V. PUC.

MECHANISM FOR SORTING THE SOCKET MEMBERS OF SNAP FASTENERS.

APPLICATION FILED JAN. 9, 1920.

1,421,715.

Patented July 4, 1922.

5 SHEETS—SHEET 1.

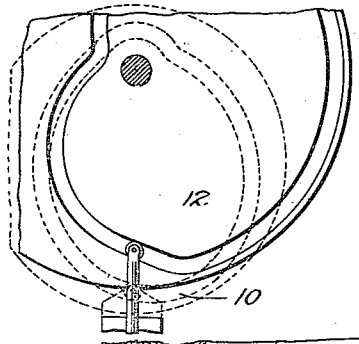
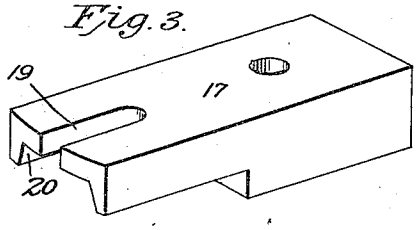


Fig. 3.



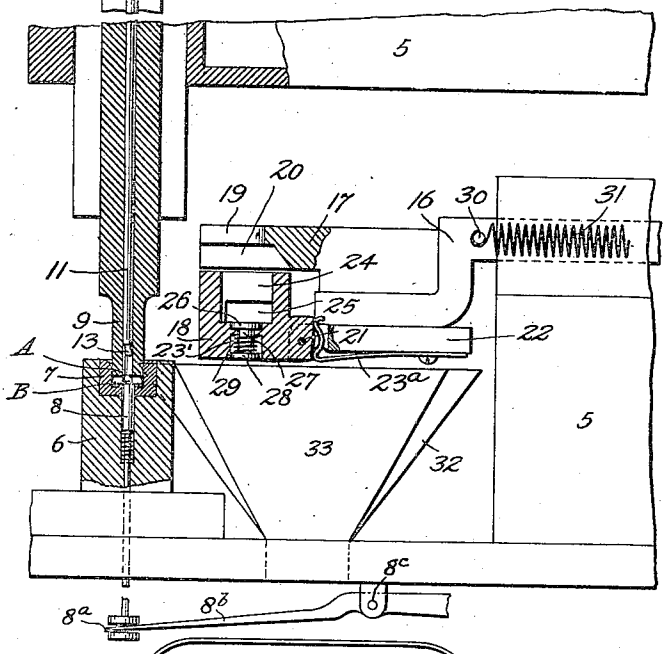
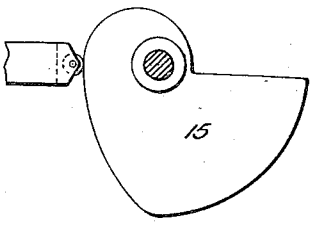


Fig. 1.



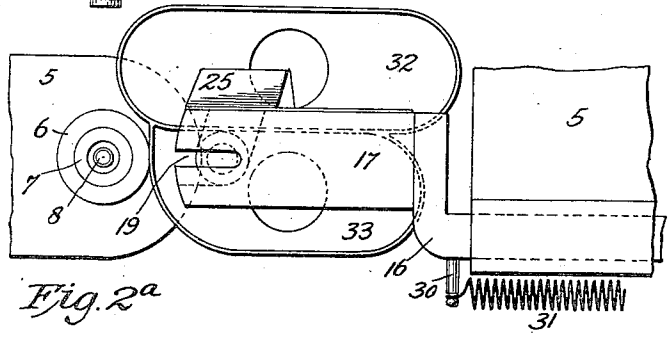


Fig. 2a

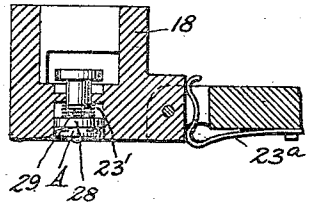
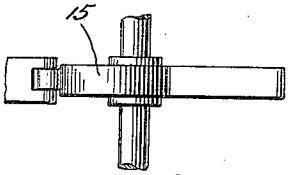


Fig. 2.



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5 SHEETS—SHEET 2.

Fig. 4.

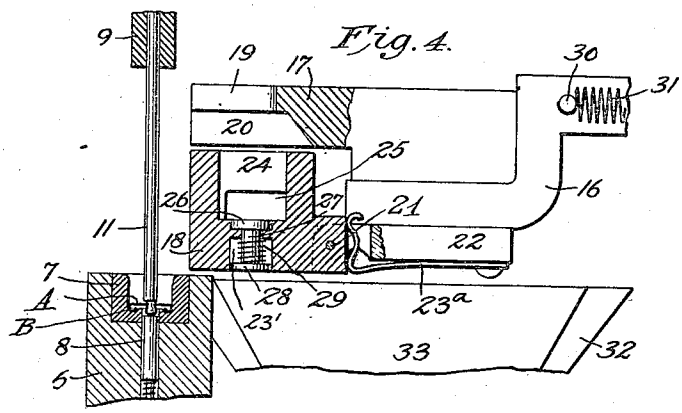


Fig. 8.

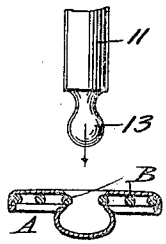


Fig. 5.

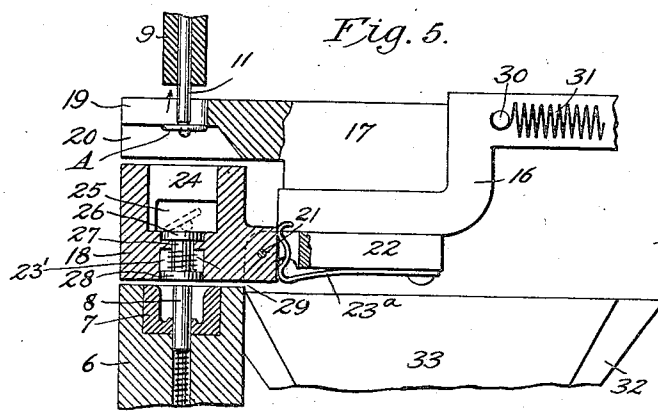


Fig. 7.

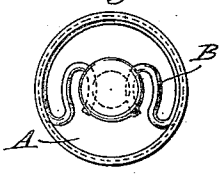


Fig. 10.

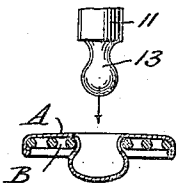


Fig. 6.

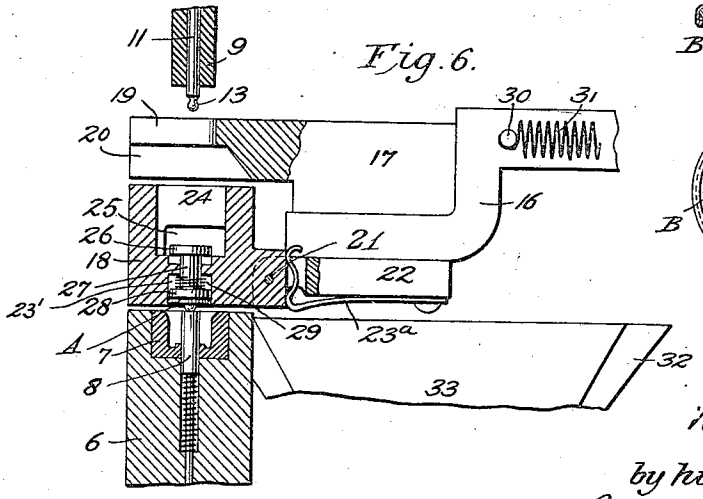
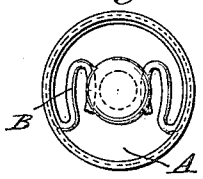


Fig. 9.



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5 SHEETS—SHEET 3.

Fig. 11.

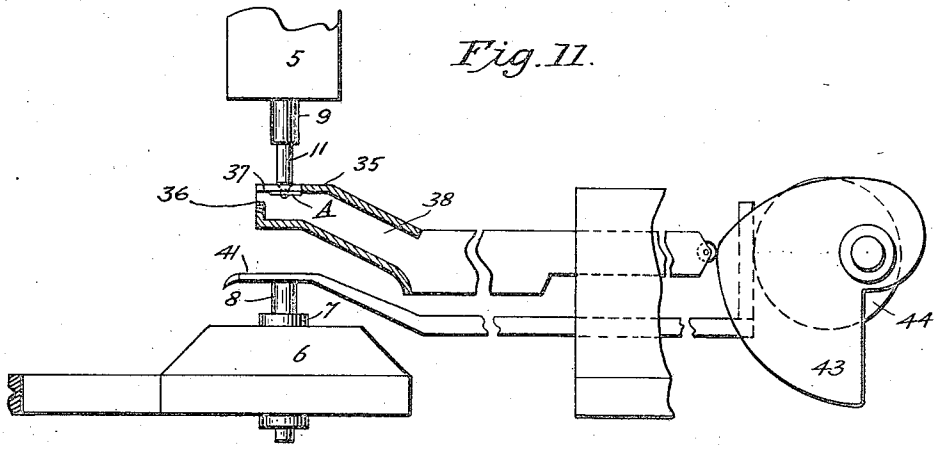


Fig. 11a

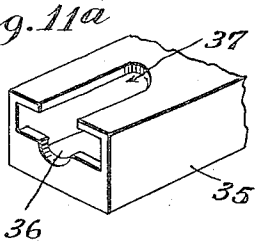
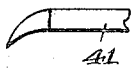


Fig. 12.

Fig. 13.



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5 SHEETS—SHEET 4.

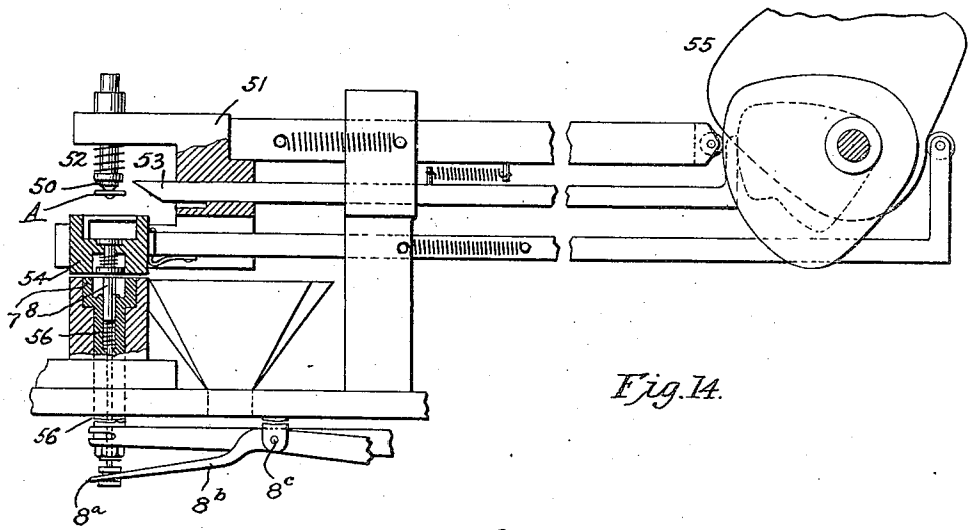


Fig. 14.

Fig. 14a



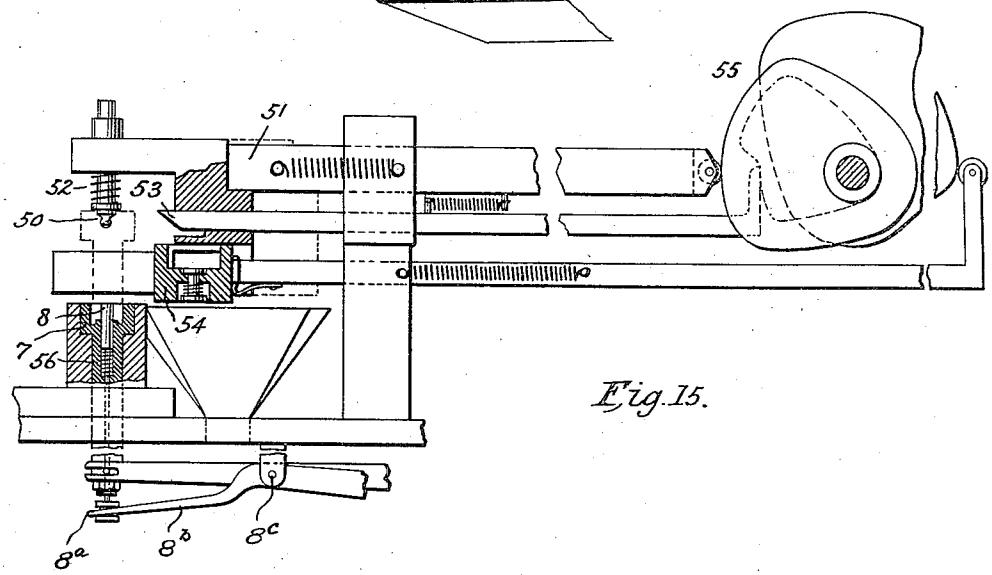


Fig. 15.

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5 SHEETS—SHEET 5.

Fig. 16.

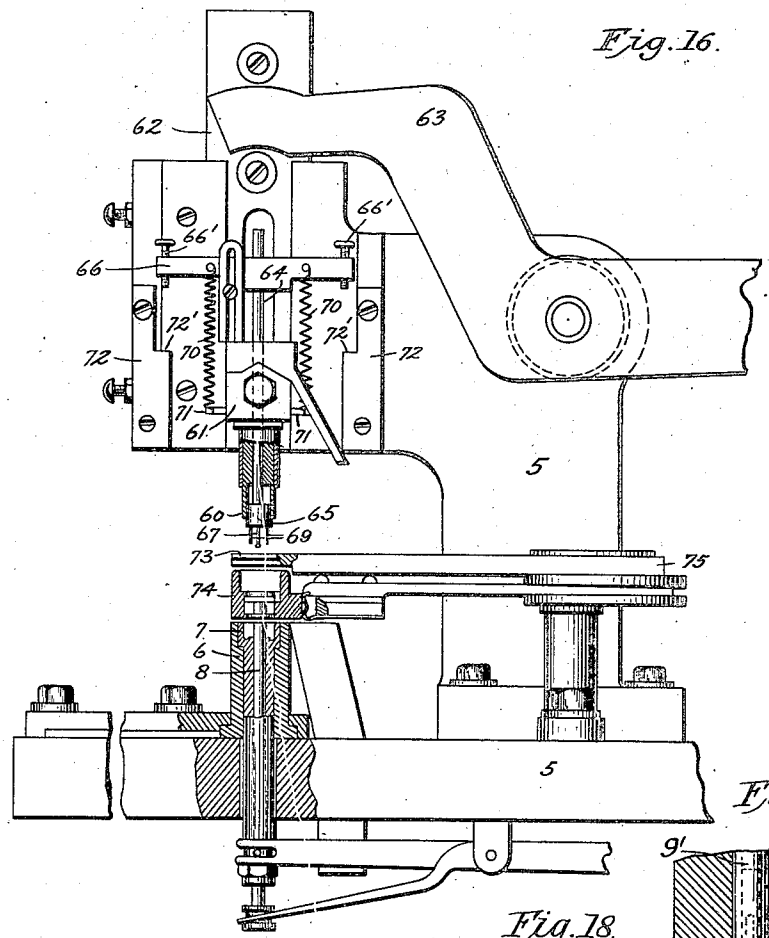


Fig. 17.

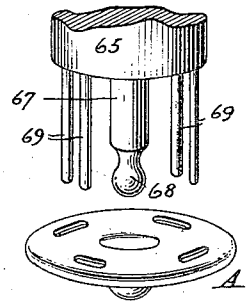


Fig. 18.

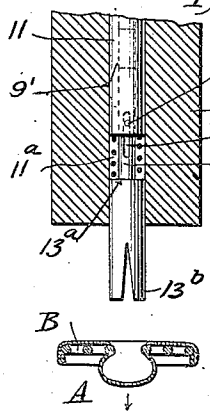


Fig. 19.

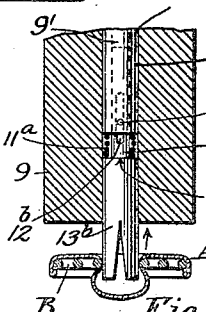


Fig. 19a



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UNITED STATES PATENT OFFICE.

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MECHANISM FOR SORTING THE SOCKET MEMBERS OF SNAP FASTENERS.

1,421,715. Specification of Letters Patent. Patented July 4, 1922.

Application filed January 9, 1920. Serial No. 350,361.

(GRANTED UNDER THE PROVISIONS OF THE ACT OF MARCH 3, 1921, 41 STAT. L., 1313.)

To all whom it may concern:

Be it known that I, VOJTĚCH PUC, a citizen of the Republic of Czechoslovakia, residing at Prague-Vinohrady, in Bohemia, have invented certain new and useful Improvements in Mechanism for Sorting the Socket Members of Snap Fasteners, (for which I have filed applications in Austria, filed Aug. 24, 1914, patented Feb. 17, 1917, No. 74,271; in Germany, filed Aug. 29, 1914, patented Dec. 20, 1918, No. 309,872).

My invention relates to a sorting mechanism particularly adapted for use in connection with presses employed in the production of snap fasteners and similar articles, and especially for use in presses for the production of the socket members or "uppers" of such fasteners, the object of the mechanism being to separate the defective articles from the properly formed ones.

Heretofore, in presses, and particularly those used for the production of snap button sockets in which there is an inserted spring, use has been made of a reciprocally moving stripper which, after the article is finished, grasps it in a suitable manner and carries it to a collecting receptacle. In presses of this kind, however, the proper insertion of the spring in the required position in the button for the desired retention of the corresponding stud or button head of the fastener is by no means assured, as it is always possible to produce socket members in which the springs do not extend through the circumferential slots in the cap of the socket in such manner as to grasp the neck portion of the stud to thereby effect the locking of the fastener.

The strippers, as above described, make no provision for separating defective articles and they are stripped with the good articles into a common receptacle, and must later be sorted out by hand. Such sorting is laborious, consumes a great deal of time, and is attended with considerable expense.

The present invention eliminates this defect by the provision of a catch or sorting-pin preferably shaped like the head of the stud of a fastener, and so positioned on the press that it may be moved into engagement with the finished articles. Preferably the pin is so shaped that if the article has no defect, it will releasably unite with the catch and be brought into engagement with a stripper adapted to remove it from the catch and convey it to a suitable receptacle for the reception of good articles. Thus, articles without springs, or with bent or misplaced springs, do not unite with the catch and are engaged by other stripping mechanism which conveys them to a receptacle for defective articles. The sorting pin may be so shaped or constructed as to engage and become locked to defective or improperly-formed articles and separate them from good or well-formed ones, but I prefer the construction first mentioned.

In the accompanying drawings, in which Figures 1 to 10, inclusive, show the preferred embodiment of my invention:

Figure 1 represents a section through a portion of a button press equipped with my improvements;

Figure 2 is a plan view of the part of the machine shown in Figure 1;

Figure 2[a] is a vertical section through that portion of the machine which removes defective buttons.

Figure 3 is a detail perspective view of the stripper for removing good articles from the sorting pin;

Figure 4 shows the position of the catch and stripping mechanism, when the catch has first moved into engagement with the finished article;

Figure 5 shows the mechanism in position to strip a well-formed article from the sorting pin;

Figure 6 shows the stripping mechanism in position to remove defective articles from the press;

Figure 7 represents a plan view of a button having the inserted spring properly formed;

Figure 8 shows in detail the catch for engaging the button, a good button being shown in section beneath the catch;

Figure 9 shows a plan view of the button with an improperly-formed and improperly-inserted spring;

Figure 10 represents the catch or sorting pin about to be inserted into the socket of a fastener having an improperly formed spring, as shown in Figure 9, the button being shown in section;

A modification of my invention is diagrammatically shown in Figures 11, 12 and 13, in which:

Figure 11 shows the parts in position to strip the buttons;

Figure 11[a] is a perspective view of the stripper member employed in this modification;

Figure 12 shows the mechanism in retracted position to permit the operation of the punch for curling the edges of the buttons;

Figure 13 shows in detail a portion of the stripper for removing defective buttons from the matrix;

Figures 14 and 15 show a further modification of the invention;

Figure 14 shows the parts in position to strip good buttons from the sorting pin;

Figure 14[a] is a perspective view of the stripper member employed in this modification;

Figure 15 shows the parts in position to move the buttons into engagement with the sorting pin.

Another modification of the invention is shown in Figures 16 and 17, in which the machine is adapted to sort socket members not only having defective springs, but also those members which have defective thread holes;

Figure 16 is a side elevation, partly in section, of the machine for inserting the springs and sorting the good and defective buttons.

Figure 17 shows in detail the end of the sorting pin which I employ in this construction.

Figures 18, 19 and 19[a] illustrate a modification in which the sorting pin is adapted to engage defective buttons instead of good ones.

In the drawings, 5 indicates a portion of the frame of a press for forming the socket members of snap fasteners. A support 6 is provided in which is secured the matrix 7 suitably formed to curl over the edges of the buttons to retain the springs in position. Positioned in the support 6 and adapted to reciprocate in a central opening in the matrix 7 in the usual manner is a punch 8 of known construction, and which is actuated by suitable mechanism, such as a yoke 8[a] at the end of the lever 8[b] pivoted to the frame at 8[c] and actuated by proper cam mechanism not shown, for raising the finished buttons from the matrix at the proper time. Arranged directly over the matrix 7 is a vertically reciprocable closure punch 9, also of known construction, and adapted to cooperate with the matrix to curl the edges of the buttons to retain the springs. The closure punch 9 may be actuated in the usual manner by a suitable cam mechanism indicated diagrammatically at 10. Passing through the center of the punch 9 is a rod or sorting pin 11 adapted to be reciprocated independently of the punch 9 by a suitable cam mechanism, as indicated diagrammatically at 12. In accordance with the present invention, the lower end of the pin 11 is formed to correspond to the member of the fastener with which the product of the press is adapted to cooperate. When the mechanism is used for sorting socket members of snap buttons, the end of the pin 11 is preferably formed in the shape of a button-stud, as indicated at 13.

Supported in the frame 5 in such a manner that it may be horizontally reciprocated across the top of the matrix 7 by means of a suitably power driven cam, or other mechanism, indicated at 15, is a frame 16 adapted to carry the stripping mechanism. The stripping mechanism comprises an upper stripper 17 and a lower stripper 18. The upper stripper 17 (shown in detail in Figure 3) comprises a block suitably secured to the reciprocating frame 16 and having its projecting end bifurcated, as shown at 19, and under-cut, as shown at 20.

The lower stripper 18 is preferably carried on a pivot 21 in the supporting member 22 bolted to the frame 16, in such a way that it may have a slight upward movement, meeting yielding resistance by the free top end of the spring 23[a]. It is prevented from moving downward by the lower curved portion of the sprnig. The upper face of the stripper 18 is hollowed out to form a receptacle 24 therein for the reception of good buttons removed by the stripper 17. At one side of the receptacle so formed is a laterally extending spout 25. The floor of the receptacle is formed of a disk 26 on the end of a bolt 27, the lower end of the bolt comprising a second disk 28 in the recess 23′.

The compression spring 29 of a little greater strength than spring 23[a], but weaker than said spring plus the weight of the member 18, is provided for urging the disk 28 downwardly so that the face thereof is even with the lower face of the stripping member 18. A pin 30 may be provided on the member 16 to which may be secured one end of a tension spring 31. The other end of the spring 31 is secured to the stationary frame of the press, whereby the spring may coact with the cam 15 to return the stripping mechanism to retracted position. A double hopper is suitably supported in the frame beneath the stripping mechanism and is provided with a compartment 32 for good buttons, and a compartment 33 for defective buttons, the shape of the hopper being shown in plan in Figure 2. The lower portion of these compartments may be provided with spouts to carry the respective contents to proper receptacles. In practice, the cams 10, 12 and 15 and the punch 8 are driven in synchronism from a common source of power whereby the various elements function in the proper order to accomplish the finishing of the articles and the sorting of

the buttons in the manner hereinafter described.

The spring B and the socket blank A are first fed to the matrix, the closure punch is moved down and the edges of the button blank are curled over the spring B to retain the latter in position. The article thus formed is shown in Figures 7 and 8. Then, as the closure punch withdraws, the sorting pin 11 moves downwardly until the head 13 engages the socket of the fastener member A, as shown in Figure 4. If the button is not defective and the spring is correctly positioned, as in the button shown in Figures 7 and 8, it will detachably lock to the head 13 of the sorting pin 11. The pin 11 will then be raised, and at the same time, the stripping mechanism will advance across the top of the matrix, the pin 11 passing between the bifurcated portion of the stripper 17 until the fastener member will engage the undercut portion of the stripper, the parts at this time being in the position shown in Figure 5. Upon slight additional upward movement of the stripping pin, the socket member will snap off into the receptacle 24 and pass through the spout 25 into the compartment 32 of the hopper.

If, on the other hand, the spring of the button member is defective, as indicated in Figures 9 and 10, the article will not be raised from the matrix by the sorting pin and will remain therein until the disk 28 of the lower stripper 18 is positioned thereover, when the defective button will be pushed against said disk and forced into the recess in which the disk operates by the lower punch 8.

After the defective button has been pushed out of the matrix against the disk 28 and into the recess 23′, the stripper 18 moves quickly to the right owing to the shape of the cam 15. This movement is so quick that the button is moved over the upper surface of the part 6 before it can drop back into the matrix. As soon as the stripper 18 has moved entirely away from the matrix the spring 29 expands and the disk 28 pushes the defective button into the hopper or receptacle 33. This operation is repeated every time a button is pressed, whereby all defective socket members may be sorted from the good ones.

In the embodiment of the invention shown in Figures 11, 12 and 13, the good buttons are removed from the sorting pin by a stripper 35 having an open end 36 and which is bifurcated at the top at 37. The under side of the stripper 35 is closed so that buttons snapped from the sorting pin slide down the sloping passage 38 into a suitable container. The defective buttons, on the other hand, are raised from the matrix by the punch 8. The defective buttons will be pushed off from the punch 8 after they have been raised out of the matrix by a stripper 41 having sharp edges, as indicated at 42, the stripper being shown in detail in Figure 13. Any suitable mechanism may be provided for operating the two strippers, such as two cams 43, 44.

In the construction indicated in Figures 14 and 15, the sorting pin 50, provided with the stud shaped end, is vertically reciprocable in the horizontal reciprocating stripping frame 51, a coil spring 52 being provided to normally urge the pin downward. Passing through the stripping frame 51 is a stripper 53 reciprocable independently of the frame. A second stripping mechanism 54 may be provided for removing defective buttons, said second stripper moving independently of the first and of the stripper frame. For operating the various parts, I have shown, diagrammatically, a suitable cam mechanism, indicated at 55. The construction of the stripper 54 is similar to the member 18 described in connection with the preferred form of my invention, illustrated in Figures 1 to 10, inclusive. The stripper frame is slotted, however, to permit of the reciprocation of the stripper 54 independently of the stripping frame. In this instance, the matrix 7 of ordinary construction, hereinbefore described, is supported in a vertically reciprocable member 56. A central punch 8 of usual construction, is also provided, which may be reciprocated in a vertical direction independently of the matrix.

In operation, after the closure punch, not shown, has operated, the stripper frame 51 is advanced over the matrix and the matrix is then lifted to the dotted line position shown in Figure 15, until the button member engages the sorting pin 50. If the button is good, it will fasten to the pin, and the matrix will move downwardly. When it has moved to its lowermost position, the lower stripper will then be advanced thereover and the stripper 54, together with the stripper frame, will begin to move simultaneously to the retracted position. At the same time, the stripper 53 will move in the opposite direction. If a button is locked to the pin, it will be stripped therefrom by the stripper 53, and fall into the receptacle in the lower stripping member 54. If, however, the article is imperfect it will not be removed from the matrix until the matrix has reached its lowermost position, when the central punch 8 will actuate to force the imperfect button into the recess in the lower face of the stripper 54. Upon the stripper 54 being moved to retracted position, the imperfect button will be dropped into a proper receptacle in the manner hereinbefore described in connection with the preferred form of my invention.

In the embodiment of the invention shown in Figures 16 and 17, 5 is a punch frame, 6 the matrix support, 7 the matrix, and 8 the

central punch member reciprocable in the matrix in the manner hereinbefore described. The punch for curling the edges of the buttons is indicated at 60 and is supported in a chuck member 61 carried on the slide 62. A suitable rock arm 63 may be provided for reciprocating the slide. Passing centrally through the punch 60 and chuck 61 is a rod 64 provided on its upper end with a cross bar 66. On the outer ends of the cross bar 66 are set screws 66′. The lower end of the rod 64 is provided with an enlarged member 65 which carries a central pin 67 having the pear-shaped end 68 for sorting buttons, as hereinbefore described. Surrounding the central sorting pin 67 are a plurality of smaller pins 69, the number of the pins 69 and their location depending on the number and location of thread holes in the articles to be sorted. For moving the cross bar 66 and the rod 64 with the punch 60, I provide tension springs 70 connected to the cross bar and to pins 71 on the chuck member 61. Provided at both sides of the chuck member 61 are bars 72 having shoulders 72′ thereon, which shoulders are in the path of the set screws 66′ whereby the downward movement of the cross bar is limited. The form of stripping mechanism described in connection with Figures 1 to 10 of my invention is indicated at 73 and 74. Cam mechanism is shown at 75 for reciprocating the strippers in the usual manner.

In machines of this kind the spring members are ordinarily formed in one part of the machine and the button blanks cut and punched in another part. The mechanism for moving the button blanks from the forming punch to the matrix is such that the button is not turned and the thread holes assume the same relative position in the matrix. In the operation of the machine shown in Figures 16 and 17 after a spring and a socket blank have been placed in the matrix in the usual manner, the rock arm 63 is actuated to move the punch 60 into engagement with the button blank to curl the edges thereof around the spring. As the punch 60 moves down, the rod 64 is also moved down by reason of the tension of the springs 70. If the spring in the socket member is well formed and the thread holes are well formed, the socket member will adhere to the sorting pin as the punch is withdrawn from the matrix and the buttons so formed will be stripped by the member 73. If, however, the spring is defective or the thread holes are not properly formed, the socket will not adhere to the sorting pin and will be stripped in the manner hereinbefore described by the member 74.

The screws 66′ are for the purpose of exactly adjusting the mechanism in order that the end 68 of the punch 67 and the pins 69 may go to the proper depth in the button. In the operation of the machine the punch 60 is subject to considerable wear and frequent adjustment is required to insure the proper penetration of the parts 68 and 69. This adjustment is obtained by the adjustment of the parts 66′, 64 and 65. When all the thread holes are perfect and the socket is perfect the parts 68 and 69 properly enter the thread holes and the socket but if one or more of the holes is imperfect or the socket is not well formed the part 65, carrying the members 68 and 69, will yield, this yielding action being afforded by the spring 70.

While I have described the preferred forms of my invention, it is obvious that other changes may be made within the scope of the appended claims. It is also contemplated that the invention may be used for sorting other articles than the sockets of spring inserted fasteners.

While I have shown machines adapted to sort well formed buttons from defective ones, in which a sorting pin is constructed and operated to engage good buttons, the sorting pin may be so constructed and operated as to engage defective buttons and separate them from the good ones. This is illustrated in Figures 18 and 19. In this case the closure punch 9 is equipped with a sorting pin 11 having a button engaging end 13^b of such size that it will not pick up a good button (Figure 18), where the spring properly enters the socket member, but will pick up a defective one (Figure 19), where the spring does not properly enter the socket. As shown, the part 13^b is cylindrical and has a plane lower end that is bifurcated and at its upper end is formed with a part 13′, of reduced diameter, adapted to enter a socket 9′ in the pin 11. A spring 11^a is interposed between the shoulder 13^a and the end of the pin 11. A pin 12^a crosses the socket 9′ and extends through a slot 12^b, serving to hold the part 13 in position on the part 11.

When the sorting pin descends upon a well formed button (Figure 18), the part 13^b will not engage the button inasmuch as it is arrested by the spring B. At this time the spring 11^a yields and the part 13^b rises. But when the device descends upon a defective button, i. e., one where the spring B does not project properly into the socket, the part 13^b will enter the button and frictionally engage it in the manner shown in Fig. 19, i. e., the part 13 is of such size that it will closely fit the socket of the button when it enters so that the button will not accidentally drop off but may be stripped off when desired.

It will, therefore, be understood that while I prefer to so construct the sorting device that it is adapted to engage and become locked to good and well formed but-

tons, I may, if desired, perform the sorting operation by causing the sorting device to engage and become locked to defective buttons. Otherwise the construction and operation of the latter type of machine is similar to that first described.

I claim as my invention:—

1. A machine for sorting good and defective articles comprising a sorting pin for detachably locking to some of the articles, means for bringing the sorting pin into engagement with articles to be sorted, and means for stripping articles from the sorting pin.

2. A sorting mechanism comprising a sorting pin having means thereon for detachably engaging some of the articles, means for presenting the articles to be sorted beneath the sorting pin, means for bringing the articles into engagement with the sorting pin, means for detaching articles from the sorting means, and means for removing other articles from beneath the sorting means.

3. In combination with a press having a matrix for forming articles, a punch cooperating with the matrix, a sorting mechanism comprising a sorting pin, means on the sorting pin for detachably uniting with some articles formed in the matrix, means for projecting the sorting means into the matrix after each article is finished whereby articles may detachably unite with the sorting means, means for stripping the articles from the sorting means, and means for removing other articles from the matrix.

4. In combination with a press having a matrix for forming articles, a punch cooperating with the matrix, a sorting mechanism comprising a sorting pin, means on the sorting pin for detachably uniting with some articles formed in the matrix, means for projecting the sorting means into the matrix after each article in finished, whereby articles may detachably unite with the sorting means, means for stripping the articles from the sorting means, and means for removing other articles from the matrix, said means comprising a reciprocating member.

5. In combination with a press for forming articles having a matrix, and a punch cooperating therewith, a pin for removing articles from the matrix and moving them to one place, and other means for removing other articles from the matrix and moving them to a different place.

6. In combination with a press for forming articles having a matrix and a punch cooperating therewith, a sorting means for detachably locking to some articles in the matrix, means for stripping articles from the sorting means and moving them to one place, and other means for removing other articles from the matrix.

7. In combination with a press having a matrix and a punch cooperating therewith for forming socket members of snap fasteners, a sorting pin having means thereon for detachably uniting with some socket members, means for moving said sorting pin into engagement with finished socket members in the matrix after each socket member is completed, means for stripping such sockets as adhere to the sorting pin and moving them to one place, and other means for removing those sockets from the matrix which do not unite with the sorting pin.

8. In combination with a press having a matrix and a punch cooperating therewith for forming socket members of snap fasteners, a sorting pin having means thereon for detachably uniting with some of said socket members, means for moving said sorting pin into engagement with finished socket members in the matrix after each socket member is completed, means for stripping such sockets as adhere to the sorting pin and moving them to one place, and another stripper for removing the articles which remain in the matrix and conveying them to another place.

9. The combination with a press for forming articles, said press having a matrix in which the articles are finished and a punch cooperating with the matrix, the matrix also having another punch member therein, of a sorting mechanism comprising a sorting pin passing through the center of the first named punch and reciprocable independently thereof, means on the sorting pin for detachably uniting with some articles formed in the matrix, means for projecting the sorting pin into the matrix after each punching operation, means for removing the articles that adhere to the sorting pin upon the withdrawal thereof from the matrix, means for collecting the articles so removed, and other means cooperating with the reciprocable punch in the matrix for removing other articles remaining in the matrix after the withdrawal of the sorting pin.

10. The combination with a press for forming articles, which press is provided with a matrix in which the articles are finished, and a punch for co-operating therewith, of a sorting mechanism comprising a pin adapted to enter said matrix after each punching operation, means on said sorting pin to which some articles detachably unite, and stripping mechanism movable across the top of the matrix, said stripping mechanism comprising means for removing articles from the sorting pin, and other means for removing other articles from the matrix.

11. The combination of a press having a matrix for finishing articles and a punch cooperating therewith, a double hopper positioned near said matrix and having a compartment for good buttons on one side and a compartment for defective buttons on the

other side, a sorting pin movable into and out of the matrix after each punching operation and having means thereon for detachably uniting with some articles formed in the matrix, a stripping mechanism adapted to move over the matrix upon the withdrawal of the sorting pin from the matrix, means on the stripping mechanism for removing the buttons from the sorting pin and conducting them into the first compartment, and other means on the stripping mechanism for transferring defective articles to the compartment for defective articles.

12. A machine for sorting good and defective snap socket members having a socket and thread holes, said machine comprising a sorting member having a central sorting pin adapted to detachably engage socket members, other pins surrounding the sorting pin and corresponding in number and position to the thread holes in the articles to be sorted, means for yieldably moving the articles to be sorted into engagement with the sorting member, and means for stripping such articles as adhere to the sorting member and conducting them to a suitable receptacle.

In testimony whereof, I have hereunto subscribed my name.

VOJTĚCH PUC.