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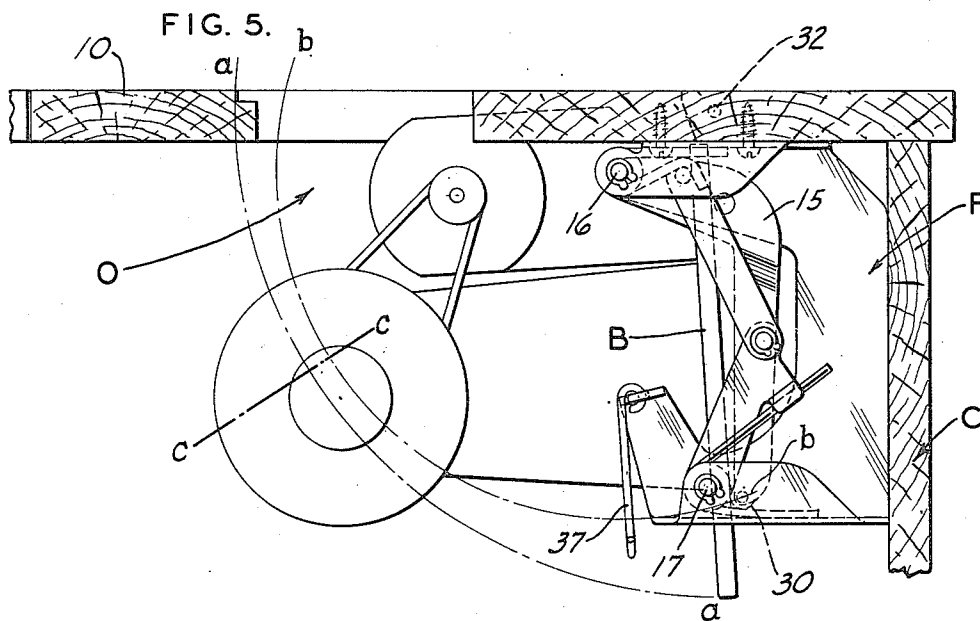
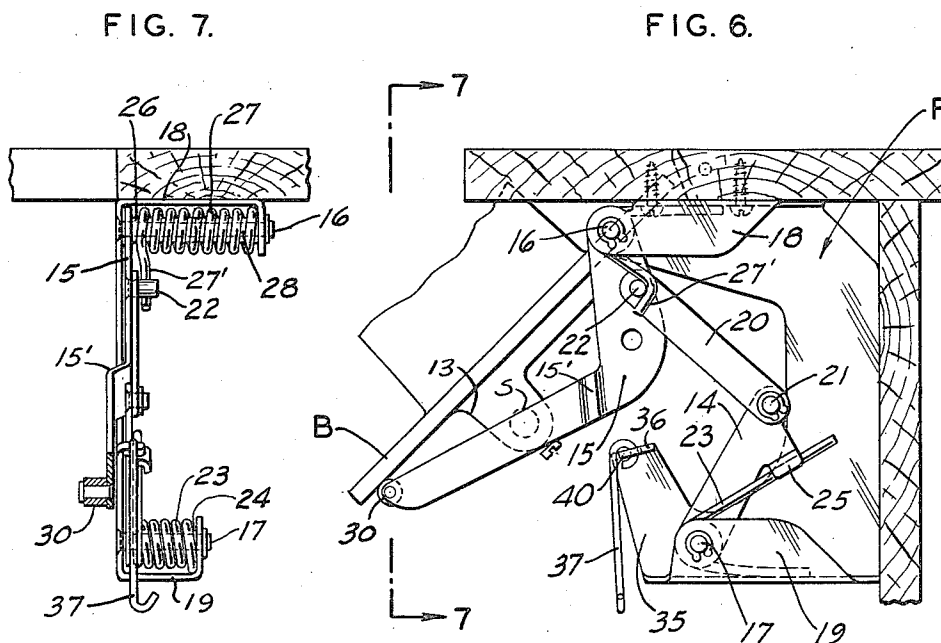
J. C. HOCHMAN

2,711,940

DROP HEAD MACHINE AND BOOSTER

Filed May 19, 1954

3 Sheets-Sheet 2



INVENTOR.

JULIUS C. HOCHMAN

BY

DEAN, FAIRBANK AND HIRSCH

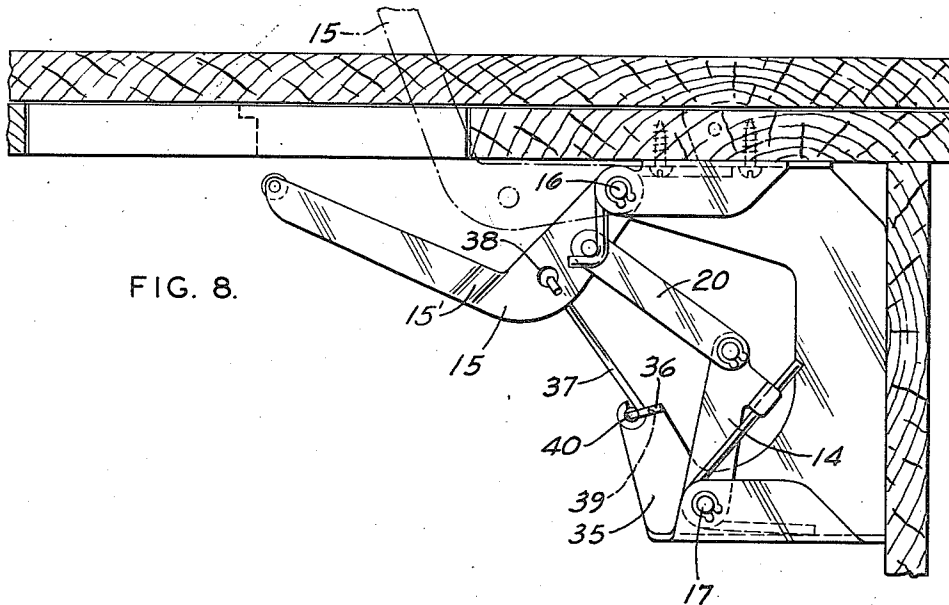
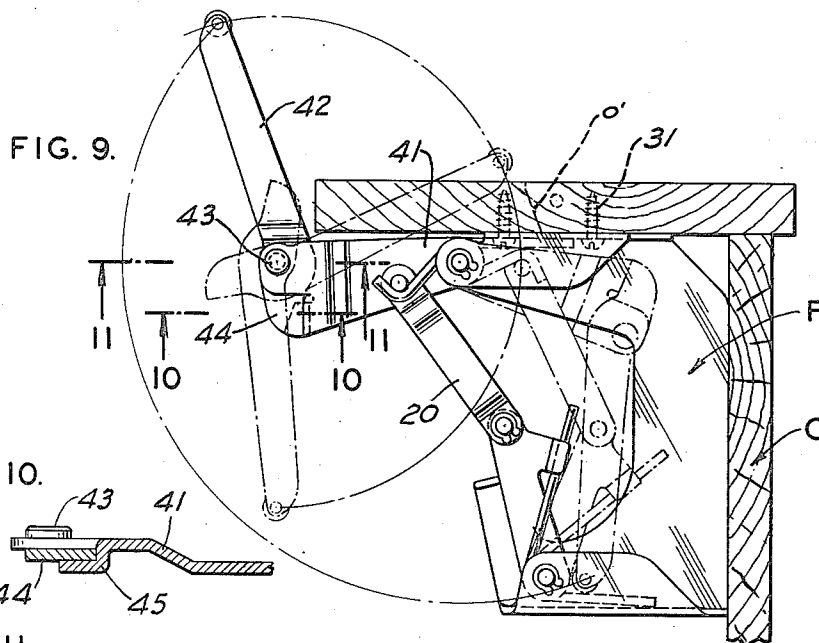
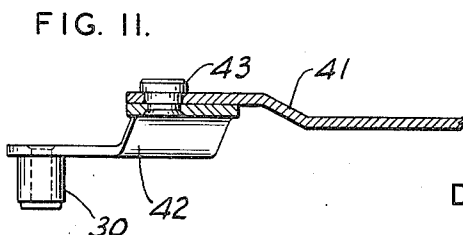
HIS ATTORNEYS

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3 Sheets-Sheet 3



DEAN, FAIRBANK AND HIRSCH
HIS ATTORNEYS

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2,711,940

DROP HEAD MACHINE AND BOOSTER

Julius C. Hochman, New York, N. Y.

Application May 19, 1954, Serial No. 430,769

25 Claims. (Cl. 312—30)

The present invention is concerned with cabinets for drop head machines and while applicable to typewriting and other machines, is shown embodied in a sewing machine cabinet.

The unaided manual lifting of a sewing machine head from the well of a cabinet or desk to operative position involves considerable effort on the part of the user of such machines, and may involve considerable strain to the operator of a modern home sewing machine that is heavy due to numerous special attachments on the usual cast iron arm of the machine.

It is among the objects of the invention to provide simple, compact lifting aid or booster means that may be originally built into sewing machine cabinets of the drop head type or may readily be installed in such cabinets that are not especially designed for such booster means, and which shall serve greatly to facilitate the elevation of the machine head from idle to operative position and the return to idle position, without fortuitous undesired tendency to rise from idle position, which may further afford facilities for shifting the machine head beyond position of use, to permit positioning of the usual flap, and may permit tilting the head back further for convenient access to the under part of the mounting base of the head.

Another object is to provide a booster means which may readily be installed as a pre-assembled unit upon any of a wide variety of sewing machine cabinets for facilitating the lifting of the sewing machine head to various raised positions, including the position of use and for return of such head to idle dropped position, all without more effort than can readily be exerted by a little child, which unit shall be of inexpensive construction and include no operating parts of the kind likely to become deranged or jammed, such as motors, cams, treadles, dash pots, latches, or other relatively bulky and costly mechanical elements and which in fact involves merely a few strip steel parts, pins and springs assembled as such booster unit.

Another object is to provide a booster unit of the type indicated, which acts resiliently against the lower face of the sewing machine head base and which, in the event of the removal of the sewing machine head from the cabinet, for repair for instance, may readily be set, in the absence of such head, to preclude the protrusion (that would in such case occur), of a part of such booster unit above the cabinet top.

Where it is attempted to facilitate the manual raising of the machine head from idle to position of use by the aid of a counterbalance spring, two difficulties arise:

(a) The counterbalance spring has its greatest effectiveness only at the beginning of the lifting stroke and becomes progressively weaker as the lifting proceeds.

(b) The counterbalance spring at best must be of low power, otherwise it might overcome the weight of the dropped head and raise it more or less, instead of keeping it down in idle position while out of use.

According to the invention from one of its aspects, a spring assists the lift of the head when manually

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raised from idle toward position of use, and means in the form of toggle linkage that multiplies the thrust exerted by the spring serves to compensate for the weakening of such spring as the lifting of the head progresses.

According to another feature, the toggle linkage which multiplies the lifting thrust of the spring during lifting of the head from depressed to position of use, performs the additional function of reversing the lifting thrust of such spring as the machine head moves downward toward idle position to aid in maintaining the head depressed, except during manually applied lifting impulse.

According to another feature of the invention, the lifting thrust is applied under the base of the machine head by means of a lifting lever which has a roller at its free end that rides during the lifting action along the base of the head, which is hinged to the cabinet top, and has an associated spring which assists such lifting motion and thereby supplements the action of the toggle operating spring, and of the toggle which latter comprises a toggle lever under the influence of the first spring and a toggle link connecting said lever to the lifting lever.

According to another feature, the toggle has an associated stop which limits the straightening of the toggle in position when the sewing machine head has been tilted backward beyond operative position sufficiently to permit hinging to horizontal of the usual flap of the sewing machine top followed by return of the head from such extreme position to position of use where it rests upon the edge of such flap.

According to another feature, the hinged sewing machine head is movable backward beyond the flap clearance elevated position and out of engagement with the lifting lever, for ready access by a mechanic to the mechanism under the base of the head.

According to another feature, the pivotal mount of the sewing machine head and the pivotal mount of the lifting lever are so arranged that the maximum mechanical advantage is exerted by the lifting lever when the machine head has such position during the lifting stroke (ordinarily about 30° below horizontal) as to give maximum assistance at the stage of lifting where such maximum assistance is required to obviate the need for substantial manual effort in lifting.

Another feature is the construction of the booster accessory as a simple unit comprising a bracket mounting the lifting lever, the toggle lever, the intervening toggle link and the associated springs and adapted for ready installation in a cabinet for correct correlation to the sewing machine head.

In the accompanying drawings in which are shown one or more of various possible embodiments of the several features of the invention,

Fig. 1 is a perspective view showing a sewing machine in operative position on the cabinet,

Fig. 2 is a fragmentary plan view of the machine on a somewhat larger scale,

Fig. 3 is a fragmentary transverse sectional view taken on line 3—3 of Fig. 2,

Fig. 4 is a sectional view taken on line 4—4 of Fig. 2, showing the machine head in full lines in its operating position and in dot-and-dash line in position tilted upward from operative position, sufficiently to permit bringing the flap of the cabinet to horizontal,

Fig. 5 is a transverse sectional view on a larger scale showing the machine in dropped position within the cabinet,

Fig. 6 is a sectional view showing the right hand portion of Fig. 5, but with the machine head partly raised from the depressed position of Fig. 5,

Fig. 7 is a view showing the structure of the booster bracket and taken along line 7—7 of Fig. 6,

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Fig. 8 is a sectional view through the cabinet showing one embodiment for retracting the lifting lever to permit closure of the cabinet with the sewing machine head removed, as for instance for repair,

Fig. 9 is a view similar to Fig. 8 of a modified embodiment, showing the normal position of the lifting lever protruding well above the cabinet in the absence of the sewing machine head, and showing in dot and dash lines the displaced position of the lifting lever to permit closure of the cabinet in the absence of the head,

Fig. 10 is a sectional detail view taken on line 10—10 of Fig. 9, and

Fig. 11 is a transverse sectional detail view taken on line 11—11 of Fig. 9.

Referring now to the drawings, Fig. 1 shows a more or less conventional sewing machine cabinet C with a hinged L-shaped flap 10 extending across part of the well opening O and forming part of the seat for the base B of a sewing machine head H which in position of use covers an opening of corresponding area in the top of the cabinet, the rear edge of which opening O is desirably beveled downward at o' . The head H is illustratively shown as having in addition to the drive wheel 11, an adaptor attachment 12 for selectively varying the stitch made by the machine, and may have various other attachments (not shown). The cabinet is shown with an extension top panel T that may be hinged inward to overlie the top of the cabinet when the machine head is in the idle position shown in Fig. 5, so that the cabinet has the appearance of a table or desk when the sewing machine is not in use. Below the base of the machine is operating mechanism shown only in fragment and including shaft S, one end of which turns in a bearing in the depending lug 13 near one edge and spaced from the right forward corner of the base B. The machine head illustratively shown is that of the Necchi sewing machine, for which the particular embodiment of the invention shown in the drawings has been especially adapted, but it will be understood that the invention is applicable, with suitable obvious variations of detail, to other types of drop head sewing machines and to drop head machines of other character within the scope of the claims.

In the particular embodiment shown, the booster accessory is a unit that comprises a bracket F, preferably a strip steel bracket with two bearings, one near the lower end of the bracket for mounting a toggle lever 14, the other bearing near the upper end of the bracket for mounting a lifting lever 15.

In a preferred embodiment, the bearings are cross pins 16 and 17, mounted in channel formations 18 and 19, respectively, that are integral parts of the bracket F which is desirably generally rectangular.

The lifting lever 15 is preferably generally L-shaped, as shown, and is connected to the toggle lever 14 by an intervening toggle link 20. The lower end of the toggle link is pivoted at 21 to the outer end of the toggle lever 14 and its upper end preferably bears on a pin 22 protruding from the side of the lifting lever 15 at a short distance from the bearing mount 16 of said lever.

A spring, desirably a coil spring 23, encompassing a suitable spring thimble 24 about the bearing pin 17 of the toggle lever 14 reacts at one end against the base of the channel formation 19, and at the other end against a hook conformation 25 integral with the toggle lever 14, thereby to apply a thrust tending, in the position illustratively shown in Fig. 6, to move the toggle toward straightening position.

The lifting lever 15 preferably has a mounting sleeve 26 integral therewith, that also acts as a thimble for part of the length of a coil spring 27, a further thimble section 28, preferably of length the same as that of thimble 24 of spring 23 encompassing the remaining length of the bearing pin 16. The lifting lever coil spring 27 reacts at one end against the upper channel formation 18 of the bracket F and its other end 27' is hooked around the pro-

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truding end of pin 22, thereby to tend to urge the lifting lever 15 and with it the outer end of the toggle link 20 in machine lifting direction.

The outer end of the lifting lever carries a roller 30 which engages the side edge portion of the under surface of the base B of the sewing machine head. The lifting lever 15 is offset at 15', for its outer part and roller 30 to extend along the outer face of bracket F as shown in correct correlation with the base B. The shaft bearing lug 13 that protrudes downward from the sewing machine head shown is sufficiently to the rear of the forward edge of the base B thereof to afford an adequate length of track therebetween for the movement of the roller 30 between the various positions that it assumes in the course of the lifting and dropping movement of the head, as shown in various figures of the drawings.

It will of course be understood that the toggle lever 14, the lifting lever 15, the intervening toggle link 20 and the associated springs 23 and 27 of the toggle lever and the lifting lever respectively, may be separately installed in correct relation in the cabinet, but the unit assembly of the bracket described, carrying the various levers, links and springs as set forth is much to be preferred for reasons that are obvious.

The booster unit F is shown installed beyond but adjacent the base B of the sewing machine head as appears perhaps most clearly in Fig. 2, and under the top of the cabinet C by means of screws 31, the lifting lever 15 extending forward from the bracket as shown for its roller 30 to engage said base along the length of its side beyond the bearing lug 13. The bracket F is mounted preferably against the rear wall of the cabinet, or if desired against a brace (not shown) for a wider cabinet, so that the main wall of the bracket is effectively braced, as shown, in order to resist any tilting or shearing strain on the bracket in the course of lifting or dropping the sewing machine head, bearing in mind that the bracket is affixed to the wooden top of the cabinet merely by a few wood screws 31.

The sewing machine head is preferably pivoted as at 32 with respect to the cabinet top and the lifting lever pivot 16 under the cabinet top is somewhat forward of said pivot. The dot-and-dash line $a-a$ shows the locus of movement of the forward edge of the sewing machine base B in its path about pivot 32 between dropped and raised position. The dot-and-dash line $b-b$ shows the locus of movement of the roller 30 at the end of the lifting lever 15 in its path about pivot 16 during such movement. By reason of the relation of the machine pivot center 32 and the lifting lever mount 16, the locus arcs $a-a$ and $b-b$ are closest together at the region $c-c$, approximately 30° below horizontal, where the roller 30 on the lifting lever 15 comes closest to the free edge of the base B of the sewing machine head, and therefore has the greatest mechanical advantage to assist as much as possible the manual lifting effort at that region in the lifting path, at which the need required for such manual effort would otherwise be a maximum.

In Fig. 4, the sewing machine is shown in dot-and-dash lines in position tilted backward well beyond the full line or position of use of the sewing machine head and is maintained in such lifted position by the lifting lever, in its extreme raised position, as determined and assisted by the power multiplying factor of the toggle angle formed by the toggle lever 14, toggle link 20 and toggle spring 23, a rearward tilt required to permit hinging of the cabinet flap 10 from upwardly extending position suggested in Fig. 4 to its horizontal machine head supporting position. The transverse arm 10' of the flap clears the sewing machine head and its various accessories or protruberances, such as accessory 12, in such position. After the flap 10 has been thus set, the machine head is pushed down to its position of use in which the forward edge of the machine base B rests upon

the extending support fin 10^a on the flap 10, as shown in Fig. 4.

Thus the toggle angle is increased as the head is lifted for enhanced supporting power, and decreased as the head is lowered to weaken the supporting function of the toggle, for firm rest of the machine head upon the cabinet top, unopposed by any material lifting action on the part of the toggle and associated springs for steady vibrationless sewing.

In Fig. 5 the machine head is shown in its depressed or idle position. To depress the head after use, it is first tilted upward and back to the position shown in dotted lines in Fig. 4 to permit movement of the flap 10 out of the path of the sewing machine head H, whereupon the head is depressed by hand to the position shown in Fig. 5. In this depression, the roller 30 of the lifting lever 15 moves along the base B of the sewing machine head between lug 13 and the adjacent corner of base B, until the head reaches its extreme position shown in Fig. 5, which is shown with its base B tilted slightly beyond the vertical downward position. It will be seen that in this depressing operation (an intermediate stage of which is shown in Fig. 6), as the depression proceeds the pin 22 of the toggle link 20 passes dead center with respect to the lifting lever pivot 16, and as the head approaches the position of Fig. 5, the toggle spring 23 opposes the lifting lever spring 27 and the toggle tends to move the lifting lever 15 away from lifting position. Thus the pendent weight of the sewing machine head H is assisted by spring 23, here also increased by the power multiplying factor of the widespread toggle members 14 and 20, in overcoming the lifting effort of the fully wound spring 27, so that there is no tendency for the machine head to rise from idle or depressed position.

In lifting the head from the position shown in Fig. 5 to operating position, the user simply grasps the waist of the head H, and a lifting effort in the order of about 4 pounds is adequate to lift the machine head of well over 30 pounds. This is due to the fact that the coil spring 27, and later the coil spring 23 as well (which are fully wound when the head is in the position of Fig. 5), activate the lifting effort, and that in the course of such lifting, the toggle 14, 20 assists the lifting effort of toggle spring 23. Thus as the springs 23 and 27 unwind in assisting the lifting effort and becomes progressively weaker as the lift of the head proceeds, the toggle 14, 20 moves toward straightening position and progressively increases the multiplication of the lifting effort exerted by toggle spring 23 through the toggle lever 14, so that the user has adequate mechanical assistance in the lifting of the head. The maximum effort to be exerted by the operator with the machine shown and described, that weighs 34 pounds, is substantially only 7 pounds, and the manual effort through much of the lifting stroke is but 4 pounds. The lifting occurs smoothly without the need for tugging and nearly effortlessly, despite the relatively large weight of the head.

The lower portion of the bracket F preferably has a rising web 35 with an outstanding toe 36 that serves as a stop to limit the displacement of the toggle lever 14 in the lifting movement, as best shown in dot-and-dash line position of Fig. 4. That is the position to which the machine head is first raised, as shown, to permit clearance in positioning of the flap 10 of the sewing machine top. Near the extreme position of the toggle, the lifting or multiplying effect of the thrust of coil spring 23 is adequate to facilitate the tilting lift of the sewing machine head with but the small manual effort indicated, and the toggle members will automatically maintain the head in its rearward tilted position to make possible unhurried positioning of flap 10 even though the springs 23, 27 are in their unwound or weakest state.

It will be apparent (though not shown in the drawings), that the machine head may be tilted back beyond and out of engagement with the roller 30 of the lifting

lever 15 beyond the dotted line position shown in Fig. 4. In such tilted back position, access is readily afforded to the mechanism of the sewing machine which is under its base B.

It is thus seen that despite the very considerable weight of the sewing machine head, the booster disclosed and described permits all but effortless lifting of the machine head from idle and dropped to and beyond position of use. At no time in the lifting stroke is there any tendency to bind or is a tug required, but the operation is smooth and substantially effortless throughout the entire stroke.

In lowering the machine head from operating to idle position, the weight of the machine of course assists in winding up the springs 23 and 27 which serve as a brake to prevent unrestrained dropping of the machine, and as above pointed out, the toggle moves away from the nearly straight position shown in dotted lines, Fig. 4, and so becomes progressively weaker. The effective thrust of the toggle lever spring becomes reversed as the dropped position is approached, so that said toggle lever spring then assists the weight of the pendent head in opposing the lifting effort of the lifting lever spring 27. This circumstance coupled with the fact that the toggle 14, 20 in the depressed position of the head, tends to urge the lifting lever in direction opposed to lifting, affords assurance that the machine head will stay in depressed position without fortuitous lifting by the action of spring 27. Lifting can occur only after initiation of a manual lifting effort applied to the head.

By reason of the fact that the toggle activating spring 23, opposes the lifting action of the lifting lever spring 27, when the machine head is in depressed position, the spring 27 may be made considerably stronger than the usual counterbalance spring, without risk of the machine head being objectionably lifted by such powerful spring, from depressed position.

Should it become necessary to remove the machine head from the cabinet for service or repair, then in the absence of the weight of the machine head, the lifting lever 15 as thus far described, would extend upward well above the top of the cabinet, as suggested by dot-and-dash lines in Fig. 8. This would be unsightly because it would preclude closing the cover panel T of the cabinet and the otherwise attractive article of furniture would be most unsightly, perhaps for some days or weeks until the machine head had been reinstalled.

To preclude such upward protrusion of the lifting lever in the absence of the sewing machine head, a hook 37 mounted on the bracket F with its hook end releasably held in an eye hole 38 in the lifting lever 15 affords simple means for maintaining the lifting lever below the cabinet top when the machine head has thus been removed.

Preferably the eye end of the hook, desirably a wire hook, is passed through a suitable aperture 39 in the toe 36 on the bracket which serves as the stop for the toggle lever. The eye of the hook preferably extends to the left in Fig. 6 in a corresponding notch 40 in the toe, so that when the hook is to be released from the lifting lever 15 upon restoration of the machine head to the cabinet, a simple manual depression of said lever 15 will cause the hook 37 to disengage from eye 38 and reliably to drop by gravity to the left side of the web 35, as shown in Fig. 6, where it could not by any possibility become jammed or caught.

In another embodiment shown in Figs. 9 to 11, the L-shaped lifting lever is formed of two separate parts 41 and 42 that are pivotally connected together by rivet 43 in such manner that the lifting lever in normal use acts as a unitary rigid structure, but its outer arm may be manually pivoted downward to extend below the top of the machine at such time as the machine head is removed.

To this end the outer section 42 of the lifting lever has a root extension 44 beyond the pivot 43, which exten-

sion is lodged in a shoulder indentation 45 near the extremity of the companion lever section 41, so that the thrust of the lever is effectively transmitted through the shoulder 45 and root extension 44 in operation, as if the lever were of the unitary rigid construction shown in Figs. 1 to 6.

When it is desired to maintain the lever depressed upon removal of the sewing machine head, the upwardly protruding section 42 is simply turned inward about the pivot 43 and downward as shown in dot-and-dash lines, the root 44 of lever section 42 thus moving out of and away from the stop shoulder 45 and lever section 42 is thus moved until it passes through the opening in the top of the cabinet from which position it will continue to drop by gravity along the arc shown in Fig. 9 to the lower position there shown in dot-and-dash lines. The mode of return of the lever to normal position upon reinstallation of the sewing machine head is obvious.

It will be understood that while the arrangement of two springs in combination with power multiplying means such as toggle linkage, is generally preferred substantially as shown and described, the advantages of the invention could be in part attained where the toggle linkage or other power multiplying means is omitted and the two springs assist each other in lifting, but one of the springs is arranged to apply a thrust opposed to the lifting thrust of the companion spring at such times as the head is in depressed or idle position.

While the invention has been illustratively shown in connection with the Necchi sewing machine, it will be understood that a suitable track for movement of the lifting lever roller could be used or if absent, could be incorporated with the base of other constructions of sewing machine head, or other drop head machines within the scope of the accompanying claims.

As many changes could be made in the above construction, and many apparently widely different embodiments of this invention could be made without departing from the scope of the claims, it is intended that all matter contained in the above description, or shown in the accompanying drawings, shall be interpreted as illustrative and not in a limiting sense.

Having thus described my invention what I claim as new and desire to secure by Letters Patent of the United States is:

1. In a drop head machine of the type comprising a cabinet having a top, a machine head having a base positioned upon said top for use and displaceable from said position of use to drop to idle position wholly below said position of use, booster means to facilitate displacement of the machine head from idle position to position of use and conversely; the combination in which the booster comprises a lifting lever having a fulcrum affixed with respect to the cabinet, a lifting end slidable in operation under the base of the head, power increasing linkage mounted at one end in fixed position with respect to the cabinet and connected at the other end thereof with the lifting lever and spring means reacting against the cabinet and operatively connected to the power increasing linkage to enhance the thrust of said linkage.

2. In a drop head machine of the type comprising a cabinet having a top, a machine head having a base mounted thereon for use and displaceable from said position of use to drop to idle position within the cabinet, booster means in the cabinet to facilitate displacement of the machine head from idle position to position of use and conversely; the combination in which the booster means comprises a lever pivoted to the cabinet and extending under the base of the machine head, a toggle linkage interposed between the cabinet and said lever and pivoted at its upper end to and near the pivot of said lever, and means for activating said toggle linkage whereby during movement of the machine head from fully dropped to raised position, lifting thrust will be exerted by the toggle linkage and during the latter part of the

movement of the head from raised to dropped position, the thrust exerted by the toggle linkage will reverse to oppose lift of the machine head.

3. In a drop head machine of the type comprising a cabinet having a top, a machine head having a base mounted thereon for use and displaceable from said position of use to drop to idle position within the cabinet, and booster means in the cabinet to facilitate the displacement of the machine head from dropped to operating position and conversely; the combination in which said booster means comprises a lever pivoted to the cabinet and extending under the base of the machine head, power increasing toggle linkage, means affixing one end of said toggle linkage with respect to the cabinet, means connecting the other end of said linkage to said lever, to apply thrust from said toggle to said base in lifting, and to relax such thrust in dropping of the machine head, and spring means to activate the toggle in the lifting operation.

4. In a drop head machine of the type comprising a cabinet having a top, a machine head having a base mounted thereon for use and displaceable from said position of use to drop to idle position within the cabinet, and booster means in the cabinet to facilitate the displacement of the machine head from dropped to operating position and conversely; the combination in which said booster means comprises toggle linkage, a lower bearing affixed to the cabinet at one end of the toggle linkage, a lifting lever having a fulcrum affixed with respect to the cabinet, and connected to the other end of the toggle linkage, said lifting lever having sliding connection near its other end with respect to the base of the head for transmitting and releasing lifting effort from the toggle linkage to the machine head, and spring means reacting against the cabinet and operatively connected to the toggle linkage to assist the lifting effort in raising the machine head.

5. In a drop head machine of the type comprising a cabinet having a top, a machine head having a base mounted thereon for use and displaceable from said position of use to drop to idle position within the cabinet, and booster means within the cabinet to facilitate the displacement of the machine head from dropped to operating position and conversely; the combination in which the booster means comprises toggle linkage, a bearing for the toggle linkage affixed to the cabinet at one end of said linkage, a lifting lever having a fulcrum affixed to the cabinet, and connected to the other end of the toggle linkage, said lifting lever having operative connection with respect to the base of the head for transmitting and releasing lifting effort from the toggle linkage to the machine head and spring means reacting against the cabinet and operatively connected to the lifting lever to assist the lifting effort in raising the machine head, and further spring means reacting against the cabinet and operatively connected to the toggle linkage to exert lifting effort in raising the machine head.

6. The combination recited in claim 5 in which the toggle linkage is constructed and arranged to pass dead center during the dropping movement of the machine head, and thereby to apply the effort of the spring associated with the toggle in reverse direction to assist the downward thrust of the weight of the machine head in dropped position.

7. In a drop head machine of the type comprising a cabinet having a top, a machine head having a base mounted thereon for use and displaceable from said position of use to drop to idle position within the cabinet, and booster means within the cabinet to facilitate the displacement of the machine head from dropped to operating position and conversely; the combination in which the booster unit comprises a bracket affixed to the cabinet, said bracket having a lifting lever pivoted thereto at one end thereof with its opposite lifting end engaging said base, said lever being spaced from said base between its ends, toggle link-

age pivotally mounted at its lower end to said bracket and connected at its upper end to said lifting lever near the pivoted end thereof, and means resiliently to urge the lifting lever for coaction of its lifting end with the lower face of the machine head base.

8. In a drop head machine of the type comprising a cabinet having a top, a machine head having a base mounted thereon for use and displaceable from said position of use to drop to idle position within the cabinet, and a booster unit within the cabinet to facilitate the displacement of the machine head from dropped to operative position and conversely; the combination in which the booster unit comprises a bracket affixed to the cabinet, said bracket having a lifting lever pivoted thereto and having a lifting portion engaging said base, toggle linkage pivotally mounted at its lower end to said bracket and connected at its upper end to said lifting lever near the pivot of said lever, and spring means coacting with the lifting lever to assist the toggle in the lifting action.

9. In a drop head machine of the type comprising a cabinet having a top, a machine head having a base mounted thereon for use and displaceable from said position of use to drop to idle position within the cabinet, and a booster unit mounted within the cabinet to facilitate the displacement of the machine head from dropped to operative position and conversely; the combination in which the booster unit comprises a bracket affixed to the cabinet, said bracket having a lifting lever pivoted thereto with an operating free end, toggle linkage pivotally mounted at its lower end to said bracket and connected at its upper end to said lifting lever, spring means coacting with the lifting lever to assist in the lifting action, and further spring means connected to the lower part of the toggle linkage, to assist the toggle in the lifting action.

10. The combination claimed in claim 9 in which the bracket has stop means to limit the straightening motion of the toggle linkage at the uppermost position to which the lifting lever raises the head.

11. The combination recited in claim 9 in which the machine head is hinged to the cabinet, in which the bracket has a stop to limit the straightening of the toggle linkage in a position in which the machine head base is pivoted backwardly beyond horizontal position and in which the toggle linkage is spaced from said stop when the machine is in operating position with its base resting upon the cabinet top.

12. In a dropped head sewing machine cabinet of the type comprising a top, a machine head having a base hingedly mounted to the top for positioning alternatively in dropped or in operative position, and booster means in the cabinet to facilitate displacement of the head from dropped to operative position and conversely; the combination in which said booster means comprises a bracket unit affixed to the cabinet under its top and to one side of the machine head, said bracket having a bearing near its top, a lifting lever mounted at said bearing, a spring about said bearing to urge the lifting lever upward with its lifting end to engage the under surface of the base of the machine head, said bracket having a bearing near the lower end thereof, a toggle lever mounted at said bearing, a toggle link connecting said toggle lever to said lifting lever, and a spring about said latter bearing to urge said toggle in direction to assist the lifting lever.

13. A dropped head sewing machine cabinet of the type comprising a top, a machine head having a base hingedly mounted to the top for positioning alternatively in dropped or in operative position, and booster means in the cabinet, to facilitate displacement of the head from dropped to operative position and conversely; the combination in which said booster means comprises a bracket affixed to the cabinet under its top and to one side of the machine head, said bracket having a bearing near its top, a lifting lever mounted at said bearing, a spring about said bearing to urge the lifting lever upward with its end engaging the under surface of the base of the machine head, said booster means having a bearing near the lower end there-

of, a toggle lever mounted at said bearing, a toggle link connecting said toggle lever to said lifting lever and a spring about said latter bearing urging said toggle in direction to assist the lifting lever, said toggle being arranged to pass dead center as the machine head is dropped to idle position, thereby to reverse the thrust of the toggle spring in the course of drop to idle position, from lifting to depressing action.

14. The combination recited in claim 13 in which the bracket has a stop unitary therewith to limit the toggle straightening movement of the toggle lever when the machine is engaged by the lifting lever in a position tilted backward above and beyond operative position.

15. In a drop head sewing machine cabinet of the type having a top, a sewing machine head having a base hingedly mounted to said top for positioning alternatively in dropped or in operative position, and booster means in the cabinet to facilitate displacement of the head from dropped to operative position and conversely; the combination in which the booster means includes a bracket affixed under the top of the cabinet adjacent the machine head, said bracket including an upper channel and a lower channel formation, a bearing in said upper channel formation, a lifting lever mounted on said bearing, a coil spring about said bearing reacting against said channel and against said lifting lever to urge its free end against the under surface of the base of said sewing machine head, a bearing in the lower channel formation of the bracket, a toggle lever mounted on said bearing, a toggle link connecting the free end of said toggle lever and said lifting lever, a spring about said toggle lever bearing, said spring reacting at one end with said lower channel formation and at the other with said toggle lever to urge the toggle composed of said toggle lever and said toggle link toward straightening position, said toggle being arranged to pass dead center as the machine head is pivoted substantially below operative position, thereby to reverse the action of the toggle lever spring to oppose the lift of the lifting lever spring.

16. As an article of manufacture, a unit adapted for attachment within a dropped head cabinet to assist in shifting the drop head from dropped to operative position and conversely; said unit comprising a bracket, a bearing near the upper part of said bracket, a lifting lever pivoted on said bearing, a bearing near the lower end of the bracket, a toggle lever pivoted on said latter bearing, a toggle link connecting the free end of said toggle lever to said lifting lever near the pivot of the latter, and a pair of springs reacting against said bracket and respectively against said lifting lever and said toggle lever.

17. The combination recited in claim 16 in which the bracket has a stop to limit the motion of the toggle lever to a position in which the outer end of the lifting lever extends well above the top of the bracket, and in which the toggle lever is spaced from said stop when the outer end of the lifting lever is substantially at the level of the top of said bracket.

18. As an article of manufacture, a unit adapted for attachment within a dropped head cabinet to assist in shifting the drop head from dropped to operative position and conversely; said unit comprising a bracket having a downwardly extending upper channel and an upwardly extending lower channel, pivot pins in said channels, a lifting lever pivoted on the upper bearing pin, a toggle lever pivoted on the lower bearing pin, a toggle link connecting the free end of said toggle lever to said lifting lever near the pivot of the latter, a lifting lever coil spring about said upper bearing pin, reacting at one end against the upper channel formation and at the other against said lifting lever, and a coil spring about the lower bearing pin, reacting at one end against the lower channel and at the other against the toggle lever.

19. The combination claimed in claim 18 in which the parts are arranged so that the toggle composed of the toggle lever and toggle link moves past dead center in

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depressing the head below horizontal to urge the toggle lever spring in direction opposed to the lifting lever spring.

20. In a dropped head cabinet of the type having a base hinged to the cabinet, a booster unit affixed within the cabinet to facilitate the lifting of the head from dropped to operative position and conversely; said unit including a bracket, a lifting lever and spring means to urge and maintain said lever against the lower surface of said base, throughout the lifting movement of the head to tilted position beyond horizontal or operative position of the head, whereby when the head is removed from the cabinet as for instance for service, the lifting lever is spring urged upwardly above the cabinet top, and means releasably to maintain the lifting lever below the cabinet top in the absence of the machine head.

21. The combination recited in claim 20 in which the said means comprises a hook affixed with respect to the cabinet and the lifting lever has an eye releasably to accommodate said hook for maintaining the lifting lever in depressed position.

22. The combination recited in claim 20 in which the means releasably to maintain the lifting lever below the cabinet top in the absence of the machine head, comprising a hook is pivoted to said bracket below the lifting lever and in which the lifting lever has an eye releasably to accommodate the free end of the hook in order to maintain the lifting lever depressed.

23. The combination recited in claim 20 in which the lifting lever has two pivotally connected arms at approximately right angles to each other, the inner arm presenting a stop for defining the position of the outer arm in lifting action, whereby the outer arm may be pivoted inwardly away from the stop on the inner arm through an aperture in the cabinet top.

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24. The combination recited in claim 23 in which the lifting lever has two pivotally connected arms at approximately right angles to each other, the inner arm having a shoulder and the outer a stub end normally engaging said shoulder.

25. In a dropped head cabinet of the type having a machine head mounted in the cabinet, booster means within the cabinet to facilitate the lifting of the head from dropped to operative position and conversely; said booster means comprising two levers; two springs connected to the respective levers, one of said springs being stressed to assist the lifting of the head and to oppose the dropping of the head, the second of the springs being arranged with respect to said head to assist in the lifting operation and to become reversed in the direction of its thrust during the final part of the depression movement of the head to oppose the other spring and thereby assist in maintaining the head in depressed and idle position.

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