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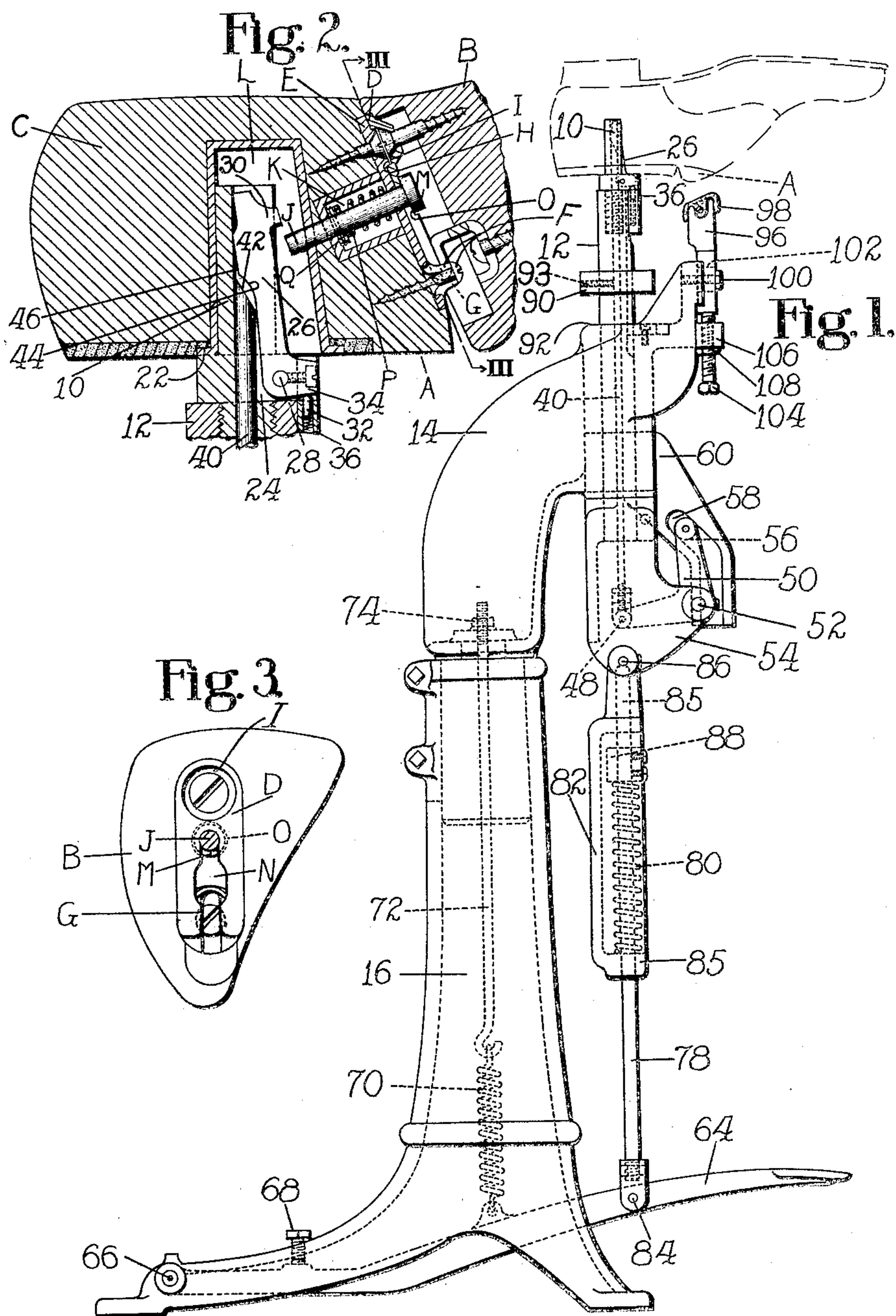
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MACHINE FOR OPERATING ON LASTS

Filed March 12, 1930

2 Sheets-Sheet 1



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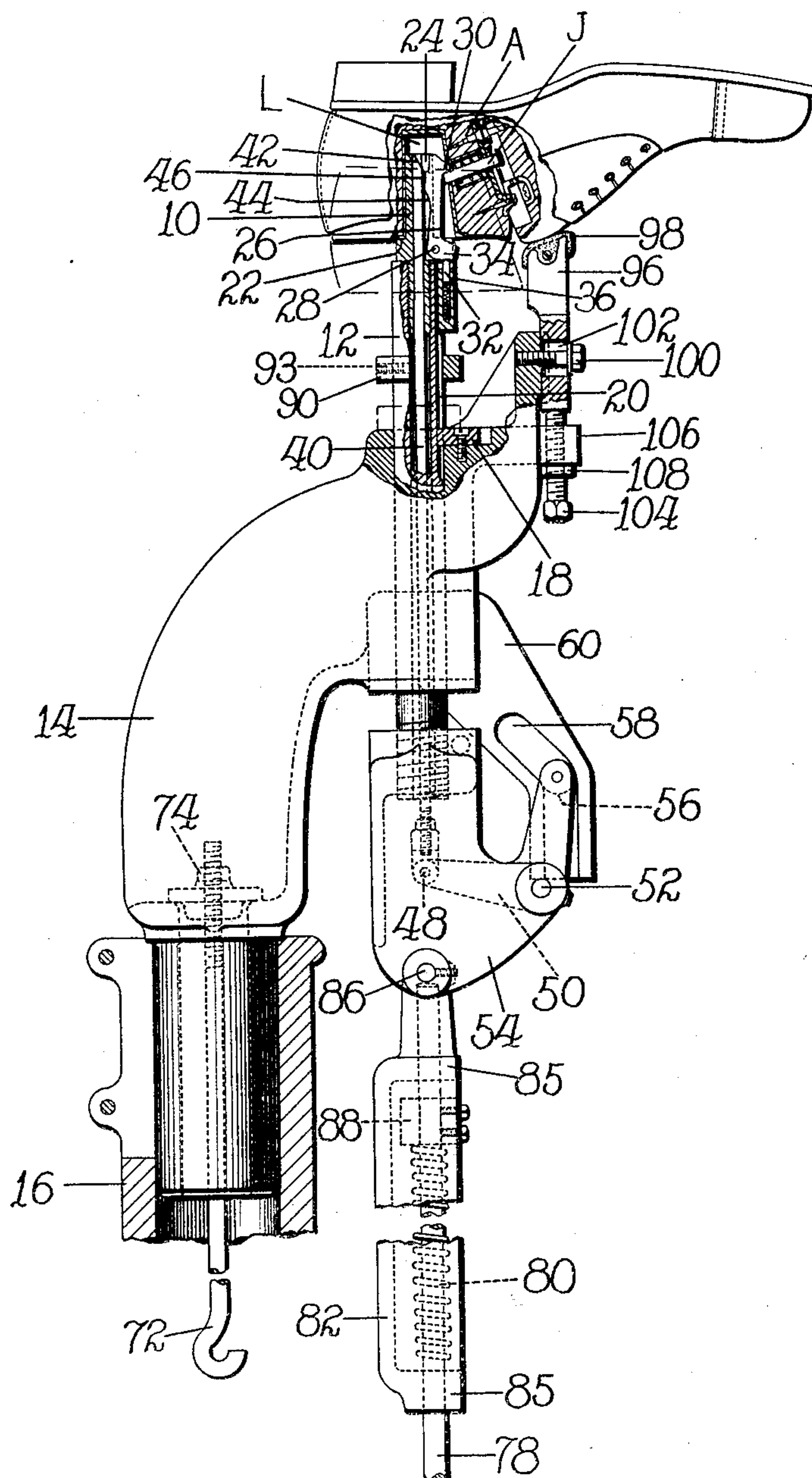
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Fig. 4.



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MACHINE FOR OPERATING ON LASTS

Application filed March 12, 1930. Serial No. 425,302.

This invention relates to machines for operating on lasts. The invention is herein illustrated as embodied in a machine particularly adapted to disassemble the foreparts and heel parts of separable lasts of the type in which the forepart and the heel part are held in assembled relation by means comprising a latch which is releasable from within the jack pin thimble hole in the heel part of the last, and including interengaging bonding devices which are disengageable after release of the latch to disconnect the last parts and to effect separation or disassembly of those parts by relative tilting and sliding movements thereof. A last of this general type is disclosed in a copending application Serial No. 386,034, filed August 15, 1929, in the name of G. P. S. Cross now matured into Patent 1,856,127 of May 3, 1932. The illustrated machine is also especially designed to operate upon a separable last, the parts of which are assembled and secured together within a shoe, to disassemble the last parts after such operations as are customarily performed upon a lasted shoe have been completed, and to pull the heel part of the last at least part way out of the shoe. The invention, however, is not limited to machines for operating upon lasts of the type referred to inasmuch as machines embodying certain features of the invention may be useful in operating upon movable-heel-part lasts the parts of which are capable of being collapsed but not entirely disconnected. Neither is the invention necessarily limited to machines for relatively moving last parts for the purpose of collapsing or disassembling them.

In using separable lasts in the manufacture of shoes, the forepart and the heel part of a last of that type are separately placed within a shoe which is in process of manufacture and thereafter the parts of the last are connected together by first tilting or rotating the forepart of the last heightwise relatively to the heel part and thereafter sliding the forepart in a heightwise direction. A machine for thus connecting the foreparts and heel parts of separable lasts is disclosed in a copending application Serial No. 435,301, filed March 12, 1930, in the name of the

present inventor. After operations such as are customarily performed upon a lasted shoe have been completed, the parts of the last must be disassembled and removed from the shoe. To disassemble the last parts they must first be relatively tilted and thereafter relatively slid heightwise of the shoe in a direction opposite to that in which they were slid in the act of assembling them. Manual disassembly of the parts of a separable last within a shoe is impracticable chiefly because of the resistance offered by the shoe to the necessary relative movements of the last parts.

One object of the present invention is to provide a machine which will be adapted for use in disassembling the foreparts and heel parts of separable lasts.

With this object in view, one feature of the invention consists in the provision, in a machine for disassembling the foreparts and heel parts of separable lasts having interengaging bonding elements, of means for supporting one of the parts of such a last, and means for effecting relative movement between the last parts in a direction to disengage the bonding elements and disassemble the last parts.

The separable lasts upon which the illustrated machine is designed to operate have their foreparts and heel parts latched in assembled relation, as hereinbefore explained, and, in order to disassemble the parts of such a last, the parts must first be unlatched, after which it is necessary to tilt and also to slide one of the last parts relatively to the other heightwise of the last. Accordingly, for the purposes in view, the illustrated machine comprises a fixed abutment for engaging the forepart of a separable last, and a downwardly movable jack pin which is adapted to enter the thimble hole in the heel part of the last and which has connected therewith treadle-operated mechanism for releasing the latch in the last and for clutching the jack pin to the last so that when the jack pin is lowered it will move the last forepart into engagement with the abutment and thereafter exert a positive downward pull on the heel part of the last to effect the necessary rela-

tive tilting and sliding movements of the last parts. Moreover, in separable lasts of the general type above referred to, the bonding elements are normally interengaged in such a manner that they are not free to slide relatively to one another for the purpose of disengaging them until the last parts have first been tilted relatively to one another. Accordingly, in the illustrated machine the last parts are first tilted relatively to each other to render the bonding elements capable of relative sliding movement, and thereafter the heel part of the last is slid relatively to the forepart to disengage the bonding elements and separate the last parts and to remove the heel part of the last at least partially from the shoe.

The invention further consists in features of construction and combinations and arrangements of parts hereinafter described and claimed.

In the accompanying drawings,

Fig. 1 is a side elevational view of a machine constructed in accordance with the present invention;

Fig. 2 is a fragmentary sectional view of a separable last of the type upon which the machine is particularly designed to operate;

Fig. 3 is a view, partially in elevation and partially in section, on the line III—III of Fig. 2; and

Fig. 4 is a view, partially in side elevation and partially in section, and on an enlarged scale, of a portion of the machine shown in Fig. 1.

The machine herein illustrated is designed to operate upon a separable last A which, except in certain particulars hereinafter pointed out, is similar to the last disclosed in the copending application Serial No. 386,034 hereinbefore mentioned now matured into Patent 1,856,127 of May 3, 1932. Referring particularly to Figs. 2 and 3 of the drawings in the present application, the illustrated last, in common with the last shown in said application, comprises a forepart B and a heel part C which are firmly fastened together by interengaging bonding elements while the last is in use but which are adapted to be entirely separated one from the other to facilitate the insertion of the last in a shoe or the removal of the last from a shoe. As shown, the complementary inclined end faces of the forepart B and the heel part C are recessed to receive metallic plates D and E, respectively. The plate E carries a bonding element F which is arranged to co-operate with a complementary bonding element formed by slotting the lower portion of the plate D as indicated at G. The bonding elements just referred to are adapted to be engaged and disengaged by relative heightwise sliding movement of the last parts, although the construction of these elements in such that normally, when the last parts are assembled,

they are locked against such sliding movement but are adapted to be unlocked by a preliminary relative tilting or rotational movement of the last parts about a transverse horizontal axis. As a further means for maintaining the last parts in assembled relation a projection or boss H on the plate E is arranged to engage within a corresponding depression I on the plate D and the projection H and the depression I are arranged to be disengaged, preparatory to collapse of the last, by the preliminary relative rotating or tilting of the last parts above referred to. All the parts so far described are substantially the same in construction and operate in substantially the same manner as that of corresponding parts disclosed in the above-mentioned copending application Serial No. 386,034 now matured into Patent 1,856,127 of May 3, 1932. The illustrated last is also provided with additional means for holding together the last parts, this means consisting of a latch which differs in construction and mode of operation from that of the latch employed for a similar purpose in the last of said application. The latch in the illustrated last comprises a pin or bar J which is longitudinally slidable in the heel part C of the last. As shown, the latch pin J extends through the plate E, through a socket K in the heel part C, and projects into the jack pin thimble hole L of the last. At its forward end the latch pin J is provided with a head M which is adapted to be received in an enlarged portion N of the slot G in the plate D (see Fig. 3), the construction being such that when the last parts are in assembled relation the portion of the latch pin immediately behind the head M engages within a contracted upper portion of the slot in the plate D, while the head M bridges portions of the plate D at opposite sides of the slot and is seated in a countersunk recess O formed in the inner side of the plate. The latch pin J is acted upon by a coiled spring P which surrounds the pin within the socket K, one end of the spring bearing against the plate E and the opposite end against a collar Q on the latch pin. The spring P thus tends to hold the latch in operative position with the head M of the latch pin J seated in the countersunk recess O and thus to hold the last parts in assembled relation and to lock them against relative sliding movement such as would disengage the bonding elements F and G. When the latch is released, however, the last parts are rendered capable of both tilting and sliding relatively to each other whereupon the forepart of the last may be tilted relatively to the heel part about a transverse horizontal axis to disengage the boss H from the recess I and thereafter the last parts may be slid relatively to one another heightwise of the last to disengage the bonding elements F and

G. The last parts will then be entirely disconnected and may be removed separately from the shoe.

In the machine illustrated in Figs. 1 and 4, the jack pin is indicated at 10. As shown, the threaded lower portion of the jack pin 10 is screwed into the upper end of a tubular carrier 12 which, together with the pin 10, constitutes a last-supporting jack. The jack pin carried 12 is guided for vertical sliding movement in the forwardly offset upper portion of a head 14 which surmounts a hollow pedestal 16. A key 18 (Fig. 4) rigidly secured to the head 14 projects into a vertical keyway 20 in the carrier 12 to prevent turning of the carrier in its guideway in the head 14. The upper part of the jack pin is adapted to be projected into the thimble hole L in the last A to an extent determined by the engagement of a shoulder 22 on the jack pin with the top face of the cone of the last. The jack pin is slotted at 24 to receive a dog 26 which functions to release the latch pin J of the last and also, by engagement with the latch pin, to clutch the jack pin to the heel part of the last. The dog 26 is pivoted at 28 to the jack pin to enable the dog to be swung into actuating engagement with the latch pin J and the upper extremity of the dog is hook-shaped, as indicated at 30, to overlies the portion of the latch pin which projects into the thimble hole L to establish a positive connection between the jack pin and the heel part of the last. Normally the dog 26 is maintained inoperative and disengaged from the latch pin J by means of a spring-pressed plunger 32 which bears against a tail 34 on the dog. The plunger 32 is mounted in a socket formed in a block 36 which is rigidly secured to the jack pin carrier 12. The block 36 is located between the side walls of the keyway 20 and thus serves to prevent the jack pin from turning within the tubular carrier 12. The dog 26 is adapted to be moved into operative position by means of an actuator rod 40 which is slidable within a central bore in the jack pin 10 and which extends downwardly through the tubular carrier 12. The upper end of the rod 40 is formed with a cam face 42 adapted to coact with a curved edge face 44 on the dog 26 to operate the latter to release the latch pin J after which the side of the rod 40 bears against a straight edge face 46 on the dog to hold the latter in operative position with the hooked upper end of the dog engaging the latch pin so as positively to connect the jack pin with the last and to hold the latch pin in released position. At its lower end the rod 40 is pivoted at 48 to one arm of a bell crank lever 50 that is fulcrumed at 52 to a yoke frame 54 which is screwed to the lower end of the carrier 12. The bell crank lever 50 carries a cam roll 56 which projects

into a cam slot 58 formed in an extension 60 of the head 14.

The jack pin 10 is actuated by a treadle mechanism comprising a foot treadle 64 (Fig. 1) which is pivoted at 66 to the base of the pedestal 16 and is normally maintained at an elevation determined by its engagement with a stop screw 68 by means of a spring 70 connected at its lower end to the treadle and at its upper end to a rod 72 which extends upwardly through the bottom of the head 14 and is supported in the head by means of a nut 74 on the rod. The nut 74 may be turned to vary the tension of the spring 70. The treadle 64 is yieldingly connected with the yoke frame 54 by means comprising a treadle rod 78, a coiled spring 80, and a link 82, the rod 78 being pivoted at 84 to the treadle and extending through spaced guideways 85 in the link 82 and the link 82 being pivoted at 86 to the yoke frame 54 while the spring 80 encircles the rod 78 between the lower guideway 85 and a collar 88 which is rigidly secured to the rod 78 but may be adjusted on the rod to vary the compression of the spring 80. Upon depression of the treadle 64 the jack pin 10 is lowered through the yielding connections above described until its downward movement is arrested by engagement of a collar 90 on the jack pin carrier 12 with a surface 92 on the head 14. The collar 90 is secured in place by means of a set-screw 93 and the extent of downward movement imparted to the jack pin may be varied by adjustment of the collar 90 on the holder 12.

The relative movement of the last parts for the purpose of separating them is effected by continued downward movement of the heel part C after downward movement of the forepart B has been arrested by contact of the latter with a fixed abutment 96 carried by the head 14. The abutment 96 is arranged to engage the top of the forepart of the last at a point near its rear face and, as shown, the abutment is provided with a leather facing 98 for preventing injury to the last. The abutment 96 is rigidly but adjustably secured to the front of the head 14 by a bolt 100 which extends through a vertically elongated slot 102 which is provided in the lower portion of the abutment to permit vertical adjustment of the abutment to accommodate different sizes of lasts.

Adjustment of the abutment 96 may be effected by means of an adjusting screw 104 which is threaded through a lug 106 on the head 14 and engages the bottom of the abutment 96. A check nut 108 is provided for securing the bolt 104 in adjusted position while the abutment itself may be clamped in adjusted position by tightening the bolt 100.

In operation, a separable last with a shoe thereon is placed upon the jack pin 10 in the position indicated by dotted lines in Fig. 1

with the forepart of the last extending toward the operator and being located directly above the fixed abutment 96. The operator then depresses the treadle 64, thus causing the
 5 jack pin 10, together with the last and the shoe, to be lowered, while at the same time, by means of the cam slot 58 and the bell crank lever 50, the actuator rod 40 is raised relatively to the jack pin. This upward movement
 10 of the actuator rod 40 causes the dog 26 to be swung into the position shown in Fig. 4, thereby releasing the latch J in the last and, by engagement of the hooked portion 30 of
 15 the dog with the rear extremity of the latch, clutching the jack pin to the heel part of the last. After the above-described operations have taken place the forepart of the last engages the abutment 96 which arrests further
 20 downward movement of the forepart. The jack pin, together with the heel part of the last, continues to move downwardly, however, and this movement operates through the latch pin first to tilt the forepart of the last in
 25 a direction to disengage the elements H and I and thereafter to slide the heel part of the last downwardly relatively to the forepart, thereby disengaging the bonding elements F and G. The downward movement of the
 30 jack pin continues until the collar 90 engages the head 14 by which time the heel portion of the last has been at least partially removed from the shoe. The release of the foot treadle then results in elevating the shoe, together
 35 with the disassembled parts of the last, and finally in lowering the actuator rod 40 relatively to the last pin, thereby disengaging the dog 26 from the latch J to permit the heel part of the last to be readily removed from
 40 the jack pin. The yielding connection between the treadle 64 and the jack pin afforded by the spring 80 enables the operator to depress the treadle to its full stroke irrespective of any unusual tendency of the heel part of the last to stick in the shoe. Under such con-
 45 ditions, after the treadle has been depressed, the energy stored up in the spring becomes effective upon manipulation of the shoe by the operator to withdraw the heel part of the last. The extent to which the heel part
 50 of the last is withdrawn from the shoe may be varied by adjustment of the collar 90 upon the jack pin carrier 12. The abutment 96 may be adjusted by means of the screw 104 in accordance with the shape and size of the last
 55 being operated upon to insure the release of the latch and the clutching of the jack pin to the heel part of the last before any relative movement is effected between the last parts for the purpose of separating them.

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

65 1. In a machine for disassembling the foreparts and heel parts of separable lasts having interengaging bonding elements, means for

supporting one of the parts of such a last, and means for effecting relative movement between said last parts in a direction to disengage said bonding elements and disassemble the last parts. 70

2. In a machine for disassembling the foreparts and heel parts of separable lasts having interengaging bonding elements, means for supporting one of the parts of such a last, and means for relatively sliding
 75 said last parts in a direction to disengage said bonding elements and disassemble the last parts.

3. In a machine for disassembling the foreparts and heel parts of separable lasts having interengaging bonding elements, means for supporting the heel part of such a last, and means for effecting relative rectilinear sliding movement between said last
 80 parts in a direction to disengage said bonding elements and disassemble the last parts. 85

4. In a machine for disassembling the foreparts and heel parts of separable lasts, means for supporting one of the parts of such a last, and means for relatively moving the last parts first in one direction and there-
 90 after in another direction to disassemble them. 9

5. In a machine for disassembling the foreparts and heel parts of separable lasts, means for supporting one of the parts of such a last, and means for effecting relative rotating and sliding movements between the last
 95 parts in a direction to separate them. 95

6. In a machine for disassembling the foreparts and heel parts of separable lasts, a member for engaging the forepart of a separable last, and means cooperating with said member to tilt the forepart and slide the heel
 100 part of the last in a direction to disassemble the last parts. 105

7. In a machine for disassembling the foreparts and heel parts of separable lasts, an abutment for engaging the forepart of a separable last, and a support for the heel part of the last movable to cooperate with said
 110 abutment to effect relative rotating and sliding movements of the last parts in different directions to disassemble the last parts. 110

8. In a machine for disassembling the foreparts and heel parts of separable lasts, a member for engaging the heel part of such a last, a member for engaging the cone of the forepart of the last, and means for effecting relative tilting movement between
 115 said members in a direction to disassemble the parts of the last. 120

9. In a machine for disassembling the foreparts and heel parts of separable lasts having shoes thereon, a member for engaging the heel part of such a last, a member for engaging the forepart of the last, and means for moving said members in different
 125 directions to disassemble the parts of the last and to remove the heel part of the last at least partially from the shoe. 130

10. In a machine for disassembling the foreparts and heel parts of separable lasts of the type having interengageable bonding elements adapted to be disengaged by relative tilting and sliding movements of the last parts, a jack for supporting the heel part of such a last, a member for engaging the forepart of the last, means for effecting relative movement between said member and the jack to effect relative tilting and sliding movements of the last parts, and adjustable means for determining the extent of relative movement of said jack and said member.

11. In a machine for disassembling the foreparts and heel parts of separable lasts having interengaging bonding elements, a member for engaging the heel part of such a last, a member for engaging the forepart of the last, means for relatively moving said members to disassemble said last parts, and means for adjusting one of said members relatively to the other to accommodate lasts of different shapes and sizes.

12. In a machine for disassembling the foreparts and heel parts of separable lasts having interengaging bonding elements, a member for engaging the heel part of such a last, a member for engaging the forepart of the last, means for relatively moving said members to disassemble said last parts, and adjustable means for determining the extent of relative movement of said members.

13. In a machine for disassembling the foreparts and heel parts of separable lasts having interengaging bonding elements and a latch for assisting in holding the last parts together, means for supporting one of the last parts, means for releasing the latch, and means for relatively moving the last parts in a direction to disengage said bonding elements.

14. In a machine for disassembling the foreparts and heel parts of separable lasts having interengaging bonding elements disengageable by relative sliding movement of the forepart and heel part of the last and having also means for preventing said sliding movement capable of being rendered ineffective by relative rotary movement of the last parts, in combination, a support for one of the parts of such a last, and mechanism for relatively rotating the last parts to render said means ineffective and for relatively sliding the last parts to disengage said bonding elements.

15. In a machine for disassembling the foreparts and the heel parts of separable lasts having interengaging bonding elements and having also a latch releasable from within a thimble hole in the heel part of the last for assisting in holding the last parts together, a jack pin for entering the thimble hole in the heel part of the last to support the last, means carried by the jack pin for releasing said latch, and means for relatively moving

the last parts in a direction to disengage said bonding elements.

16. In a machine for disassembling the foreparts and heel parts of separable lasts of the type in which the last parts are maintained in assembled relation by a spring latch, a jack pin for supporting one part of the last, and means movable relatively to the jack pin in a direction to release said latch to permit disassembly of the last parts.

17. In a machine for disassembling the foreparts and heel parts of lasts of the type in which the last parts are capable of being separated by relative movements thereof but are normally maintained in assembled relation by a spring latch, means for supporting one part of the last, means for releasing said latch, and means for effecting relative disassembling movement of the last parts.

18. In a machine for operating upon separable lasts of the type provided with a jack pin thimble hole and a latch for maintaining the foreparts and heel parts of the last in assembled relation, a jack pin for supporting the heel part of the last, means carried by the jack pin for releasing the latch, an abutment for engaging the forepart of the last, and means coacting with said abutment for relatively moving the last parts.

19. In a machine for operating upon movable-heel-part lasts, a jack pin adapted to enter a thimble hole in the heel part of a divided last, means for clutching the jack pin to the heel part of the last, a member for engaging the forepart of the last, and means for effecting relative movement between the jack pin and said member for relatively moving said last parts.

20. In a machine for operating upon the foreparts and heel parts of separable lasts, a jack pin adapted to enter a thimble hole in the heel part of a separable last, means carried by the jack pin for clutching the jack pin to the heel part of the last, a member for engaging the forepart of the last, and means for effecting relative movement between the jack pin and said member for relatively moving the forepart and the heel part of the last.

21. In a machine for operating upon separable lasts the foreparts and heel parts of which have interengaging bonding elements comprising a latch device releasable from within a thimble hole in the heel part of the last, a jack pin for entering the thimble hole to support the heel part of the last, a fixed abutment for engaging the forepart of the last, means carried by the jack pin for releasing the latch and for coacting with the latch to clutch the jack pin to the heel part of the last, and means for moving the jack pin to engage the forepart of the last with said abutment and thereafter relatively to move the heel part and the forepart of the

last to change the co-relation of said bonding elements.

22. In a machine for operating upon the foreparts and heel parts of separable lasts having interengaging bonding elements of the type comprising a latch pin projecting into a jack pin thimble hole in the heel part of such a last, in combination, a movable jack pin adapted to enter said thimble hole, a fixed abutment for engaging the forepart of the last, a pivoted member carried by the jack pin for connecting the jack pin with said latch pin, a slide rod for actuating said pivoted member, and means movable in one direction to move said pivoted member into operative position and to move the jack pin to effect relative movement of the last parts.

23. In a machine for disassembling the foreparts and heel parts of separable lasts of the type having a jack pin thimble hole and a latch pin releasable from the interior of the thimble hole for maintaining the parts of the last in assembled relation, a hollow jack pin for supporting the heel part of the last, a device carried by the jack pin for releasing the latch pin and clutching the heel part of the last to the jack pin, a member slidable through the jack pin for operating said releasing and clutching device, a fixed abutment for engaging the forepart of the last, and means for moving the jack pin to engage the last with said abutment and thereafter to effect a movement of separation between the forepart and the heel part of the last.

24. In a machine for disassembling the foreparts and heel parts of separable lasts each having two sets of interengaging elements for maintaining the last parts in assembled relation, means for supporting one of the parts of such a last, and means for relatively tilting the last parts to disengage the elements of one of said sets and thereafter relatively sliding the last parts to disengage the elements of the other of said sets.

25. In a machine for disassembling the foreparts and heel parts of separable lasts of the type wherein the last parts are maintained in assembled relation by means comprising a latch constructed and arranged to lock the last parts against relative sliding movement, means for releasing the latch to permit relative sliding movement of the last parts, and means for relatively sliding the last parts in a direction to disassemble them.

26. In a machine for disassembling the foreparts and heel parts of separable lasts wherein said parts are normally maintained in assembled relation by means comprising a latch and two sets of interengaging elements, in combination, means for supporting one of the parts of such a last, means for releasing said latch, and means for relatively moving the heel part and the forepart

of the last in a direction to disengage both sets of interengaging elements.

27. In a machine for disassembling the foreparts and heel parts of separable lasts having interengaging bonding elements of the type comprising a latch pin projecting into a jack pin thimble hole in the heel part of such a last, in combination, a movable jack pin adapted to enter said thimble hole, a fixed abutment for engaging the forepart of the last, a pivoted member carried by the jack pin for connecting the jack pin with said latch pin, a slide rod for actuating said pivoted member, treadle-controlled means movable in one direction to move said rod into operative position and also to move the jack pin to engage the forepart of the last with said abutment and thereafter separate the parts of the last, said means being movable in the opposite direction to retract said rod, and means for moving said pivoted member into inoperative position to release the hold of the jack pin on the last when said rod is retracted.

In testimony whereof I have signed my name to this specification.

ERIC A. HOLMGREN.