M. ADAIR.

MACHINE FOR STITCHING HANDKERCHIEFS OR THE LIKE.

APPLICATION FILED MAR. 25, 1908.

1,026,546.

Patented May 14, 1912.

5 SHEETS—SHEET 1.

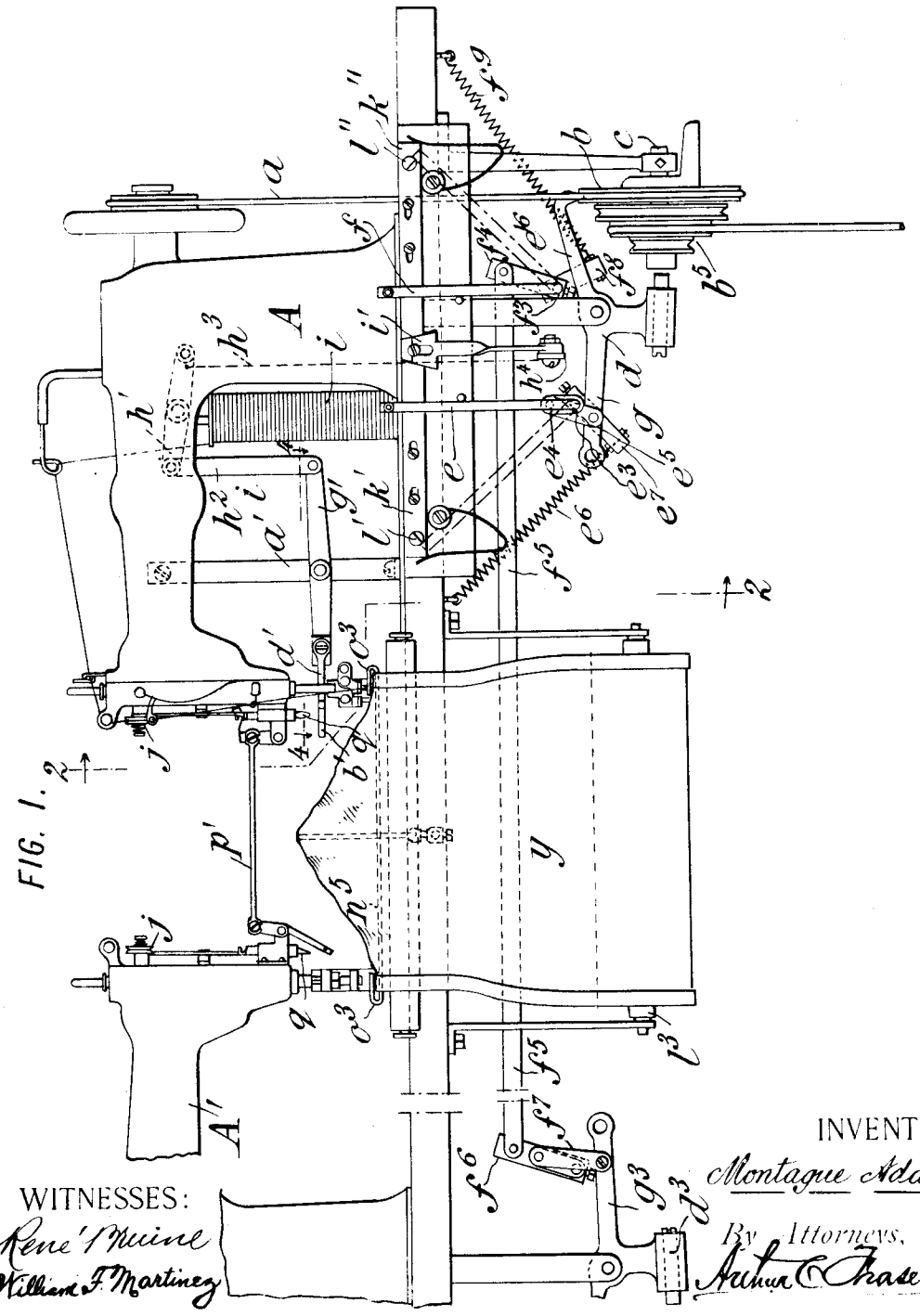

FIG. 1.

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5 SHEETS—SHEET 2.

FIG. 2.

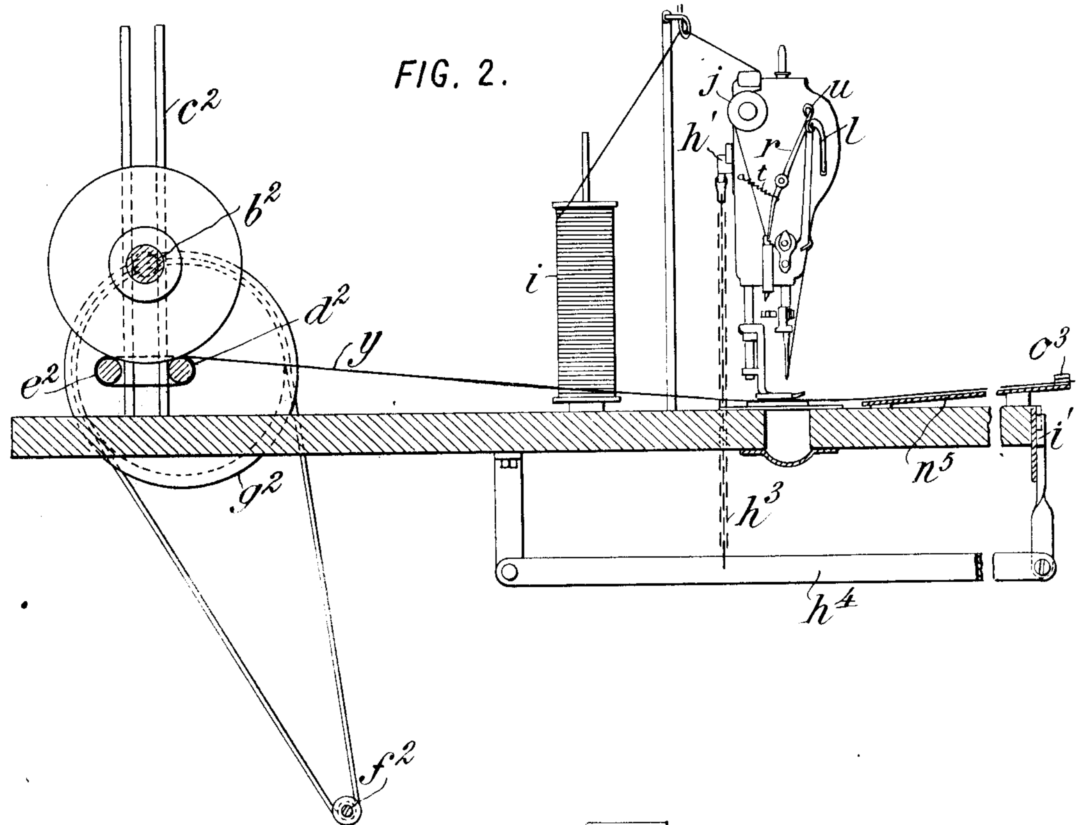


FIG. 4.

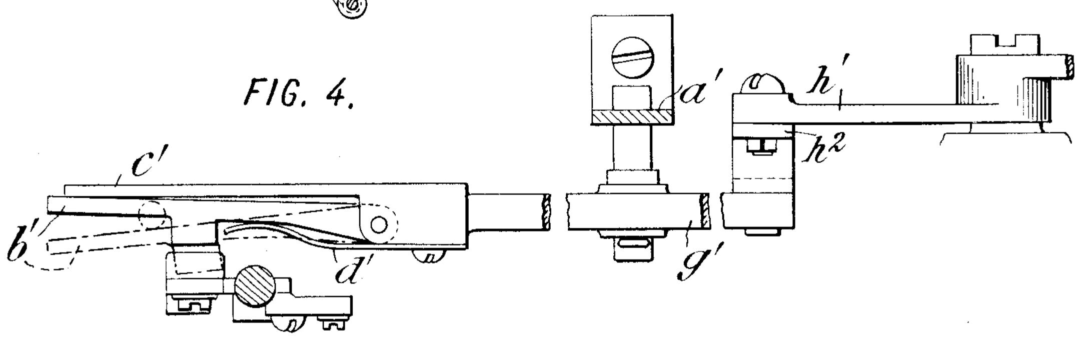
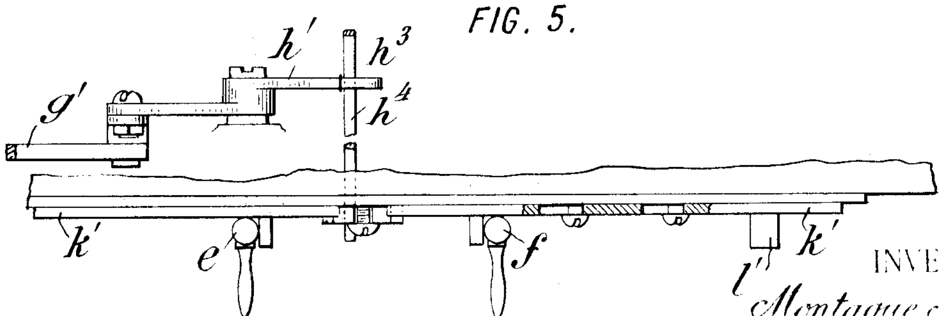


FIG. 5.



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5 SHEETS-SHEET 3.

FIG. 3.

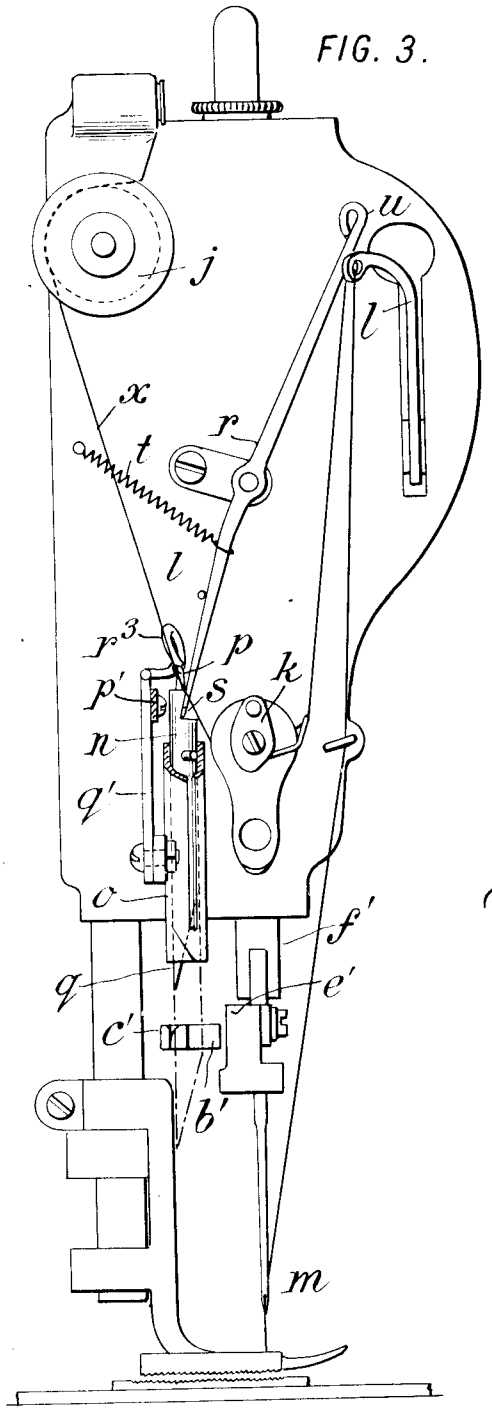
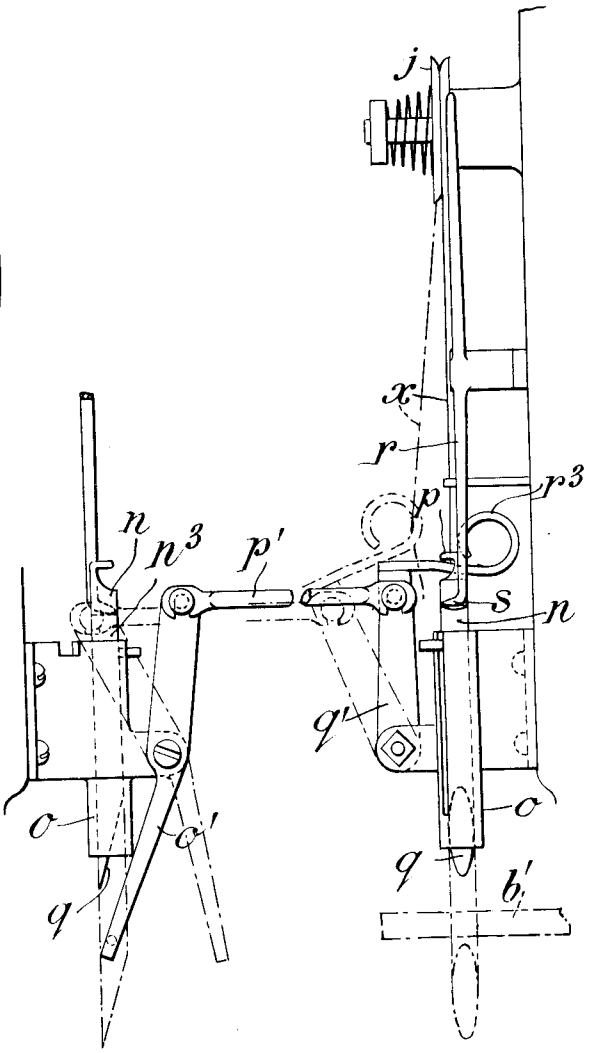


FIG. 7.



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5 SHEETS—SHEET 4.

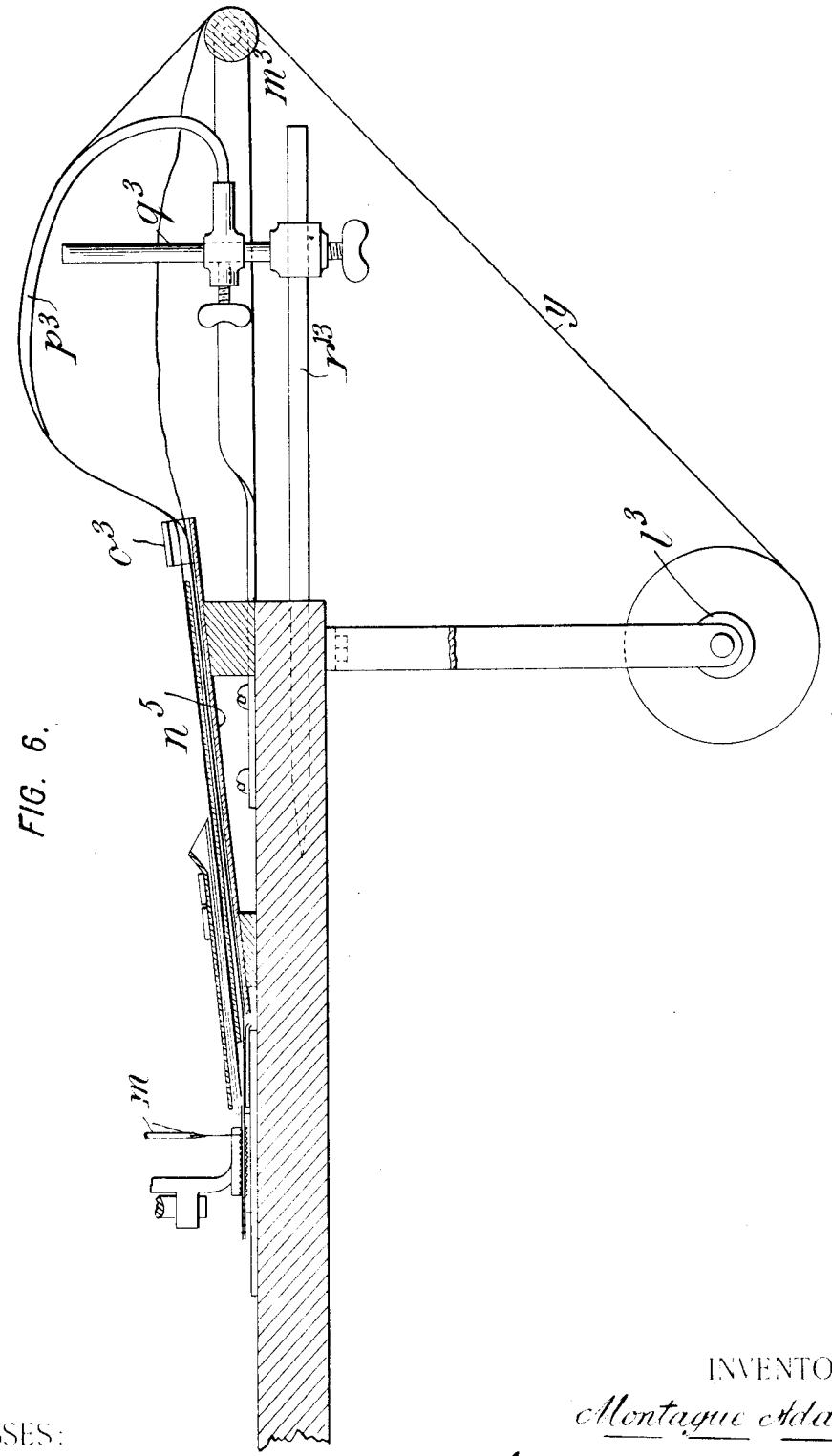

FIG. 6.

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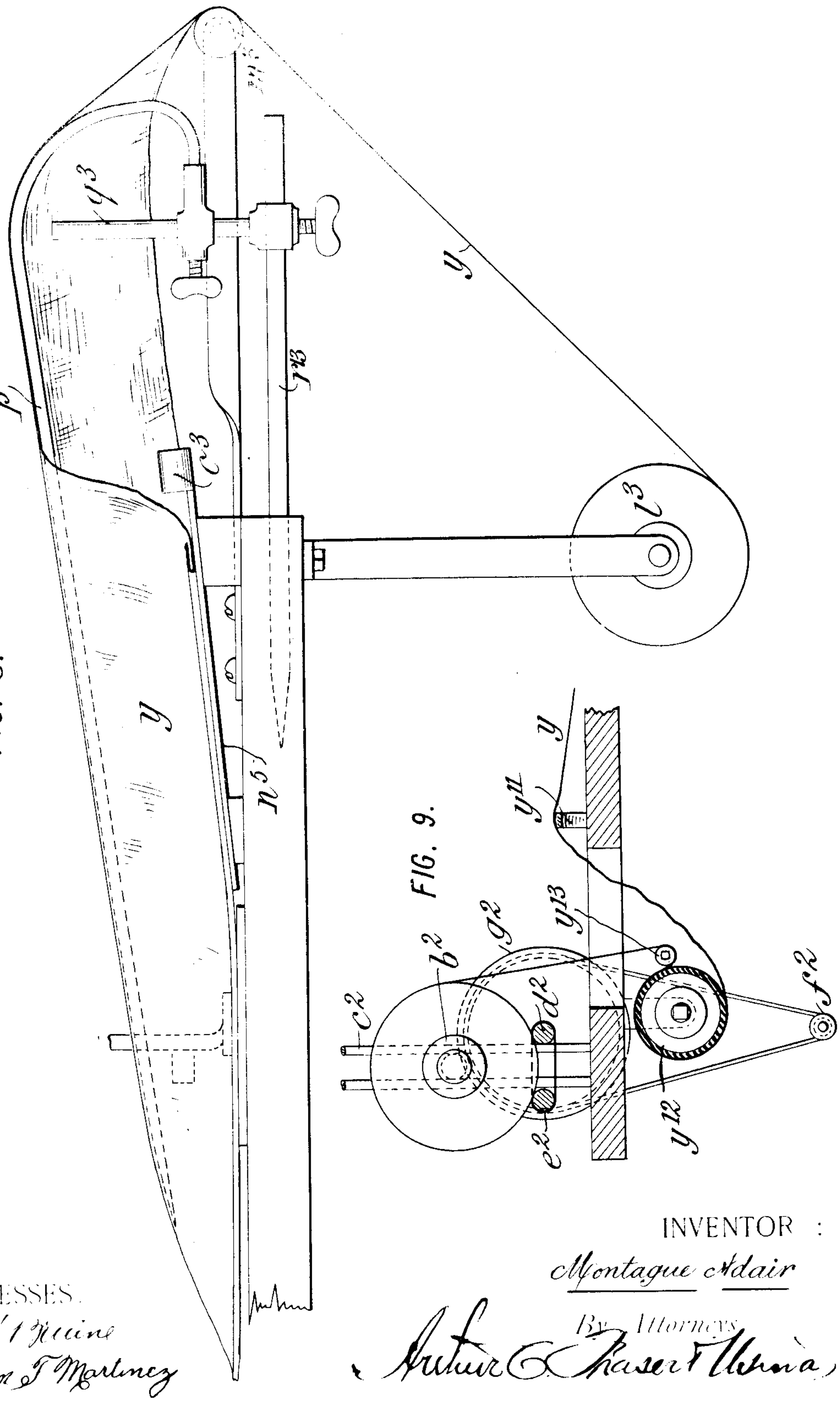
5 SHEETS—SHEET 5.

FIG. 8.

FIG. 9.



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UNITED STATES PATENT OFFICE.

MONTAGUE ADAIR, OF NEW YORK, N. Y., ASSIGNOR TO ADAIR MACHINE COMPANY, OF BROOKLYN, NEW YORK, A CORPORATION OF NEW YORK.

MACHINE FOR STITCHING HANDKERCHIEFS OR THE LIKE.

1,026,546. Specification of Letters Patent. Patented May 14, 1912.

Application filed March 25, 1908. Serial No. 423,143.

To all whom it may concern:

Be it known that I, MONTAGUE ADAIR, a citizen of the United States, and a resident of the borough of Brooklyn, in the county of Kings, city and State of New York, have invented certain new and useful Improvements in Machines for Stitching Handkerchiefs or the Like, of which the following is a specification.

This invention relates to machines for hemming handkerchiefs or other articles, and aims to provide certain improvements therein.

In the making of handkerchiefs according to the present methods the fabric is first torn or cut the proper size, and each of the four edges thereof is hemmed and in the great majority of cases hemstitched. According to the present practice a hemstitching sewing machine is used, each side of the handkerchief being separately hemstitched. By using two handkerchief blanks causing one to follow the other alternatively through the machine, one operator can keep a single machine in practically constant operation, but this requires rapid and skilful work on the part of the operator.

According to my invention, instead of forming the fabric into separate blanks of the required size, I form the fabric into a strip of indefinite length, but of the width necessary to produce the proper width of handkerchief when hemstitched, and simultaneously hem this strip by two sewing machines arranged end to end.

My invention includes in its preferred form means for automatically stopping the sewing operation of one such machine when the thread of the other machine fails. To gain the fullest advantage of my invention, however, means are provided for stopping the sewing operation of both machines when a thread of either machine fails.

The breaking of the spool thread is of quite frequent occurrence, and if one of the machines was permitted to remain running after the other one had broken its thread a considerable disadvantage would ensue. By stopping both machines simultaneously upon the breaking of thread the work is not disarranged or damaged, and the parts are in readiness to proceed at once when the machine is re-threaded. By this invention one operator can take care of a large number of machines. This number depends largely upon the average number of threads broken per hour as but little attention is required on the part of the operator except in the case of the breakage of a thread.

My invention includes such an automatic mechanism and other improvements which will hereinafter be referred to.

Referring to the drawings which illustrate an embodiment of the invention, Figure 1 is an elevation of a duplex hemstitching machine, some of the parts of the left-hand machine being omitted. Fig. 2 is a section on the line 2—2 in Fig. 1. Fig. 3 is an enlarged end elevation of the head of the right-hand machine in Fig. 1, showing some of the parts in section. Fig. 4 is an enlarged view of the left-hand side of the operating mechanism of Fig. 1, the view being taken approximately on the line 4—4 in Fig. 1. Fig. 5 is a continuation of Fig. 4 and shows the right-hand side of such mechanism on a smaller scale. Fig. 6 is a view partly in section showing the bed plate and one form of slack adjusting device on a larger scale. Fig. 7 is an enlarged view of the connecting device between the controlling members of the two machines. Fig. 8 is a view similar to Fig. 6 showing the preferred form of slack adjusting device. Fig. 9 is a sectional view of the preferred form of winding-up mechanism.

Referring to the drawings let A A′ indicate the tops or heads of two sewing machines shown as hemstitching machines. The hemstitching mechanism may be of any suitable type, but the invention is best applied in connection with the well-known Wheeler & Wilson hemstitch sewing machines. Each machine is driven by a belt a which is connected to a pulley b which is normally loosely mounted upon a shaft c and which is driven by friction from a stepped pulley b^5. A clutch mechanism is provided for each head, that for the head A being operated by a bell-crank lever d, which normally tends to permit the pulley b^5 to rotate out of engagement with the pulley b. To operate the clutch mechanism d, I provide a lever e which is fixed upon a rock shaft e^3 which has fixed to it an arm e^4 connected by a link e^5 with the arm g of the lever d. When the lever e is in its vertical or full line position (Fig. 1) the arm g of the lever d is moved upwardly thereby releasing the pulley b^5 from engagement with

the pulley b and stopping the machine. At the same time a brake e^{10} is thrown into engagement with the pulleys b to insure that the machine stops quickly.

In order to maintain the clutch in its inoperative position, and to tend to throw it to such position, a spring e^6 is provided which is fixed at one end to a stationary part of the machine, and the other end is connected to an arm e^7 secured upon the rock shaft e^8. When the lever e is moved to the dotted line position the arm g of the lever d is pushed downwardly, thereby frictionally connecting the pulleys b^5 and b and starting the operation of the machine. The arm e is held in its clutched position by a pin l' mounted upon a spring-pressed sliding plate or bar k', which bar is adapted to be thrown to the left to release the lever in a manner to be described. The mechanism for operating the clutch of the machine head A′ is similar to that just described. In this case the operating lever f is mounted upon a rocking shaft f^3 which also carries an arm f^4 connected by a long rod f^5 with a lever f^6 mounted in the frame of the machine. The lever f^6 is connected by a link f^7 to the arm g^3 of a three-arm lever d^3, which operates the clutch of the head A′. On the rock shaft f^3 to which the lever f is fixed is also mounted an arm f^8 connected by a spring f^9 to a fixed part of the machine. Such spring tends to normally maintain the clutch of the machine A′ in its disengaged position, and corresponds to the spring e^6 of the clutch for the machine A. The lever f is also adapted to be held in its operative position by a second pin l^{11}, mounted upon a second plate k^{11}, and is also adapted to be released by a movement of the plate as will be described.

The invention in its preferred form provides a means for automatically stopping the sewing of the seams of both machines when there is a failure of the spool thread in either machine. Preferably the entire machines are stopped. Such failure of the thread may arise from several different causes. The most common of these is the breakage of the thread, but it may arise from the thread being exhausted from the spool or from other causes. In the drawings I have shown the mechanism which I prefer to use for this purpose but it will be understood that any other suitable means may be employed for effecting the same result. Such means in the present construction are adapted to release the levers e f so that they may swing to the full line positions of Fig. 1, thereby releasing the clutches.

The thread is carried on any suitable spool such as i in Fig. 1, and is led through the usual guides to the tension device j, Fig. 3. In the usual construction of the machine the thread passes from the tension member j to the guide device k and then upwardly through the take-up arm l and thence to the needle m.

In the construction shown I provide a controlling device shown as a weight n which is mounted to slide in a guide o on the head of the machine, such weight being provided with a hook p which normally engages the thread between the tension member j and the guide k. The weight n is tapered at its lower end q and is adapted to throw off the clutch of the machine through intermediate mechanism to be described. The weight n is normally held in its upper position by the tension upon the thread. During the normal cycle of operations of the machine, however, the tension is removed from the thread by the take-up arm l so that the weight would drop and throw off the machine, if there were not certain additional mechanism which is designed to engage the weight and hold it during the period when the thread is slack. The means shown for this purpose comprises a lever r pivoted to the head of the machine, the lower end or point of which s is normally held in engagement with the weight by a spring t. With this means the weight is upheld irrespective of the tension of the thread. Preferably instead of restricting the action of the lever to a period in which the thread is slack, I make such lever act continuously to hold the weight except for a short period during each cycle of operations. For this purpose I extend the upper arm u of the lever to a point where it will be engaged at each upward movement of the take-up arm l with the effect that the end s of the lower arm of the lever is momentarily moved out of engagement with the weight. The result of this construction is that when the thread fails for any reason as by breakage at any point, upon the next upward movement of the arm l, the lever r is moved out of engagement with the weight n, and the latter being no longer supported by the thread falls and actuates the intermediate mechanism which is connected with the clutches and which will now be described.

Mounted upon the machine at the rear of the head is a lever q' (Figs. 1, 4 and 5) which is pivoted at its middle to a suitable bracket a'. At the left-hand end of this lever is mounted a pivoted arm b' which normally is in contact with the arm c' of the lever, being held yieldingly in this position by a light spring d'. The arms b', c', inwardly of their ends, are somewhat separated (see Figs. 3 and 4) so that the point q of the weight n may enter between them when it drops, and throw forward the pivoted arm b', from the full line position of Fig. 4 to the dotted line position in this figure. The

force developed by the dropping of the weight is, of course, insufficient to throw off the clutch and I preferably use a moving part of the machine to develop sufficient power to perform this operation. To this end I mount an abutment e' on the needle shaft f' of the machine, which normally escapes the pivoted arm b' of the lever g' when the latter is in its inactive position. When the arm b' is pressed outwardly, however, by the action of the weight n, the arm is moved into position where it is engaged by the abutment e' on the needle bar as it moves upwardly. By this means the lever g' is tilted around its pivot, throwing the end of the lever downwardly thereby rocking an intermediate lever h' (Fig. 1) to which it is connected by a link h^2. The lever h' is connected by a chain h^3 to a lever h^4 (Fig. 2) located under the machine which in turn is connected to a wedge shaped block i'. The wedge shaped block i' is located between the ends of the two sliding catch bars k' k' which carry at their opposite ends the pins l' l' which engage the throw off levers e f in their clutched positions. Upon the ascent of the wedge block i' both of the sliding bars k' k' are moved apart thus releasing the levers e f which under the tension of their springs move to the full line position in Fig. 1 and throw off the clutches.

As shown in Fig. 7 I prefer to form the lower end s of the lever r with a hooked portion, which frictionally engages the upper end of the weight n and which extends below the thread indicated at x in this figure By this means as the weight moves downwardly after the failure of the thread it will be certainly released from the hook p by the end s of the lever.

The foregoing description relates to the head A of the machine. The head A′ might be furnished with a complete set of similar mechanism but for the sake of simplicity and economy I prefer to duplicate on the head A′ only those parts which are necessary for it, utilizing most of the mechanism described with reference to the head A. The head A′ is hence provided with a weight n^3 (Figs. 1 and 7) which is operated in the same manner as the weight n and a lever o' which normally stands in a position approaching the vertical with its lower end in the path of the weight. Upon descent of the latter the lever o' is rocked past the vertical so that its heavier upper end falls to the left thereby giving it a relatively great movement. By means of a connecting rod p' this movement is communicated to a short rock-arm q' which is adapted to support the opposite end of the rod. Referring to Fig. 7 it will be seen that the rod p' is provided with a laterally extending member r^3 which is hooked to engage the thread x. The result of this construction is that when the weight n^3 of the head A′ falls the lever o' is tilted, thereby moving the rod p' and by means of the extension r' pulling the thread x off the hook of the weight n and permitting the latter to drop, with the same effect as though the thread of the head A has broken.

My invention provides a certain novel construction of feeding mechanism which is of practical importance in connection with the present method of forming the handkerchief. At any suitable point on the machine I arrange a roll l^3 (Figs. 5, 6 and 8) on which the strip of fabric y to be stitched is wound. The fabric is led up over a guide roller m^3 and from thence it is passed over a bed plate n^5 arranged in front of the two presser feet of the machine heads. Such bed plate is preferably slanted toward the presser feet of the machine as shown in Fig. 6. On each side of the bed plate n^5 is arranged a guide o^3 o^3 (Figs. 1, 6 and 8) which guide is shown in the form of a U-shaped plate, a part of which overlies the fabric. I prefer to provide a device for taking up the slack in the fabric when the latter is of greater width than the distance between the two machines. In the drawings I have shown a curved bar p^3 for this purpose. Such bar is adjustably mounted upon an upright rod q^3 which itself slides upon a horizontal rod r^{13} fixed to the machine table. By this means the guide p^3 may be adjusted in various directions and serves to assist in the proper feeding of the cloth. In Fig. 8 the end of the bar p^9 is carried to the rear of the presser feet. Any other suitable feeding means may be employed.

My invention also provides several means whereby the cloth may be wound up upon a roll (b^2) at the rear of the machine, the winding operation being constant, notwithstanding the increasing thickness of the roll of fabric. To this end the roll b^2 (Figs. 2 and 9) is provided with reduced ends which fit in guides c^2 arranged at the rear of the machine. A rotating shaft d^2 is arranged to bear against the bottom of the roll of fabric and this shaft is belted to a similar shaft e^2 spaced somewhat apart from the first shaft. Either of the shafts may be driven, as for instance d^2, by a pulley f^2 connected by a suitable belt to a large pulley g^2 which is mounted directly upon the shaft d^2. The shafts d^2 e^2 serve as rollers which operate against the roll of fabric and gradually rotate the same at a low rate of speed. As the fabric increases in thickness the roll b^2 moves upwardly in its guide c^2. As the shafts d^2, e^2 operate against the periphery of the roll of fabric the speed of take-up is maintained substantially constant.

In Fig. 9 I have shown the preferred means for winding up the fabric. In this figure the fabric y passes over a curved rod or spreader y^{11} and thence around a stationary

rod or roll y^{12} which is faced with rubber, felt, plush or other suitable material. The fabric is then passed over a smaller stationary rod y^{13}, and thence onto the roll b^2 which is driven in substantially the same manner as in Fig. 2. The result of this construction is that no strain whatever is placed upon the fabric as it leaves the stitching mechanism. The fabric remains loose as indicated in Fig. 9 until it reaches a certain point on the stationary roll y^{12}. Between the rod y^{13} and the roll b^2 the fabric is under considerable tension which provides an evenly wound stretched roll of fabric. If necessary a suitable brake may be placed upon the roll b^2 in case the driving means tends to wind the latter too rapidly.

The machine herein described may be used in any suitable manner. I prefer, however, to use it in connection with my improved method of handkerchief manufacture. Various efforts have been made to improve the manufacture of handkerchiefs. Such efforts have not heretofore resulted in any great economy. I have found in practice that the strip of fabric will pass through the machines, if the latter are properly constructed, practically automatically and without any attention on the part of the operator. It is possible in connection with the machine herein shown to hem or hemstitch the handkerchief strips or other articles almost entirely automatically. One operator can by the present invention operate a considerable number of machines, since practically the only manual work which is to be performed is that of rethreading the machines when the thread fails, and restarting the machines.

In case that a hemstitched handkerchief is required the heads will be provided with the usual hemstitching mechanism.

In Fig. 1 of the drawings the fabric is shown as having a preliminary fold before being fed into the machine, but this is not necessary since the machine will properly fold and hem a flat strip with accuracy.

It is obvious that numerous changes may be made in the structure herein described. I prefer the present mechanism because it promptly stops both machines when there is a failure of the thread in either machine. It is apparent, however, that instead of stopping both machines, the opposite machine only may be stopped when there is a failure of the other machine. Under these circumstances the goods would merely feed along without stitching in the machine in which the thread was broken. As compared with the preferred form of my invention, however, this is disadvantageous since it requires the pulling forward of the fabric before restarting the machines.

In the construction described I have illustrated means for stopping the feeding mechanism for the cloth, the stitching mechanism and the sewing operation upon a breakage of the thread, it being preferred to bring the entire machine to a state of rest. But any modification which permits of the automatic stopping of the sewing of the machines is within the invention. It is also greatly preferred to bring all of the parts to a state of absolute rest, but the principal advantage of the invention will be gained by reducing the speed of the machine or machines in case of breakage to a point where their movements would not be material. It is very desirable that the sewing machines should be each capable of control independently of the other, and that independent manually operable means such as the hand levers shown, should be provided, otherwise considerable difficulty is found in conveniently working the machines.

Any other changes in construction may be made without avoiding the invention.

It is also apparent that the device provided by my invention is adapted for use in sewing, hemming, or hemstitching articles other than handkerchiefs or handkerchief strips or blanks.

What I claim is:—

1. The combination of a plurality of independently operable sewing mechanisms for making seams in a fabric, and means for automatically stopping the making of the seam on one machine when a thread of another mechanism fails.

2. The combination of a plurality of independently operable sewing mechanisms for making seams in a fabric, means for manually controlling the independent operation of said mechanisms, and means for automatically stopping the making of the seam on one mechanism when a thread of another mechanism fails.

3. The combination of two independently operable sewing mechanisms for making seams in a fabric, and means for stopping one mechanism when a thread of the opposite mechanism fails.

4. The combination of two independently operable sewing mechanisms for making seams in a fabric, clutches for said mechanisms, adapted to be independently operated, and means for operating the clutch of one mechanism to stop it when a thread of the opposite mechanism fails.

5. The combination of two independently operable sewing mechanisms for making seams in a fabric, and means for automatically stopping the making of the seam on one mechanism when a spool thread of the opposite mechanism fails.

6. The combination of a plurality of independently operable sewing mechanisms for making seams in a fabric, and means for automatically stopping the making of each seam when a thread of one mechanism fails.

7. The combination of a plurality of independently operable sewing mechanisms for making seams in a fabric, means for manually controlling the independent operation of said mechanisms, and means for automatically stopping the making of each seam when a thread of one mechanism fails.

8. The combination of two independently operable sewing machines for making seams in a fabric, and means for automatically stopping both machines when a thread of either machine fails.

9. The combination of two independently operable sewing mechanisms for making seams in a fabric, clutches for said mechanisms adapted to be independently operated, and means for operating the clutches of both mechanisms when a thread of either mechanism fails.

10. The combination of two independently operable sewing mechanisms for making seams in a fabric, and means for automatically stopping the making of both seams when the spool thread of either mechanism fails.

11. The combination of means adapted to feed two sides of a strip of fabric, means for independently controlling the operation of each such means, stitch-forming mechanism coöperating with one of said means, and mechanism for stopping the other of said means when a thread of said stitch-forming mechanism fails.

In witness whereof, I have hereunto signed my name in the presence of two subscribing witnesses.

MONTAGUE ADAIR.

Witnesses:
EUGENE V. MYERS,
THOMAS F. WALLACE.