Sept. 4, 1928. 1,682,807

O. L. SMITH

MACHINE FOR REMOVING PROJECTING TACKS FROM THE INTERIOR OF BOOTS AND SHOES

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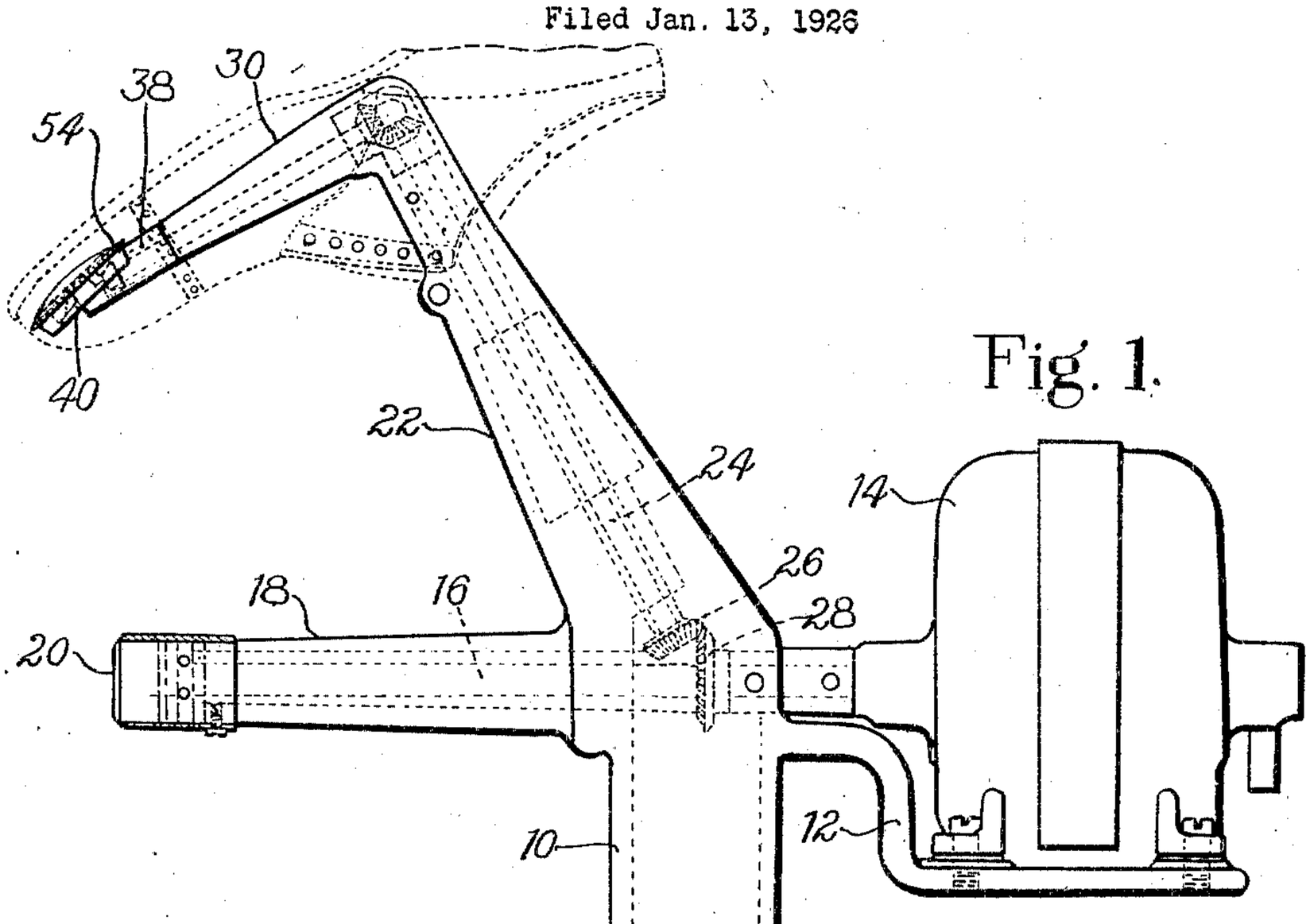


Fig. 1.

Fig. 2.

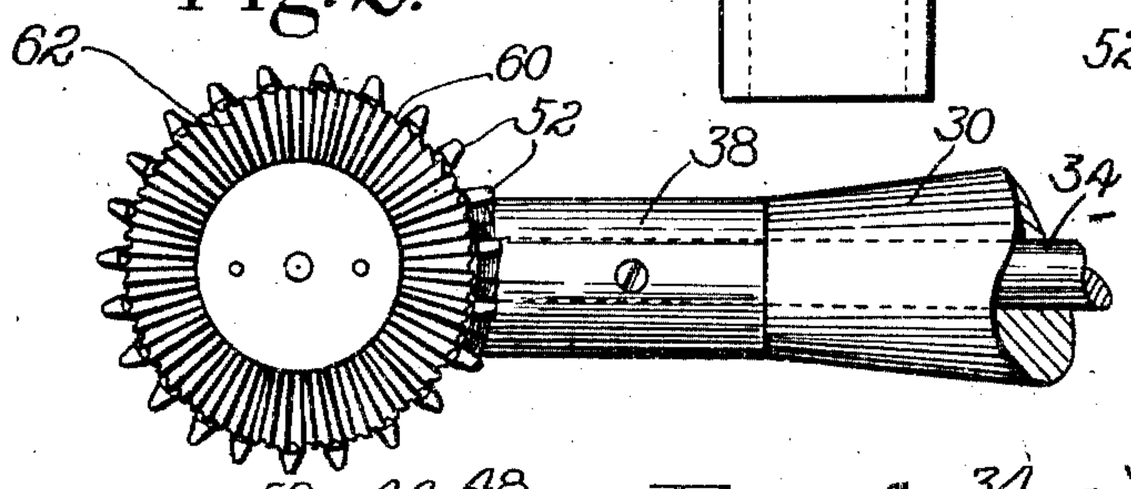


Fig. 3.

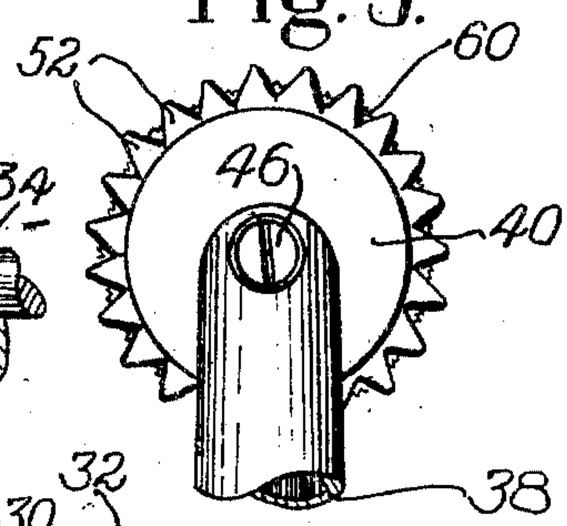


Fig. 4.

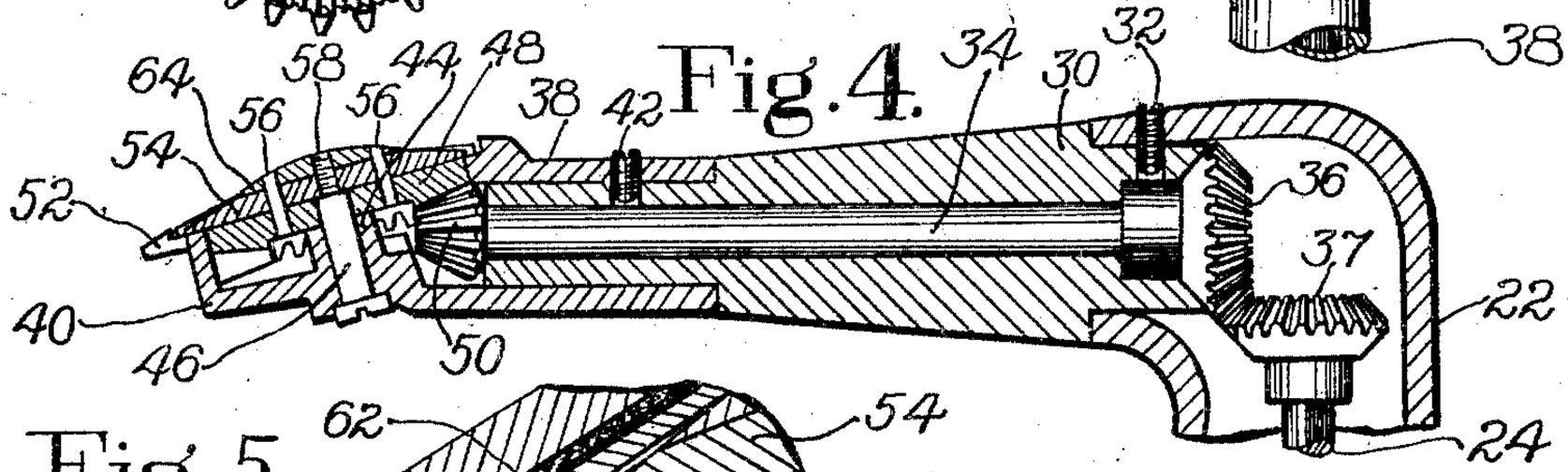
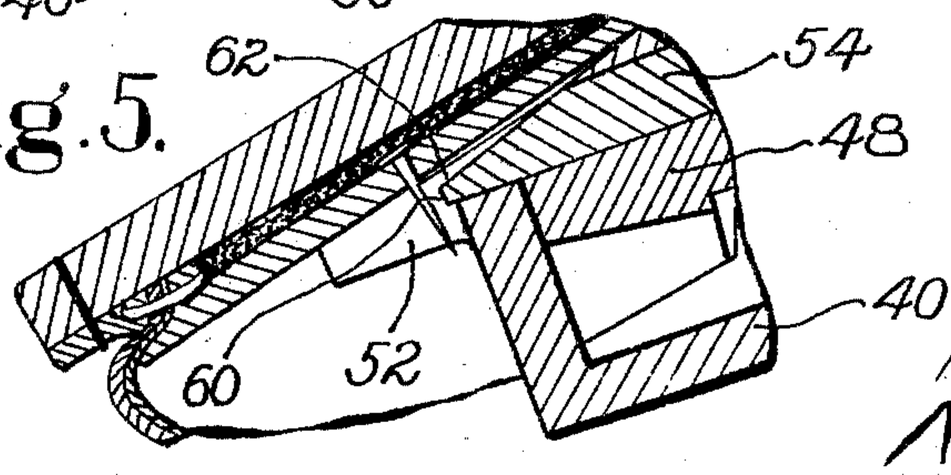


Fig. 5.



INVENTOR

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UNITED STATES PATENT OFFICE.

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MACHINE FOR REMOVING PROJECTING TACKS FROM THE INTERIOR OF BOOTS AND SHOES.

Application filed January 13, 1926 Serial No. 81,006.

This invention relates to machines for removing tacks from the interior of boots and shoes.

In the manufacture of most kinds of shoes tacks are employed to hold the upper, either temporarily or permanently, in lasted position, and in practically all kinds of shoes the sole or insole is secured temporarily to the last by tacks driven through the sole and into the last. These tacks, as well as the temporary lasting tacks, are supposed to be removed before the shoe is completed but it occasionally happens, because of inadvertence or carelessnes or because the head portions of the tacks are broken off or can not be seen, that the tacks or portions thereof remain after a shoe is completed and project into the interior of the shoe where they are a menace to the foot, for example, when the shoe is tried on, and, unless discovered and removed, may cause injury to the foot or stocking.

Objects of this invention are to provide a machine by which such tacks may be discovered readily and may be cut off and smoothed down flush with the inner surface of the sole or insole.

Features of the invention consist in a rotary cutting tool and a relatively stationary tack holding device constructed and arranged, as herein exemplified, so that the shoe may be placed over them and any part of the interior of the shoe explored by movement of the shoe bottom over the cutting tool and holding device. Contact of a tack with any part of the illustrated device or tool indicates to the operator holding and moving the shoe the presence of the tack, and movement of the tack and shoe toward the device from any direction causes the holding device and cutting tool to cooperate to cut off the projecting part of the tack substantially flush with the inside surface of the shoe bottom and to smooth the cut off tack. For this smoothing operation the cutting tool is preferably provided with cutting means distinct from the cutting means by which the tack is cut off. Means is also provided in the illustrated construction for preventing injury to the inner surface of a shoe by the tack cutting devices.

This and other features of the invention will appear more fully from the following detailed description when read in connection with the accompanying drawing and will be pointed out in the appended claims.

In the drawing:

Fig. 1 is a side elevation of a machine embodying the present invention;

Fig. 2 is a top view of the tack cutting mechanism;

Fig. 3 is a bottom view of parts shown in Fig. 2;

Fig. 4 is a sectional view of the upper portion of the machine shown in Fig. 1; and

Fig. 5 is an enlarged sectional detail showing a shoe and the action of the cutter upon a tack.

A machine embodying the present invention is shown in Fig. 1 and comprises a column 10 supported on a suitable pedestal at a convenient height from the floor. On the back side of the column 10 is a bracket 12 for supporting an electric motor 14. The armature shaft 16 of the motor is extended horizontally and provided with bearings in the column and in the outer portion of an extension 18. The front end of the shaft 16 may be provided with a rotary cutter 20 for smoothing up the heel-seat on the interior of the shoe such as is disclosed in United States Letters Patent No. 1,303,926, granted May 20, 1919, on application of B. T. Leveque. This cutter, however, forms no part of the present invention.

From the top of the column 10 extends upwardly, at a substantial forward inclination, a tapering neck 22 in which is mounted a shaft 24 having on its lower end a bevel gear 26 meshing with a corresponding gear 28 mounted on the shaft 16. The upper end of the neck 22 is hollow and is bent at right angles to the main portion. In the opening of the neck 22 is fitted an arm 30, the arm being held in place by a screw 32. Mounted in the arm 30 is a shaft 34 on the inner end of which is a gear 36 meshing with a gear 37 on the shaft 24.

Fitting over the outer end of the arm 30 is a sleeve 38 which preferably is formed integral with a circular, box-like casing 40. The sleeve 38 is held on the arm by a screw 42. The casing 40 is provided with a central boss 44 through which extends a screw 46 having next its head a cylindrical portion which passes through the boss 44 and through a bevel gear 48 which meshes with a gear 50

on the shaft 34. About the entire periphery of the box-like casing 40 are formed projections 52 which are substantially triangular in shape and form teeth between any two of which a tack may enter and, by contact with which, the tack will be supported against lateral movement. The outer faces of the projections 52 and the rim of the casing 40 are counterbored to form a recess in which is fitted a rotary disk cutter 54. The cutter 54 rests upon the outer face of the gear 48 which face is flush with the bottom of the counterbore and is held to the gear for rotation therewith by dowel pins 56. Since the outer face of the gear 48 is flush with the bottom of the counterbore in the projections 52, the lower peripheral margin of the cutter is in close proximity to and substantially in contact with the surfaces of the projections or teeth 52 at the bottom of the counterbore; that is, a running clearance only is provided between the cutter and the teeth. A tack resting against one of the teeth is thus laterally supported close to the lower peripheral margin of the cutter. The screw 46 has a reduced extension 58 provided with a left-hand thread which is screwed into the cutter until the shoulder between the cylindrical portion and the threaded portion bears tightly against the cutter and the screw will rotate therewith, the length of the cylindrical portion of the screw being such that the gear 48 has free running contact with the boss 44. The margin of the cutter 54 extends beyond the casing 40 so that it is exposed between the projections 52. The periphery of the disk 54 is provided with cutting teeth 60 similar to those of a hack-saw. The margin of the outer face of the disk 54 is provided with teeth 62 extending radially of the disk, the depth of the teeth diminishing from the edge toward the center. As illustrated, the peripheral teeth and the marginal teeth coincide at the periphery of the cutter; that is, the peripheral cutting teeth 60 are of the same size as the outer ends of the marginal smoothing teeth 62. In the center of the disk 54 is a convex nut 64 which may, if desired, be formed integral with the cutter disk. The faces of the projections 52 are substantially flush with the edges of the teeth 62 or slightly above them.

The construction has been sufficiently described so that its operation can now be readily explained, it being understood that the parts are so proportioned that a shoe of substantially any size may be placed over the arm 30, the casing 40 being small enough to enter the toe portion of a shoe of any usual size. The motor 14 will, through the gearing described, rotate the disk 54, and the shoe may be moved around over the disk with its sole in contact with the upper faces of the projections 52 and the convex surface of the nut 64. Any tack projecting from the shoe bottom will, as the shoe is manipulated, find its way between two of the projections 52, this event being indicated to the operator by his sense of touch. The operator will then merely press upon the shoe in the proper direction to hold the discovered tack against the peripheral teeth 60 of the cutter which, due to its rapid rotation, will press the tack against the side of the adjacent projection or tooth 52 which extends beneath and in close proximity to the lower peripheral margin of the cutter and affords lateral support for the tack close to the cutter. The cutter will thus sever the tack close to the supported portion. Then, by allowing the shoe to move slightly toward the center of the cutter, the severed end of the tack will engage the marginal teeth 62 of the cutter and will be reduced substantially flush with the shoe bottom. The projections 52, of course, prevent any part of the shoe except the projecting tack from coming in contact with the peripheral teeth 60, and the upper surface of the projections 52 and the convex surface of the nut 62 cause the surface of the insole to bridge across the marginal teeth 62 of the cutter so that this cutter will not dig into or injure the surface of the insole. Any object projecting slightly from the interior of the insole may, however, by pressure upon the exterior of the sole, be forced into contact with the marginal teeth 62 and reduced to a condition in which it is flush with the remainder of the surface of the insole.

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 machine of the class described, the combination of means for engaging the side of a tack projecting from the interior of a shoe to support a portion of the tack against movement transversely of the tack, and rotary cutting means for severing the supported tack approximately flush with the surface from which it projects and close to the supported portion.

2. In a machine of the class described, the combination of means for engaging the side of a tack projecting from the interior of a shoe to support a portion of the tack against movement transversely of the tack, and a rotary cutter acting to push the tack toward the supporting means and to sever the tack close to the supported portion of the tack.

3. In a machine of the class described, the combination of means for engaging a tack projecting from the interior of a shoe to support a portion of the tack spaced from the shoe sole against movement transversely of the tack, and a rotary cutter having peripheral teeth acting between the sole and the supported portion of the tack to sever the tack close to the supported portion.

4. In a machine of the class described, the combination of means for engaging a tack

projecting from the interior of a shoe to support the tack against movement transversely of the tack, a rotary disk cutter having peripheral teeth to sever the tack, and teeth formed on the margin of one face to smooth down the end of the severed tack.

5. In a machine of the class described, the combination of a casing having pointed peripheral projections closely spaced to admit between them a projecting tack, and a disk rotatable relatively to the casing and set into the casing with its outer face substantially flush with the projections of the casing and having its edge projecting into the spaces between the projections, said edge having peripheral teeth to engage and sever the tack.

6. In a machine of the class described, the combination of a casing having peripheral projections to admit between them a projecting tack, and a rotary, peripherally toothed disk set in the casing with its outer face substantially flush with the projections, the peripheral teeth being exposed between the projections, the margin of the outer face of the disk having smoothing teeth to engage the tack after it is severed by the peripheral teeth.

7. In a machine of the class described, the combination of a stationary casing having notches about its entire periphery into which a tack projecting from the inside of a shoe may be brought by movement of the shoe over the casing, a cutter projecting into the spaces at the bottoms of the notches in position to engage and sever the tack close to the surface from which it projects, and means for driving the cutter.

8. In a machine of the class described, the combination of a stationary casing having notches about its periphery into which a tack projecting from the inside of a shoe may be brought by movement of the shoe over the casing, and a cutter projecting into the spaces at the bottoms of the notches in position to engage and sever the tack close to the surface from which it projects, the surface of the cutter next to the shoe bottom being exposed and provided with teeth to engage the severed tack and smooth it off flush with the shoe bottom.

9. In a machine of the class described, the combination of a circular box-like casing having an opening and having projecting teeth about its periphery adjacent to the opening, a circular cutter disposed with its center closing the opening and with its margin countersunk into the projecting teeth and extending into the space between them, the lower peripheral margin of the cutter having a running clearance only with respect to the projecting teeth, and gearing in the casing for driving the cutter.

10. In a machine of the class described, the combination of a circular open-topped box-like casing having projecting teeth about its periphery adjacent to the opening, and a circular cutter disposed over the opening with its margin countersunk into the projecting teeth and extending into the space between them and the outer face of the cutter being convex and having its margin provided with teeth.

11. In a machine of the class described, the combination of a fixed casing having numerous closely spaced peripheral projections to admit between them a tack projecting from the interior of a shoe, and a rotary disk set into the casing with its outer face substantially flush with the projections of the casing and having its edge projecting into the spaces between the projections, said edge having peripheral teeth to engage and sever the tack presented between the projections, the projections serving to prevent engagement of the teeth with the surface from which the tack projects.

12. In a machine of the class described, the combination of a fixed casing having pointed peripheral projections closely spaced to admit between them a single projecting tack, and a rotary disk set in the casing with its outer face substantially flush with the projections, the margin of the outer face of the disk having cutting teeth to engage the tack, said teeth being prevented from digging into the work by the projections.

13. In a machine of the class described, the combination of a stationary casing having closely spaced notches about its entire periphery into any one of which an isolated tack projecting from the inside of a shoe may be brought by movement of the shoe over the casing, a cutter projecting into the spaces at the bottoms of the notches in position to engage and sever the tack close to the surface from which it projects, means to prevent the edge of the cutter from engaging said surface, and means for driving the cutter.

14. In a machine for removing projecting portions of tacks from the interior of shoes, the combination of a stationary member having pointed projections about its entire periphery adapted to receive a tack between them and over which member a shoe may be placed and moved about to explore the interior of a shoe to detect the presence of projecting tacks, said member being so constructed and arranged that contact of a tack with any portion of the periphery of the member will indicate the presence of a tack to the operator, and cutting means associated with the peripheral projections and movable relatively thereto to cause the tack to be severed when it is pressed against the cutting means by the operator.

15. In a machine for removing projecting portions of tacks from the interior of shoes, the combination of a stationary member having pointed peripheral projections adapted to receive a tack between them over which

member a shoe may be placed and moved to explore the interior of the shoe to detect the presence of tacks, said member being so constructed and arranged that contact of a tack with the member will indicate the presence of a tack to the operator, and rotary cutting means countersunk into the shoe-engaging faces of the projections, exposed between them and acting to sever the tack when it is presented to the exposed portion of the cutter by movement of the shoe.

16. In a machine for removing projecting portions of tacks from the interior of shoes, the combination of a stationary member over which a shoe may be placed and moved about to explore the interior of a shoe to detect the presence of projecting tacks, said member having numerous pointed projections on its periphery with notches between them, contact of a tack with any one of the notches indicating the presence of a tack to the operator, and rotary toothed cutting means associated with the peripheral projections exposed in the notches between them and movable relatively to the projections with its lower peripheral margin in close proximity to the projections to cause the tack to be severed when pressed against it by the operator

17. In a machine for removing projecting portions of tacks from the interior of shoes, the combination of a stationary member over which a shoe may be placed and movable to explore the interior of the shoe to detect the presence of tacks, said member being provided with projections having notches between them, contact of a tack with a projection on the member indicating the presence of the tack to the operator, and rotary cutting means countersunk into the sole-engaging faces of the projections so that its outer face is substantially flush therewith and its lower peripheral margin is in close proximity to upper surfaces of the projections, the edge of the cutting means being exposed between the projections and acting to sever the tack when it is presented thereto by movement of the shoe.

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

ORIN L. SMITH.