Aug. 2, 1949. H. R. JOHNSON 2,477,807

CLIP FOR RUBBING MACHINES AND THE LIKE

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Fig. 1.

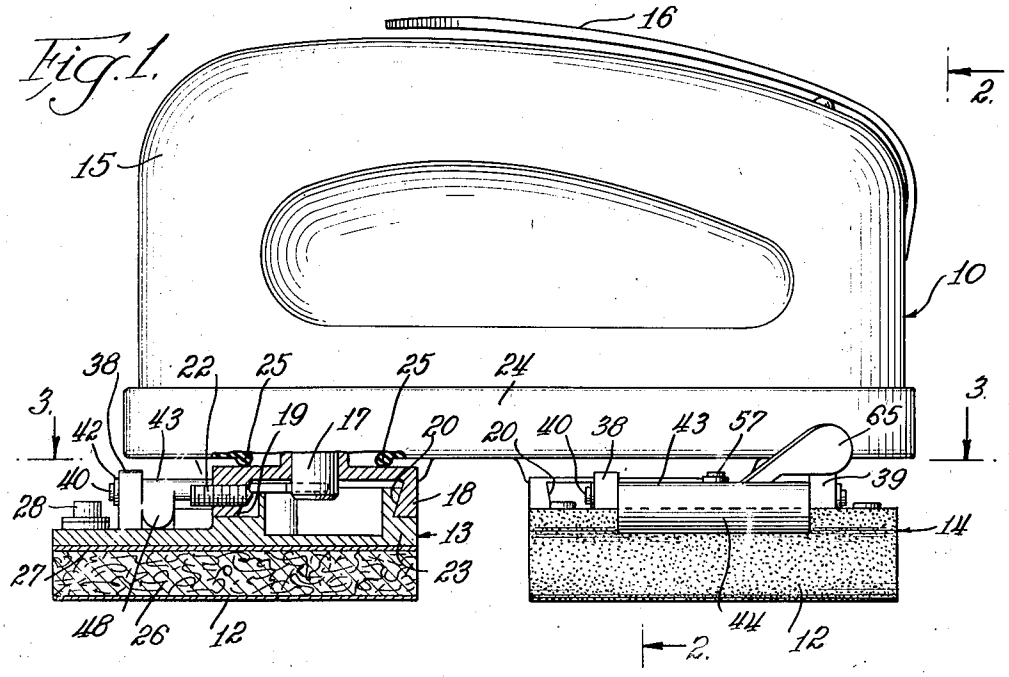

Fig. 2.

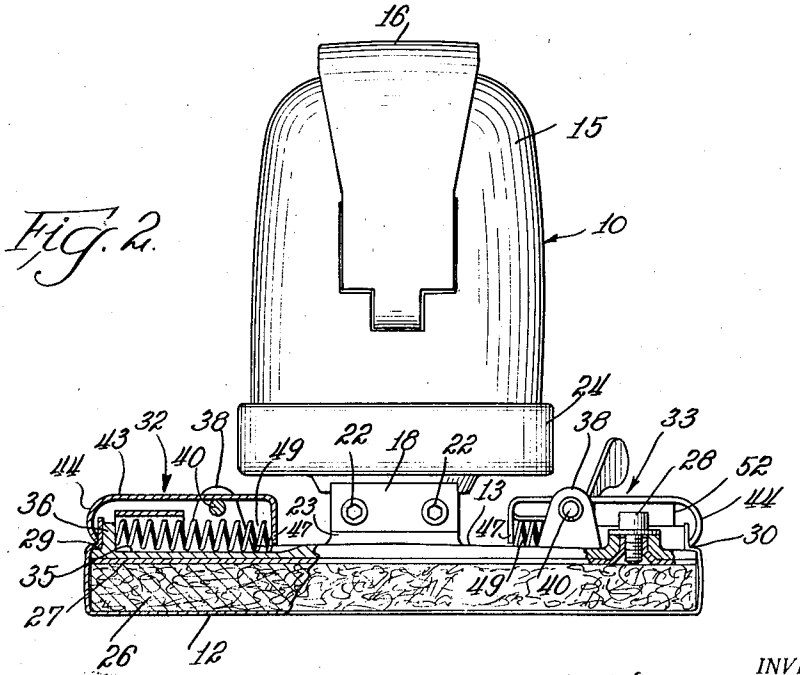

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Fig. 3.

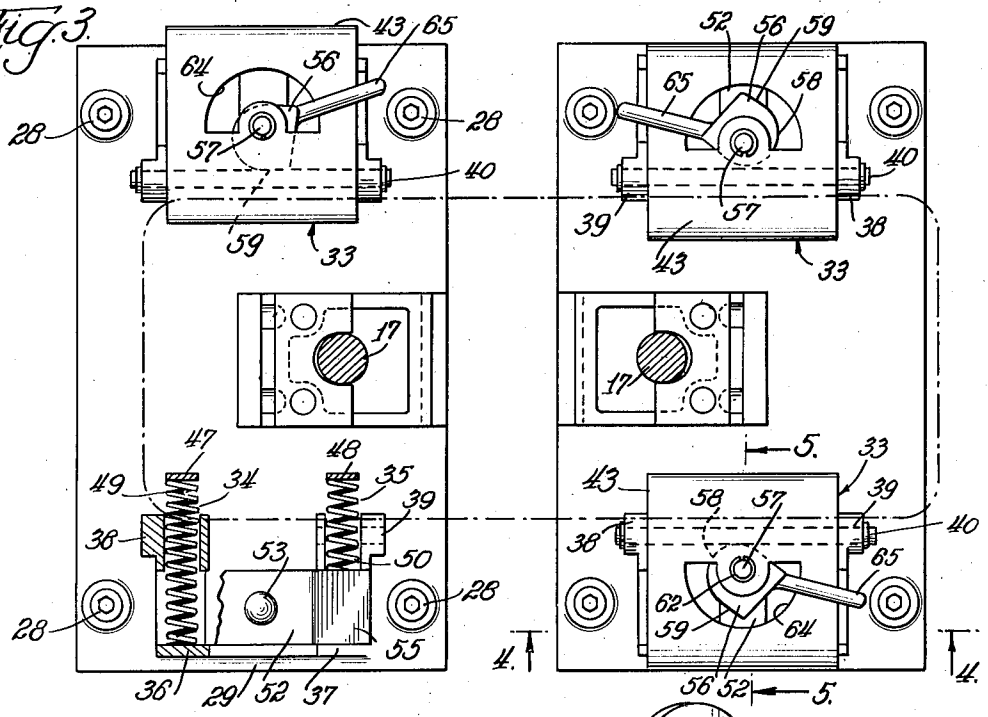


Fig. 4.

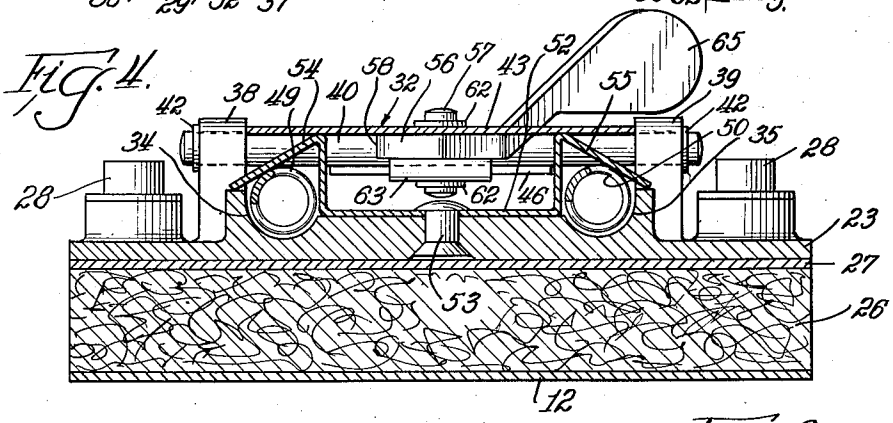


Fig. 5.

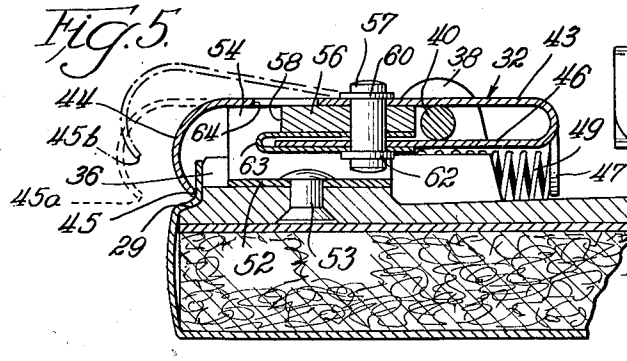
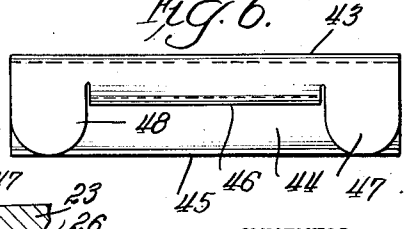


Fig. 6.



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UNITED STATES PATENT OFFICE

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CLIP FOR RUBBING MACHINES AND THE LIKE

Harold R. Johnson, Rockford, Ill.

Application August 26, 1948, Serial No. 46,228

9 Claims. (Cl. 51—189)

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This invention relates to clips for rubbing machines and the like, and more particularly to the structures of such clips which are utilized for holding the abrasive sheets, rubbing pads or the like in place on a rubbing block or shoe.

One of the more general objects of my invention is to provide a clip of rugged and durable construction which is adapted to ease of operation between open and closed positions, and which, in closing, is adapted to tighten a gripped sheet in reference to a backing surface across which the sheet is drawn.

As another object, my invention has within its purview the provision of a cam operated clip adapted to use on sanding machines and which is normally biased to one operating position, adapted normally to be held in the other operating position by the cam when operated thereto, and having a sufficient range of movement between said positions firmly to hold from one to several sheets or layers of material which provide selected rubbing surfaces.

My invention has for another object the provision of a clip having one gripping element normally adapted to substantially linear opening movement, but which gripping element, in its open position, is also swingable to increase the range of said opening movement.

Other objects and advantages of the invention will be apparent from the following description and the accompanying drawings in which similar characters of reference indicate similar parts throughout the several views.

Referring to the two sheets of drawings,

Figs. 1 and 2 are respectively side and end elevational views, with portions of each shown in section, which depict the adaptation of a prefered embodiment of my invention to a rubbing machine;

Fig. 3 is a top sectional view of a portion of the structure illustrated in Figs. 1 and 2, wherein the section is taken substantially on a line 3—3 of Fig. 1, and in which view portions are broken away to show certain views of the structure;

Fig. 4 is a side sectional view taken substantially as indicated by a line 4—4 in Fig. 3 and accompanying arrows;

Fig. 5 is a fragmentary end sectional view taken substantially as indicated by a line 5—5 and accompanying arrows in Fig. 3; and

Fig. 6 is an end elevational view of a preferred type of part utilized in the structures depicted in the other figures.

Although my invention may have many other adaptations, it is well suited to, and is shown,

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in the present instance, in an application to a machanically operated rubbing machine 10 which may be utilized for rubbing operations such as sanding, polishing and the like. In such uses, one or more sheets or layers, such as 12, of a material, such as sand paper, emery cloth, felt or cloth are secured to feet of the rubbing machine so as to be stretched tautly over the exposed rubbing surfaces of those feet. The particular rubbing machine shown is hand operated. That is, a body or housing portion 15 thereof is gripped in the hand of an operator and manually moved generally over the surface which is to be rubbed. During such general movements, a motor housed within the housing portion 15, and which may be driven either electrically or by a fluid, effects a reciprocating vibratory movement of the feet 13 and 14 relative to the main housing and relative to the workpiece surface.

In the disclosed embodiment of my invention which is shown herein for exemplary purposes, a lever 16 is movably mounted at one end of the housing and extends over the top of the housing to be gripped and actuated during the use of the machine for controlling the operation and speed of movement of the feet. As illustrated in Fig. 1, each of the feet 13 and 14 is secured to an actuating shaft 17 through a shoe carrier, from which shoe carrier the shoe may be readily detached and replaced. For the purpose of such ready and easy detachment and replacement, I utilize what may be termed a semi-dovetail joint having substantially parallel and angularly disposed side surfaces 19 and 20 accompanied by set screws 22 which are threaded into the end surface of the shoe carriers and extend into recesses in complementarily shaped top plate 23 on the shoe. A skirt 24 of a resilient material, such as rubber, is mounted on and encompasses the lower portion of the housing and has surfaces such as 25 which frictionally engage the shoe carriers to provide a seal for keeping dust out of the housing.

Each shoe, by preference, includes a pad 26 of a relatively soft material such as sponge rubber or felt which is desirably bonded to a plate 27 and removably secured to the shoe by fastening means such as screws 28. This pad provides a relatively soft and resilient backing for the sheet of rubbing material 12, which sheet, as disclosed herein, is stretched across the pad surface from one side to the other of the shoe and overlaps the ends of the shoe.

The upper end surfaces of the shoe are preferably notched as shown in Figs. 2 and 5 to pro-

vide shouldered gripping surfaces such as 29 and 30. For releasably gripping the sheet material at its opposite ends and firmly holding it in place over the pad surface, while still permitting the quick and easy change or replacement of the rubbing sheets, I have provided clips 32 and 33 which are mounted on the upper surfaces of opposite side portions of the shoe, which clips, although oppositely disposed, are similarly constructed of like parts, so that the description of one will suffice for both.

Referring now and particularly to the structure of each of the clips 32 and 33, the top plate 23 of the shoe serves as a base or base plate for the clip structure and, as previously explained, provides a shouldered gripping surface 29 which functions as a part of the clip. Also, in the preferred embodiment of my invention which is disclosed herein, and particularly as illustrated in Figs. 2 and 4, the plate 2 has in the midportion of its upper surface spaced and substantially parallel spring receiving channels 34 and 35. These channels extends laterally away from the shouldered gripping surface 29 and are separated from that gripping surface by spring abutments 36 and 37 which, by preference, are integrally formed on the plate 23. Also, and by preference integrally formed on the plate 23, I have provided upwardly projecting shaft supporting lugs 38 and 39 which are displaced along the channels 34 and 35 from the shouldered gripping surface and in aligned and opposed relationship on opposite sides of the spring receiving channels. A shaft 40 is carried by and extends between the lugs 38 and 39 in spaced relationship to the surface of the plate 23 and above the channels 34 and 35 with its axis disposed laterally of the channel. This shaft, in the present instance, extends through the lugs 38 and 39, and is held in place by resilient clip washers 42 adjacent the outside surfaces of the lugs.

A movable clip element 43, in the present instance, is preferably made of sheet metal, and has a smoothly curved portion 44 at one end thereof which provides a gripping surface 45 in opposed relationship to the shouldered gripping surface on the plate 23. At its other end, the clip element is return bent to provide a portion 46 of considerable extent and having a surface spaced from and substantially parallel to the midportion of the clip element for receiving the shaft 40 for sliding movement between those opposed clip element surfaces. Outer end portions 47 and 48 which are integrally formed on the end of the clip element opposite the gripping surface 45 extend downwardly into the channels 34 and 35 respectively and serve as spring abutments disposed in opposed and spaced relationship to the abutments 36 and 37 on the plate 23.

Substantially similar coil compression springs 49 and 50 are disposed between the abutments 36 and 37 at one end and the abutments 47 and 48 at their other ends, and extend along the channels 34 and 35 respectively. These springs, as may be noted, are almost as long as the clip element and are sufficiently longer than the limits of movement of the clip element that they provide relatively uniform and consistent spring action to bias the clip element toward a position such that the gripping surface 45 thereof engages the opposed shouldered gripping surface 29 of the plate, at the end of the shoe. A formed spring retaining plate 52 is secured at its midportion to the plate 23 by fastening means such as a rivet 53 and has shaped end portions 54 and 55 which overlie springs 49 and 50 in normally spaced relationship, so as to retain the springs in place without materially impeding their normal spring action. From the description of the structure thus far presented, it may be readily appreciated that the movable clip element 43 is mounted and supported on the shaft 40 for linear movement substantially parallel to the surface of the plate 23 and longitudinally of the axes of the springs 49 and 50, whereby the gripping surface 45 at one end of the clip element may be moved against the biasing force of the springs and to a position such as that depicted in dotted lines in Fig. 5 at 45*a* where it is spaced substantially from the opposed gripping surface 29. With the structure disclosed, and after the clip element has been moved to a position such that the gripping surface 45 is spaced from the gripping surface 29, the clip element may also be swung to a limited extent about the axis of the shaft 40 and to a position such as that depicted at 45*b* in Fig. 5. This latter swinging movement further increases the space between the gripping surfaces and provides greater ease of insertion of sheet material into the space between the gripping surfaces.

For accomplishinng the linear movement of the movable clip element 43 relative to the plate 23 and against the biasing force of the springs, as well as for holding the clip element in an open or released position, when desired, I have provided a cam 56 mounted for rotation relative to the clip element on a shaft 57 and having a cam surface 58 disposed between the parallel portions of the clip element and aligned for engagement with the surface of the shaft 40. The shape of the cam surface 58 is such that when in the normal position illustrated at the right hand side of Fig. 3, the biasing force of the springs 49 and 50 forces the clip element to a position such that the opposed gripping surfaces engage, or a sheet of material is gripped between the gripping surfaces. The cam surface, however, is smoothly curved in eccentric relationship to the axis of the shaft 57 so that as it is turned toward a position such as that illustrated at the upper left hand portion of Fig. 3 the surface engages the shaft 40 to move the clip element linearly away from the shaft so that the grippinng surfaces are separated. At the extreme limit of travel of the cam toward the opening position, I prefer to provide a flattened cam surface portion 59 (Fig. 3) which, upon engagement with the surface of the shaft 40, tends to retain the clip element in its open position against the biasing force of the springs.

Like the shaft 40, the shaft 57 is preferably retained in position by fastening means, such as resilient clip washers 60 and 62, mounted on the end portions thereof adjacent the outer surfaces of the opposed portions of the clip element. In order to provide some frictional resistance to the free movement of the cam 56 and to prevent it from rattling during vibratory movement of the shoes, I have provided a return bent leaf spring 63, one end portion of which is anchored to the lower end portion of the shaft 57, and the other end portion of which is biased against the end face of the cam.

A semi-circular slot 64 is provided in the upper surface of the clip element 43 adjacent the cam 56. A handle 65, which is preferably integrally formed on the cam, projects through that slot

and serves as a grip for effecting manual movement of the cam.

From the foregoing description and reference to the accompanying drawings, it may now be understood that I have provided a rugged and durable clip having a movable element which is normally biased to a gripping position and which tends to tighten the sheet material relative to its supporting surface as the grip on the end portion thereof is tightened. The disclosed clip, although biased to a gripping position, is adapted to self-retention in the open position and has a range of opening movements such that one or a plurality of sheets of rubbing material may be easily put in place and firmly gripped while retained.

While I have illustrated a preferred embodiment of my invention, many modifications may be made without departing from the spirit of the invention, and I do not wish to be limited to the precise details of construction set forth, but desire to avail myself of all changes within the scope of the appended claims.

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 clip adapted to use for holding a sheet of rubbing material in place on the shoe of a rubbing machine or the like, the combination comprising a base plate having therein separated and substantially parallel spring receiving channels, at one end of each of which channels is a spring abutment, and near the other ends of which channels on opposite sides thereof are opposed shaft supporting lugs, a shaft supported by and extending between said lugs and crossing said channels in spaced relationship thereto, a movable clip element having a clamping surface at one end opposed to one end of the base plate and having spring engaging lugs at the opposite end and extending into said channels, said clip element being mounted on said shaft for linear movement in directions such that the clamping surface thereof is moved from and toward the opposed end of the base plate, compression springs disposed in said channels and extending between said spring abutments and the spring engaging lugs to bias the clamping surface toward a position of engagement with the opposed end of the base plate, a retaining plate secured to the base plate and overlying said springs, a cam rotatably mounted on said clip element and having a surface engaging said shaft for effecting linear movements of the clip against the biasing force of the springs, and a handle for manually turning the cam.

2. In a clip adapted to use for holding a sheet of rubbing material in place on the shoe of a rubbing machine or the like, the combination comprising a base plate having therein separated and substantially parallel spring receiving channels, at one end of each of which channels is a spring abutment, and near the other ends of which channels on opposite sides thereof are opposed shaft supporting lugs, a shaft supported by and extending between said lugs and crossing said channels in spaced relationship thereto, a movable clip element formed to present a clamping surface at one end opposed to one end of the base plate and having spring engaging lugs at the opposite end and extending into said channels, said clip element being mounted on said shaft for linear movement in directions such that the clamping surface thereof is moved from and toward the opposed end of the base plate, compression springs disposed in said channels and extending between said spring abutments and the spring engaging lugs to bias the clamping surface toward a position of engagement with the opposed end of the base plate, a cam rotatably mounted on said clip element and having a surface engaging said shaft for effecting linear movements of the clip against the biasing force of the springs, a resilient element frictionally resisting movements of the cam, and a handle for manually turning the cam.

3. In a clip adapted to use for holding a sheet of rubbing material in place on the shoe of a rubbing machine or the like, the combination comprising a plate at one end of which are spring abutments, and having opposed shaft supporting lugs spaced from said abutments and facing one another in a direction lateral to said abutments, a shaft supported by and extending between said lugs and in spaced relationship to said plate, a movable clip element formed to present a clamping surface at one end opposed to the end of the base plate adjacent the spring abutments and having thereon spring engaging lugs at the opposite end opposed to said abutments, said clip element being mounted on said shaft for linear movements parallel to the plate in directions such that the clamping surface thereof is moved from and toward the opposed end of the base plate, compression springs disposed in said channels and extending between said spring abutments and the spring engaging lugs to bias the clamping surface toward a position of engagement with the opposed end of the base plate, said clip element also being swingable about said shaft when the springs are compressed to separate the gripping surface thereof from the plate, a retaining element for confining the movements of each of the springs, a cam rotatably mounted on said clip element and having a surface engaging said shaft for effecting linear movements of the clip against the biasing force of the springs, and a handle for manually turning the cam.

4. In a clip adapted to use for holding a sheet of rubbing material in place on the shoe of a rubbing machine or the like, the combination comprising a base having separated spring abutments near one end and opposed shaft supporting lugs spaced from the spring abutments, a shaft supported by and extending between said lugs and in spaced relationship to the base, a movable clip element having a clamping surface at one of its ends opposed to a clamping surface on the base and having spring engaging lugs thereon and opposed to said abutments, said clip element being mounted on said shaft for linear movement in directions such that said clamping surfaces are moved from and toward one another, compression springs extending between said spring abutments and the spring engaging lugs to bias the clamping surfaces toward a position of engagement, a cam rotatably mounted on said clip element and having a surface engaging said shaft for effecting linear movements of the clip against the biasing force of the springs, and a handle for manually turning the cam.

5. In a clip adapted to use for holding a sheet of rubbing material in place on the shoe of a rubbing machine or the like, the combination comprising a base having separated spring abutments near one end and opposed shaft supporting lugs spaced from the spring abutments, a shaft supporting by and extending between said lugs and in spaced relationship to the base, a movable

clip element having a clamping surface at one of its ends opposed to a clamping surface on the base and having spring engaging lugs thereon and opposed to said abutments, said clip element being mounted on said shaft for linear movement in directions such that said clamping surfaces are moved from and toward one another, compression springs extending between said spring abutments and the spring engaging lugs to bias the clamping surfaces toward a position of engagement, and cam means for effecting linear movements of the clip element against the biasing force of the springs.

6. In a clip adapted to use for holding a sheet of rubbing material in place on the shoe of a rubbing machine or the like, the combination comprising a base, a shaft supported in spaced and substantially parallel relationship relative to the base, said base having a gripping surface thereon in spaced and substantially parallel relationship to the axis of the shaft, a formed clip element having at one end a curved portion providing a second gripping surface in opposed relationship to the aforementioned gripping surface, said clip element also having at the end opposite the second gripping surface a return bent portion providing separated and substantially parallel surfaces between which the shaft is received for relative sliding movement in a direction lateral to the axis thereof, and resilient means for biasing the clip element in a direction to effect engagement of the gripping surfaces.

7. In a clip as defined in claim 6, said resilient means comprising a coil spring normally extending practically the full length of the clip element between said ends thereof, and an element for restraining lateral movements of the spring.

8. In a clip adapted to use for holding a sheet of rubbing material in place on the shoe of a rubbing machine or the like, the combination comprising a base, a shaft supported in spaced and substantially parallel relationship relative to the base, said base having a gripping surface thereon in spaced and substatially parallel relationship to the axis of the shaft, a formed clip element having at one end a curved portion providing a second gripping surface in opposed relationship to the aforementioned gripping surface, said clip element also having integrally formed thereon a portion for guiding movements thereof relative to the shaft in a direction lateral to the axis of the shaft, and resilient means for biasing the clip element in a direction to effect engagement of the gripping surfaces.

9. In a clip as defined in claim 8, the combination being further characterized by a cam carried for rotation relative to said clip element and having a surface engageable with said shaft for effecting movements of the clip element relative to the base and against the biasing force of said resilient means.

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No references cited.