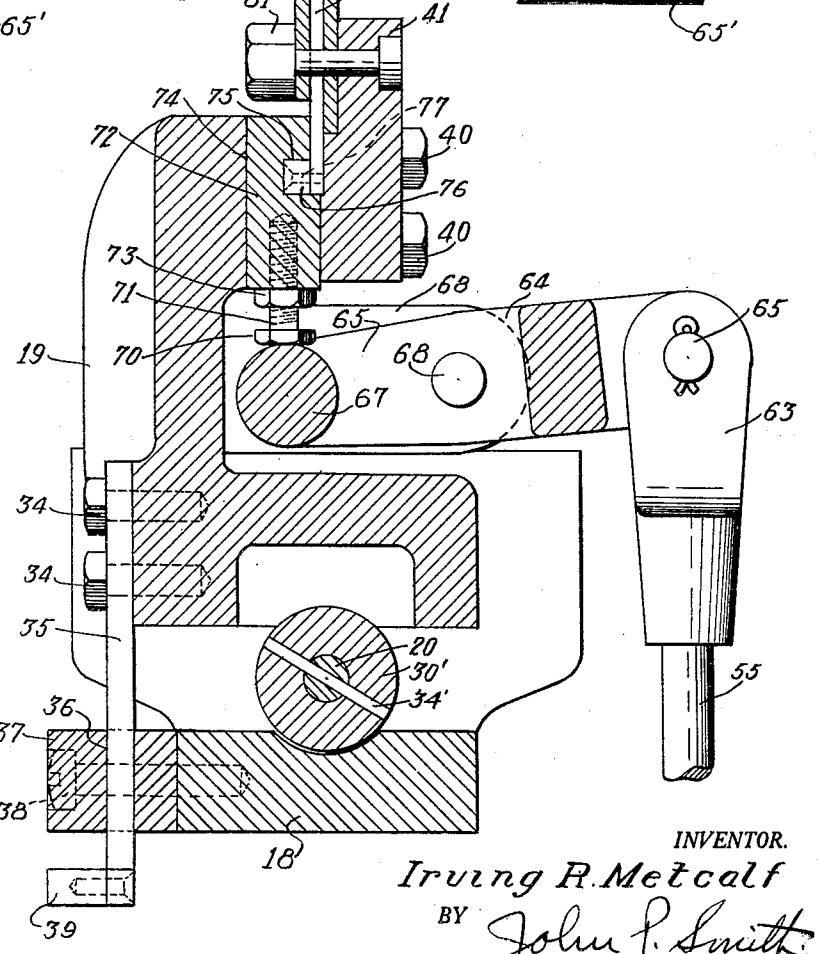


Fig. 3.



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STITCHING MACHINE

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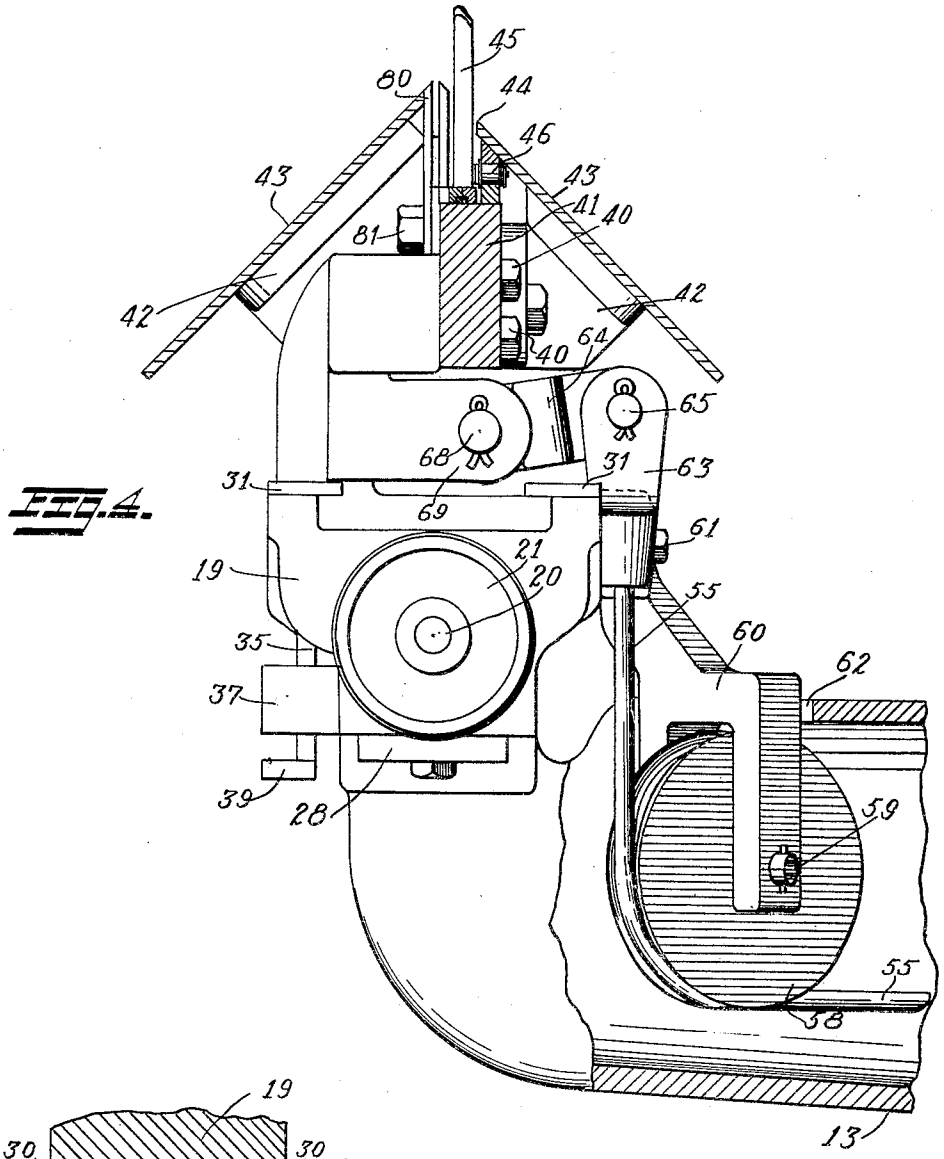


FIG. 4.

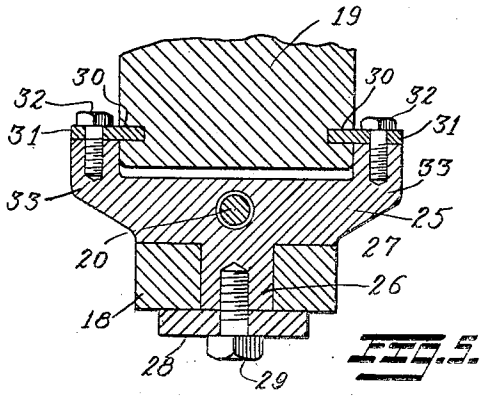


FIG. 5.

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UNITED STATES PATENT OFFICE

IRVING R. METCALF, OF ST. CHARLES, ILLINOIS, ASSIGNOR TO LATHAM MACHINERY COMPANY, A CORPORATION OF ILLINOIS

STITCHING MACHINE

Application filed January 15, 1931. Serial No. 508,831.

The present invention is directed generally to improvements in a stitching machine but more particularly to novel and improved means for adjusting the work supporting table with respect to the stitcher heads, and an improved mechanism for actuating the clinching mechanism in synchronism with the staple forming and driving mechanism.

One of the objects of the present invention is to provide a novel and improved adjustable work support or saddle which is supported at one point on the main frame or standard of the stitching machine whereby, by the simple manipulation of a hand screw, the work support or saddle may be vertically adjusted with respect to the staple forming and driving mechanism for taking care of various thicknesses of work to be stitched by the machine.

Another object of the invention is to provide a novel and improved actuating mechanism for the staple clinching mechanism by means of which the clinching mechanism may be simultaneously adjusted with the work support without interfering with the synchronized operative relation between the staple forming and driving mechanism and the clinching mechanism.

These and other objects are accomplished by providing a construction and arrangement of the various parts in the manner hereinafter described and particularly pointed out in the appended claims.

Referring to the drawings:

Fig. 1 is a side elevational view partly in cross section of a stitching machine showing my improvement embodied therein;

Fig. 2 is an enlarged front elevational view of a fragmentary portion of the work support with certain portions thereof broken away for the purpose of clearness;

Fig. 3 is an enlarged cross sectional view taken on the line 3—3 in Fig. 2;

Fig. 4 is an enlarged fragmentary end elevational view of the work support structure with certain parts thereof shown in cross section and certain other parts thereof broken away for the purpose of showing the construction and operation of the clinching mechanism;

Fig. 5 is a cross sectional view taken on the line 5—5 in Fig. 2;

Fig. 6 is a top plan view of the horizontal plate which supports the saddle; and

Fig. 7 is a fragmentary top plan view of the operating clinching lever.

In disclosing one form of my invention, I have shown the same in connection with a stitching machine which comprises the main frame generally indicated by the reference character 10. The specific frame construction disclosed in this application is covered by my co-pending application, Serial No. 503,949 filed December 22, 1930. Also the specific conveying mechanism disclosed in this application is the subject matter of a co-pending application, Serial No. 507,785 filed January 10, 1931.

The invention in the present instance is directed specifically to a novel and improved adjustment of the work support table or saddle which is adjusted with respect to the stitcher heads by the single manipulation of manual means whereby the work support is vertically adjusted for taking care of different thicknesses of work being stitched by the stitching machine. The invention also contemplates the use of a novel means for operatively connecting the clinching mechanism, carried by the work support, with the stitching mechanism so as to synchronize the operation of the stitching mechanism with its cooperative clinching mechanism. By this means the adjustment of the work support is accomplished without interfering with the cooperative action between the clinching mechanism and the stitching mechanism.

In the manner described in my previously mentioned copending application, the main frame or standard 10 is provided with

a laterally extending arm 11, to the front face of which, a plurality of stitcher heads 12 may be attached and operatively driven in a manner well understood in the art. Secured to one side of the main frame standard 10 is a laterally extending work table supporting arm 13 which is preferably secured to the main standard by means of bolts 14. The arm 13 is provided with horizontally extending flanges 16 to which is secured by means of bolts 17 a horizontal plate 18. Adjustably mounted on the horizontal plate 18 is a vertically adjustable work supporting bracket generally indicated by the reference character 19. This work supporting bracket 19 is adjustable with respect to the horizontal plate 18 through the medium of a hand screw 20, which is provided on one end with a hand wheel or grip 21. The hand screw 20 is provided on its opposite ends with right and left hand threads, as shown at 22 and 23, which are mounted in threaded engagement with oppositely disposed wedge or beveled blocks 24 and 25 respectively. These wedge blocks 24 and 25 are provided with downwardly extending longitudinally projections 26 which are slidably mounted in longitudinally extending recesses 27 formed in the opposite ends of the horizontal plate 18. (See Fig. 5.) The wedge blocks 24 and 25 are prevented from displacement with respect to the plate 18 by means of horizontal clips or plate 28 which are secured to the projections 26 by means of bolts 29. The bracket 19 is provided, on its lower opposite sides, with diagonally disposed slots or grooves 30 in which are slidably mounted guide plates 31 which are secured by means of bolts 32 to outwardly projecting portions 33 formed integrally with each of the blocks 24 and 25. The adjustable screw 20 is prevented from longitudinal displacement with respect to the plate 18 and the bracket 19 by means of a collar 30′ which is secured to the screw 20 by a transverse pin 34′. The lower portion of the collar 30′ extends into a semi-circular recess 32′ formed in the upper surface of the horizontal plate 18. The opposite ends or shoulders as indicated at 33′ are adapted to engage the opposite ends of the collar 30′ so as to prevent any longitudinal displacement of the screw 20 with respect to the plate 18. Secured to the bracket 19 by means of bolts 34 is a downwardly extending member 35 which is adapted to extend through a slot or recess 36 formed in the bracket 37 which in turn is secured to the forward side of the plate 18 by means of a screw 38. The lower end of this member 35 is provided with a right angular disposed clip 39. The upper surface of this clip 39 and the lower surface of the bracket 37 forms the gauge for determining the position of the work support and clinching mechanism with respect to the stitching mechanism. In other words, material to be worked upon may be placed between these two members and the work support adjusted through medium of the hand wheel 21 for properly adjusting the work support with respect to the stitching mechanism. Extending longitudinally of and secured to the bracket 19 by means of bolts 40 is a work supporting frame member 41. Secured to the opposite sides of the work supporting frame member 41 and spaced apart at suitable intervals therealong, are saddle brackets 42, to which are secured the inclined saddle plates 43. The rear saddle plate terminates short of the apex of both plates so as to form a longitudinal slot throughout the length of the work table as shown at 44 for the purpose of permitting conveying fingers 45 to extend therethrough for conveying material therealong. These fingers are pivotally secured to an endless chain generally indicated by the reference character 46. The construction and operation of the conveying mechanism herein shown is completely disclosed in my aforementioned co-pending application and for that reason it is believed that a more detailed description of the same is unnecessary.

Another essential feature of the present invention includes the novel means of operatively connecting the clinching mechanism so that the same synchronizes with the operation of the stitching mechanism regardless of the adjusted position of the work supporting table or saddle with respect to the stitching mechanism. This mechanism includes a power shaft 47 suitably journaled in the main frame of the stitching machine and operatively connected up for driving staple forming and driving mechanism of the various stitcher heads 12 in the manner well understood in the art. Secured to the shaft 47 is a cam 48 which is adapted to travel in the path of the roller 49 journaled on a lever 50 which in turn is pivoted at one end, as shown at 51, to an ear 52 formed integrally with the main frame 10. Pivoted to the free end of the lever 50, as shown at 53, is a cable connecting bracket 54 which has its lower end connected to flexible cable 55. The cable 55 extends downwardly and is trained about a relatively fixed pulley 56 journaled on suitable bearings within the arm 13 adjacent the outer wall of the main frame 10. A portion of the cable 55 extends horizontally through the inside of the arm 13 as shown at 57 and is trained about a relatively adjustable pulley 58 which in turn is journaled on a pin 59 carried by the downwardly extending bracket 60. The bracket 60 is secured by means of bolts 61 to the rear side of the vertically adjustable work supporting brackets 19. The pulley bracket 60 and pulley 58 extend through an opening 62 formed in the upper portion of the arm 13 adjacent the work supporting table. The outer end of the cable 55

is connected to a second cable connecting bracket 63 which has its upper end pivoted to the outer end of a fulcrum lever 64 by means of a pin 65. The fulcrum lever 64 is provided on its opposite ends with arms 65′ to each of which is secured a pin 66. These pins 66 project toward each other. Journaled on the pins 66 is a rod or shaft 67. The lever 64 is pivoted on pins 68 journaled in the opposite ears 69 which in turn are formed integrally with the adjustable bracket 19. The shaft or rod 67 is adapted to engage the head 70 of an adjustable bolt 71 which is mounted in threaded engagement to the longitudinally extending and vertically reciprocable bar 72. The bolt 70 is adjustable in the bar 72 and locked in various positions of adjustment by a lock nut 73. The bar 72 is vertically reciprocable in a longitudinal recess 74 formed in the bracket 19. The rear side of the bar 72 is provided with a longitudinally extending recess or groove 75 in which is mounted a roller 76 secured by means of a pin 77 to a reciprocating clincher member 78. The clincher member 78 is reciprocally mounted in a vertical slot 79 formed in the clincher frame 80. The clincher frame 80 is secured to the longitudinally extending work supporting member 41 by means of bolts 81. The longitudinal bar 72 is arranged to accommodate a number of clinching mechanisms to correspond with the number of stitching heads that may be positioned on the stitcher frame. For example, if three or four or more heads 12 are positioned on the frame 11, a corresponding number of clinching mechanisms may also be placed in proper position on the work supporting table or saddle and are simultaneously operated in synchronism with the stitching mechanism.

The operation of the above described device is as follows: Let us assume that the operator is desirous of adjusting the work support or saddle vertically with respect to the stitcher heads 12 to accommodate the thickness of the work being stitched, in which event, the material to be stitched is placed between the bracket 37 and the clip 39 and a manual screw 20 is adjusted by the hand wheel 21 so as to force the wedge blocks 24 and 25 towards each other in order to elevate the bracket 19, or away from each other to lower the bracket, so that the thickness of the material to be stitched corresponds with the distance between the two members 37 and 39. As these wedge members 24 and 25 are adjusted longitudinally on the plate 18, they will raise or lower the brackets by reason of the inclined plates 31 engaging the groove 30 in the bracket 19. As this adjustment is made, it will be observed that the bracket 60 which carries the pulley 58 will be similarly adjusted vertically so as not to interfere with the synchronized operative relation between the clinching mechanism hereinbefore described and the staple forming and driving mechanism.

It will also be observed that by operatively connecting the cable 55 with the lever 50 which engages the cam 48 on the operating shaft 47 (which operates the stapling mechanism) and by training the cable 55 around the relatively fixed pulley 56, the stitching mechanism is operatively related in a substantially constantly fixed relation to the clinching mechanism, regardless of the relative adjustment that is made of the work support by reason of the pulley 58 being adjustable with the work support. This construction of employing a single cable in synchronizing the staple forming and driving mechanism with the clinching mechanism obviates the necessity of employing a complicated mechanism of levers and connections which would ordinarily be required to accomplish this result.

From the above description it will be seen that I have not only provided a novel and improved adjustment for vertically adjusting the work support with respect to the stitching mechanism, but also an operative connection between the staple forming and driving mechanism which permits the vertical adjustment of the work support without interfering with the synchronized operative relation between these two operating parts.

While in the above description I have described one embodiment which my invention may assume in practice, it will of course be understood that the same is capable of modification and that modification may be made without departing from the spirit and scope of my invention as expressed in the following claims:

What I claim is my invention and desire to secure by Letters Patent is:

1. The combination with a stitching machine, of stitching mechanism therefor, a clinching mechanism, means for adjusting said clinching mechanism with respect to said stitching mechanism, and a single flexible means forming the connection between said stitching mechanism and said clinching mechanism whereby said clinching mechanism may be adjusted with respect to the said stitching mechanism without disturbing the synchronized operative relation between said stitching mechanism and said clinching mechanism.

2. The combination with a stitching machine, of staple forming and driving mechanism therefor, a shaft for driving said staple forming and driving mechanism, a clinching mechanism, a flexible cable forming the connection between said shaft and said clinching mechanism, whereby said clinching mechanism may be adjusted with respect to said staple forming and driving mechanism without disturbing the synchronized operative relation between said staple forming and driv-

ing mechanism and said clinching mechanism.

3. The combination with a stitching machine, staple forming and driving mechanism therefor, a power shaft for driving said staple forming and driving mechanism, a clinching mechanism for clinching the staples driven by said staple forming and driving mechanism, a cable having one end thereof operatively related to said power shaft and the other end thereof operatively connected to said clinching mechanism, and means for adjusting said clinching mechanism with respect to said staple forming and driving mechanism without disturbing the synchronized operative relation between said staple forming and driving mechanism and said clinching mechanism.

4. The combination with a stapling machine, of staple forming and driving mechanism therefor, a shaft for driving said staple forming and driving mechanism, a lever carried by said machine and operatively related to said shaft, a clinching mechanism for clinching the staples driven by said staple forming and driving mechanism, a flexible cable connected at one end of said lever and at the other end thereof to said clinching mechanism, and means for adjusting said clinching mechanism with respect to said staple forming and driving mechanism without disturbing the synchronized operative relation between said staple forming and driving mechanism with said clinching mechanism.

5. The combination with a stitching machine, of staple forming and driving mechanism therefor, a power shaft for operatively driving said staple forming and driving mechanism, a clinching mechanism for clinching the staples formed and driven by said staple forming and driving mechanism, a relatively fixed and a relatively movable pulley mounted on said machine, a cable operatively connecting said shaft with said clinching mechanism, said cable trained about said pulleys, and means whereby said clinching mechanism and one of said pulleys may be adjusted with respect to said staple forming and driving mechanism without disturbing the synchronized operative relation between said staple forming and driving mechanism and said clinching mechanism.

6. The combination with a stitching machine, of a frame therefor, staple forming and driving mechanism mounted on said frame, a work support for supporting material to be stitched by the stitching mechanism mounted on said frame and a vertically adjustable member for supporting said work support, two longitudinally adjustable wedge shaped members carried by said frame and engagable with said vertically adjustable member, and a hand operated screw connecting said longitudinally adjustable members together, whereby on the manipulation of said screw said work support may be adjusted for adjusting the same with respect to said stitching mechanism.

7. The combination with a stitching machine, of staple forming and driving mechanism therefor, of a work support located below said staple forming and driving mechanism, said work support including two longitudinally extending and normally inclined saddle plates, a vertically adjustable member for supporting said saddle plates, said vertically adjustable member having inclined oppositely disposed portions, oppositely inclined wedge members engagable with said vertically adjustable member, and means for manually moving said wedge members for adjusting said work support with respect to said staple forming and driving mechanism.

8. The combination with a stitching machine, of a frame therefor, staple forming and driving mechanism mounted on said frame, a shaft journaled in said frame for operatively driving said staple forming and driving mechanism, a work support mounted on said frame, a clinching mechanism mounted on said work support, means for adjusting said work support with respect to said frame, a flexible cable operatively connecting said shaft with said clinching mechanism whereby said work support and clinching mechanism may be adjusted with respect to said frame without disturbing the synchronized operative relation between said staple forming and driving mechanism and said clinching mechanism.

9. The combination of a stitching machine, of a frame therefor, a staple forming and driving mechanism mounted on said frame, a shaft journaled on said frame for operatively driving said staple forming and driving mechanism, a lever mounted on said frame and operatively related to said shaft, a relatively fixed pulley journaled on said frame, a work support mounted on said frame and adjustable with respect thereto, a clinching mechanism mounted on said work support, a pulley journaled on said work support, and a cable connected at one end to said lever and trained about both pulleys, with the other end thereof connected to said clinching mechanism, whereby said clinching mechanism may be adjusted with respect to the staple forming and driving mechanism without disturbing the synchronized operative relation between said staple forming and driving mechanism and said clinching mechanism.

10. The combination with a stitching machine, of a frame therefor, a shaft journaled on said frame and operatively connected with said staple forming and driving mechanism for driving the same, a work support mounted on said frame, means for adjusting said work support with respect to said frame including oppositely disposed wedge members, manu-

ally operative means for adjusting wedge members with respect to each other for adjusting said work support with respect to said frame, a clinching mechanism mounted on said work support, a pulley journaled on said work support, a pulley journaled on said main frame, and a flexible cable trained about both of said pulleys and having one end thereof operatively related to said shaft and the other end thereof operatively related to said clinching mechanism whereby said work support and clinching mechanism may be operatively adjusted with respect to said staple forming and driving mechanism without disturbing the synchronized operative relation between said staple forming and driving mechanism and said clinching mechanism.

11. The combination with a stitching machine, of staple forming and driving mechanism therefor, a shaft for driving said staple forming and driving mechanism, a cam secured to said shaft, a lever pivoted to said machine and actuated by said cam, a work support, a clinching mechanism carried by said work support, means for adjusting said work support, and a flexible cable operatively connecting the free end of said lever with said clinching mechanism whereby said work support may be adjusted with respect to said staple forming and driving mechanism without disturbing the synchronized operative relation between said stitching mechanism and said clinching mechanism.

12. The combination with a stitching machine, of a plurality of staple forming and driving mechanisms therefor, a plurality of clinching mechanisms cooperating with said staple forming and driving mechanism and a single operative cable connection for actuating all of said clinching mechanisms in synchronism with said staple forming and driving mechanisms.

13. The combination with a stitching machine, of a plurality of staple forming and driving mechanism therefor, a plurality of clinching mechanisms cooperating with said staple forming and driving mechanism, means including a lever and a cable connection for forming the operative connections between said staple forming and driving mechanisms and said clinching mechanisms.

14. The combination with a stitching machine, of a frame therefor, a plurality of staple forming and driving mechanism mounted on said frame, a plurality of clinching mechanisms adjustably mounted on said frame, a lever fulcrumed on said frame and adapted to engage said clinching mechanisms, and a cable for operatively connecting said lever with said staple forming and driving mechanisms for actuating said clinching mechanisms in synchronism with said staple forming and driving mechanisms.

15. The combination with a stitching machine, of a frame therefor, a plurality of staple forming and driving mechanisms mounted on said frame, an adjustable work support mounted on said frame, a plurality of clinching mechanisms mounted on said support, a lever fulcrumed on said support and adapted to engage said clinching mechanisms, and a cable for operatively connecting said lever with said staple forming and driving mechanisms for actuating said clinching mechanisms in synchronism with said staple forming and driving mechanisms.

16. The combination with a stitching machine, of a frame therefor, a plurality of staple forming and driving mechanisms mounted on said frame, an adjustable work support mounted on said frame, a plurality of clinching mechanisms mounted on said support, a lever fulcrumed on said support and adapted to engage said clinching mechanisms, a cable for operatively connecting said lever with said staple forming and driving mechanisms for actuating said clinching mechanisms in synchronism with said staple forming and driving mechanisms, and means whereby said work support may be vertically adjusted without disturbing the synchronized operative relation between said staple forming and driving mechanism and said clinching mechanisms.

17. The combination with a stitching machine, of a frame therefor, a plurality of stitcher heads mounted on said frame, a work support mounted on said frame, a plurality of clinching mechanisms mounted on said work support, means for simultaneously adjusting all of said clinching mechanisms with respect to said stitcher heads and a lever and cable forming the operative connections between said clinching mechanism and said stitcher heads.

18. The combination with a stitching machine, a stitching mechanism therefor, a clinching mechanism, means for adjusting said clinching mechanism with respect to said stitching mechanism and a single flexible means extending from a point substantially adjacent said stitching mechanism to a point substantially adjacent said clinching mechanism for forming the connection between said stitching mechanism and said clinching mechanism, whereby said clinching mechanism may be adjusted with respect to said stitching mechanism without disturbing the synchronized operative relation between said stitching mechanism and said clinching mechanism.

19. The combination with a stitching machine, stitching mechanism therefor, a clinching mechanism, means for adjusting said clinching mechanism with respect to said stitching mechanism, and a single flexible means extending downwardly from a point substantially adjacent said stitching mechanism and laterally to a point adjacent said clinching mechanism for forming the con-

nection between said stitching mechanism and said clinching mechanism whereby said clinching mechanism may be adjusted with respect to said stitching mechanism without disturbing the synchronized operative relation between said stitching mechanism and said clinching mechanism.

In testimony whereof I have signed my name to this specification, on this 30th day of December A. D. 1930.

IRVING R. METCALF.