

Oct. 8, 1968

E. E. THOMAS

3,404,493

ABRASIVE PAPER RETAINING CLIP

Filed Sept. 2, 1965

Fig. 1

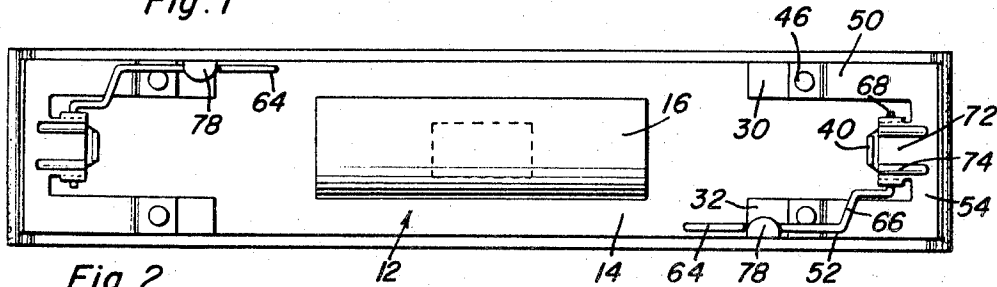


Fig. 2

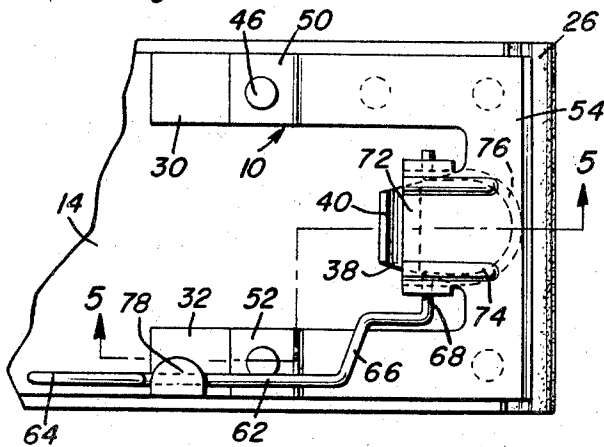


Fig. 3

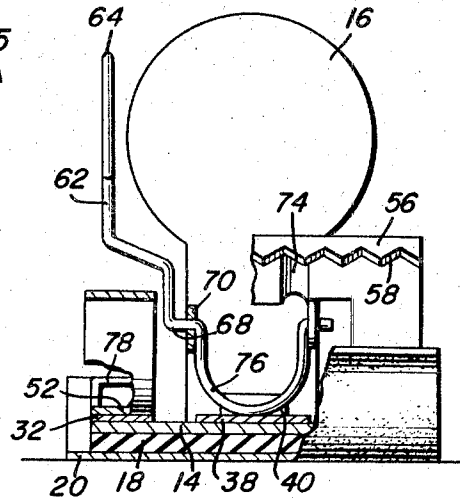


Fig. 4

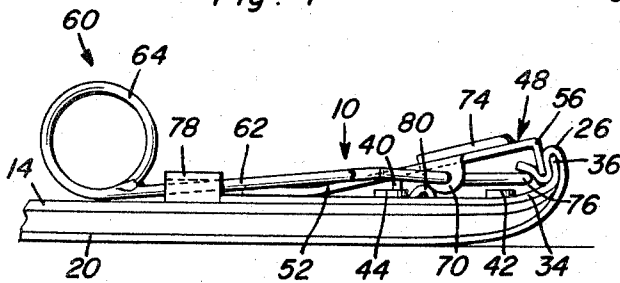
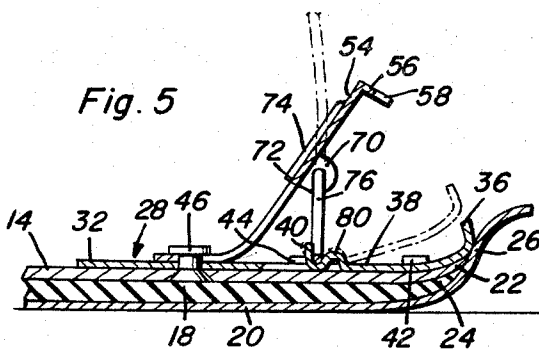


Fig. 5



Eugene E. Thomas

INVENTOR.

BY

Clarence A. O'Brien
and Harvey B. Jackson
Attorneys

1

3,404,493

ABRASIVE PAPER RETAINING CLIP

Eugene E. Thomas, Indio, Calif.

(4546 Banner Drive, Apt. 4, Long Beach, Calif. 90807)

Filed Sept. 2, 1965, Ser. No. 484,578

7 Claims. (Cl. 51—386)

ABSTRACT OF THE DISCLOSURE

A sanding shoe having a lower jaw and an upper jaw at one end thereof for releasably clamping an end of an abrasive sheet therebetween. An over-center type actuator is attached to the upper jaw for lifting the upper jaw away from the lower jaw to release the abrasive sheet and to enable clamping of another abrasive sheet. The upper jaw includes a depending lip having serrations or teeth formed thereon while the lower jaw includes an upturned lip to grippingly engage the end of the abrasive sheet. The actuator for the upper jaw is releasably retained in its jaw-opening position and in its jaw-closing position with an offset end portion thereof riding against an extension on the lower jaw during its pivotal movement and also engaging the terminal end of the abrasive sheet to force it against the inner surface of the lip on the upper jaw when the actuator is in the jaw-closing position.

The present invention generally relates to a retaining clip or holding device for abrasive paper such as that employed in conjunction with reciprocating and oscillating sanding machines for the purpose of securing a sheet of abrasive material to the sanding shoe which is operated by the sanding machine.

An object of the present invention is to provide a retaining clip for abrasive paper such as sandpaper or the like to the oscillating or reciprocating shoe or plate of a sanding machine which enables the abrasive sheet to be easily attached to the sanding shoe and easily removed therefrom for replacement.

Another object of the present invention is to provide an abrasive paper sheet retaining clip which is easy to operate and yet relatively simple and inexpensive to manufacture and which serves to securely retain the abrasive sheet in position on the oscillating and reciprocating sanding shoe.

A further object of the present invention is to provide a retaining clip in accordance with the preceding objects for enabling replacement and easy attachment of a sandpaper sheet or the like to a sanding shoe in which the retaining clip has an actuator operable to render a clamping jaw inoperative with the actuator having an over-center position to retain the clamping jaw in inoperative position until such time as the retaining clip is manually operated to the position for retaining the sanding or abrasive sheet in clamped position by permitting the clamping jaw to return to its operative position.

A still further object of this invention is to provide a retaining clip assembly in which a lower clip which is constructed to lift the end of the sanding shoe upwardly while the upper clip is pressing downwardly against the abrasive sheet at the same time is mounted on the shoe thereby neutralizing the spring pressure on the end of the sanding shoe.

Still another important feature of the present invention is to provide a retaining clip for an abrasive sheet which includes a spring-biased gripping jaw structure together with an actuating handle pivotally attached to the jaw structure and including an offset portion which swings about a horizontal axis for engaging a portion of the sanding shoe so that upward force may be exerted on the gripping jaw for releasing the gripping jaw from its

2

clamped or operative position and also forms a double lock for the abrasive sheet by virtue of the offset portion of the actuating member reversely bending the sheet behind the upper gripping jaw.

These together with other objects and advantages which will become subsequently apparent reside in the details of construction and operation as more fully hereinafter described and claimed, reference being had to the accompanying drawings forming a part hereof, wherein like numerals refer to like parts throughout, and in which:

FIGURE 1 is a top plan view of a sander employing the retaining clip of the present invention;

FIGURE 2 is an enlarged plan view of one end of the sanding device illustrating in more detail the structure of the retaining clip at each end of the sander;

FIGURE 3 is an end view of the construction of FIGURE 2 with portions thereof broken away illustrating the structural details of the invention;

FIGURE 4 is a side elevational view of the construction of FIGURE 2 illustrating the retaining clip in operative position;

FIGURE 5 is a sectional view taken substantially upon a plane passing along section line 5—5 of FIGURE 2 illustrating the retaining clip in released position with the actuating lever in its over-center position and engaged with a detent therefor and also illustrating the lower clip in dashed line prior to attachment to the shoe.

Referring now specifically to the drawings, the numeral 10 generally designates the retaining clip of the present invention with there being a similar clip at each end of a sander 12. The sander 12 may be power operated or manually operated and includes a sanding shoe or plate 14 which is oscillated or reciprocated by a handle 16 or in the case of a sanding machine, the sanding shoe 14 is oscillated or reciprocated along its longitudinal axis by a connection with a pneumatic or hydraulic power device or an electric power device of any suitable construction. The sanding shoe 14 includes a resilient pad 18 bonded thereto and forming a backing for an abrasive sheet 20 such as sandpaper, emery paper or the like. Each end of the sanding shoe or plate 14 is slightly upwardly curved as at 22 and this is also true of the sanding pad 24 thus forming an end for the sanding shoe and pad which is upwardly curved for engagement with the end portion 26 of the abrasive sheet 20.

Attached to the upper surface of the sanding shoe or plate 14 is a generally U-shaped lower jaw 28 having a pair of legs 30 and 32 which are interconnected at their forward ends by a transverse bight portion 34 having an upturned free edge 36 which lies against the upper surface of the upturned end portion 22 of the plate 14 as illustrated in FIGURE 5. The bight portion of the lower jaw is provided with a rearwardly extending projection 38 centrally disposed thereon which terminates in an upturned end 40 which forms an abutment for a purpose described hereinafter. The legs 30 and 32 are secured to the shoe or plate 14 by a plurality of fasteners 42, 44 and 46 with the fasteners 46 also securing an upper jaw generally designated by numeral 48 to the plate 14 by virtue of the fasteners 46 extending through legs 50 and 52 of the generally U-shaped upper jaw 48 that is constructed of spring metal and includes a forward transverse bight portion 54 interconnecting the legs 50 and 52 with the bight portion terminating in a downturned edge or lip 56 having teeth or serrations 58 formed in the lower edge thereof for securely gripping the end of the abrasive sheet 26 between the upturned end portion 36 of the lower jaw and the serrated or toothed edge 58 of the downturned lip 56 of the upper jaw 48. The operative position of the upper jaw is illustrated in FIGURE 4 and the inoperative position is illustrated in FIGURES 3 and 5. An actuator generally designated by numeral 60

3

is provided for moving the upper jaw 48 to the inoperative position against the inherent resiliency of the upper jaw 48. The actuator includes an elongated wire rod 62 having a finger loop 64 formed on the free end thereof and with the other end having an offset portion 66 and a laterally extending portion 68 that is journaled, for pivotal movement about a transverse axis, in the pair of downturned lugs or ears 70 formed on the side edges of a rearward extension 72 formed on the bight portion 58. The portion of the rearward extension 72 adjacent each of the lugs 70 is provided with a longitudinal rib 74 formed therein for rigidifying and reinforcing this portion of the upper jaw 48. The laterally extending terminal end of the actuator 60 is journaled in the spaced lugs 70 with the portion of the end 68 disposed between the lugs 70 being generally semi-circular or U-shaped in configuration and offset in the manner illustrated in FIGURES 2 and 3 with this offset portion being designated by numeral 76 and serving as a lift member when engaged with the upper surface of the rearwardly extending extension 38 on the lower jaw 28 with the bight portion of the offset portion 76 engaging the upstanding abutment 80 after the elongated portion of the handle 62 has gone past center thus forming an over-center position so that the upper jaw 48 will be retained in its open or inoperative position.

A latching element 78 is provided on the leg 32 of the lower jaw 28 forming an inwardly opening lug under which the wire rod handle 62 forming part of the actuator may be positioned by inwardly flexing the wire rod handle 62 when it is moved downwardly toward the plate 14 so that it may be moved under the inwardly extending lug which forms the top end of the latching element 78 thus retaining the actuator 60 more or less parallel with the shoe or plate 14 so that the resilient sheet metal from which the upper jaw is formed will urge the clamping teeth or serrations 58 into secure locking engagement with the end 26 of the abrasive sheet 20 to securely clamp it in position against the upwardly curved end portion 34 and the terminal edge 36 of the lower jaw 28 as illustrated in FIGURE 4. When it is desired to release the abrasive sheet of paper, the loop 64 is grasped and moved laterally inwardly and then upwardly so that the actuator will fulcrum about an axis defined by the end portion 68 thus bringing the U-shaped offset portion 76 of actuator 60 into engagement with the upper surface of the lower jaw so that it will move rearwardly toward the abutment 70 thus elevating the gripping teeth 58 to inoperative position.

The rubber pad 18 may be of any conventional high density live rubber bonded to the shoe or plate 14 which is preferably made of magnesium or an equivalent material for minimum weight and maximum strength. Rivets or other suitable fasteners may be employed for securing the upper and lower jaws in position on the shoe. As illustrated in FIGURE 4, the portion of the abrasive sheet which goes over the end portion 36 of the lower jaw actually forms one curve in the abrasive sheet and where the abrasive sheet goes under the clamping teeth 58 of the upper jaw, there is a second curve formed in the abrasive sheet thus providing a positive gripping action which will prevent slippage. The teeth 58 actually mash the abrasive sheet against the inner surface of the upturned end portion 36 of the lower jaw thus forming another curve in the abrasive sheet. The teeth not only prevent longitudinal slippage but also prevent side slippage even when severe forward or side movements are applied with a relatively powerful sanding machine. Locking of the operating rod 62 prevents rattle and excessive wear to the equipment. The over-center position of the actuating mechanism will prevent any possible injury to the fingers while loading the abrasive sheet. To prevent any possible accidental closing of the jaw 48, the rearward extension 38 is provided with a small upwardly extending hump or detent 80 to positively lock the actuator

4

60 in position for retaining the upper jaw spaced from the lower jaw. Also, the dimensional characteristics of the actuator are such as to force the upper jaw a substantial distance away from the lower jaw to facilitate loading of abrasive sheets therein.

The bottom jaw 28 is constructed of resilient sheet metal and, as illustrated in dashed line in FIG. 5, is normally formed with the central portion slightly lower than the end portions so that the outer end portion is normally upwardly inclined before it is secured to the shoe 14 by the fasteners 42. This will exert an upward force on the shoe 14 due to the tendency of the forward end of the lower jaw 28 to return to its normal position. This upward force exerted on the shoe will counteract the downward force exerted by the upper jaw thus eliminating any tendency of the shoe to be deflected downwardly by the gripping action of the upper jaw.

As illustrated in FIG. 4, the rounded end of offset portion 76 actually slides along the surface of rearward extension 38 and will catch the free end of the abrasive sheet and fold it upwardly toward the inner surface of the lip 56. Due to the positive inclination of edge 36 of the lower jaw 28 and the reverse break in the abrasive sheet formed by offset portion 76 and teeth 58 and the holding of the sheet against the rear surface of lip 56, a positive retaining action is provided for the abrasive sheet.

The foregoing is considered as illustrative only of the principles of the invention. Further, since numerous modifications and changes will readily occur to those skilled in the art, it is not desired to limit the invention to the exact construction and operation shown and described, and accordingly all suitable modifications and equivalents may be resorted to, falling within the scope of the invention as claimed.

What is claimed as new is as follows:

1. In a sander having a generally planar shoe for receiving an abrasive sheet, means for operating said shoe, an upper jaw and a lower jaw attached to one end of said shoe with the upper jaw being movable in relation to the lower jaw and being spring-biased toward the lower jaw for gripping an end of an abrasive sheet therebetween, an actuator attached to the upper jaw for swinging movement in relation thereto about a transverse axis and including an actuating element offset from the transverse axis for lifting the upper jaw away from the lower jaw to release an abrasive sheet and enable the end of another abrasive sheet to be inserted therebetween, said upper jaw terminating in a depending lip having serrations in the lower edge thereof forming gripping teeth, said lower jaw being provided with an upwardly curved upper surface terminating in an edge portion spaced longitudinally from the gripping teeth whereby an abrasive sheet gripped between the gripping teeth and the lower jaw will be caused to curve around the edge of the lower jaw and be gripped by the gripping teeth, said actuator including a wire rod handle having a loop on the end thereof, a catch mechanism associated with the wire rod handle for retaining the actuator in operative position for enabling the upper jaw to grip the abrasive sheet, said lower jaw being provided with a rearward extension engaged by the offset actuating element and including an upturned abutment at the inner edge thereof for engagement by the actuating element when the actuator is in an over-center position beyond the vertical.

2. The structure as defined in claim 1 wherein said actuator element is provided with a rounded actuating surface oriented centrally of said shoe for engaging the lower jaw over a relatively minor surface area to reduce the force necessary to move the actuator from its operative to inoperative position and from inoperative to operative position.

3. The structure as defined in claim 2 wherein said upper jaw includes a rearward extension having downturned lugs pivotally receiving said actuator, said exten-

5

sion including reinforcing ribs formed thereon for rigidifying the extension.

4. An abrasive sheet retaining clip assembly for use in combination with a sanding shoe comprising a lower jaw and an upper jaw, the lower jaw adapted to be secured to the sanding shoe, the upper jaw overlying the lower jaw with the inner end thereof rigid with respect to the lower jaw and the outer end being movable in relation to the lower jaw for selectively gripping the abrasive sheet, said jaws being constructed of spring metal, the outer end of the lower jaw being deformed downwardly when secured to the shoe for exerting an upward force thereon for counteracting the downward force exerted by the free end of the upper jaw when gripping the abrasive sheet.

5. An abrasive sheet retaining clip assembly for use in combination with a sanding shoe comprising a lower jaw and an upper jaw, the lower jaw adapted to be secured to the sanding shoe, the upper jaw overlying the lower jaw with the inner end thereof rigid with respect to the lower jaw and the outer end being movable in relation to the lower jaw for selectively gripping the abrasive sheet, said jaws being constructed of spring metal, the free ends of said jaws having angularly extending lips disposed in overlapping relation to form a plurality of reverse curves in the abrasive sheet, an actuator pivotally supported on the upper jaw and including a handle portion for operation thereof and an offset portion engaging the upper surface of the lower jaw to move the upper jaw away from the lower jaw when the actuator is pivoted in one direction toward a jaw opening position, and means on the lower jaw for releasably locking the actuator in jaw opening position, said locking means including a pair of upwardly extending projections formed on the lower jaw in closely spaced relation to receive the offset portion when in jaw opening position.

6. An abrasive sheet retaining clip assembly for use in combination with a sanding shoe comprising a lower jaw

6

and an upper jaw, the lower jaw adapted to be secured to the sanding shoe, the upper jaw overlying the lower jaw with the inner end thereof rigid with respect to the lower jaw and the outer end being movable in relation to the lower jaw for selectively gripping the abrasive sheet, said jaws being constructed of spring metal, the free ends of said jaws having angularly extending lips disposed in overlapping relation to form a plurality of reverse curves in the abrasive sheet, an actuator pivotally supported on the upper jaw and including a handle portion for operation thereof and an offset portion engaging the upper surface of the lower jaw to move the upper jaw away from the lower jaw when the actuator is pivoted in one direction toward a jaw opening position, and means on the lower jaw for releasably locking the actuator in jaw opening position, and a latch means engaged with said handle portion to retain the actuator in jaw closing position.

7. The structure as defined in claim 6 wherein said offset portion is dimensioned to be oriented adjacent the inner surface of the lip on the upper jaw when the actuator is in jaw closing position for clamping the abrasive sheet against the inner surface of the lip on the upper jaw.

References Cited

UNITED STATES PATENTS

2,282,043	5/1942	Ekstrom	51—384
2,402,069	6/1946	Minnick	51—382
2,481,309	9/1949	Gunnarson	51—382 X
2,683,337	7/1954	Scace	51—384
3,183,638	5/1965	Hutchins	51—386
3,267,622	8/1966	Frostad	51—384

ROBERT C. RIORDON, *Primary Examiner*.

D. G. KELLY, *Assistant Examiner*.