April 25, 1950 C. D. McCARTHY 2,505,683

ABRASIVE SHOE FOR RUBBING MACHINES

Filed May 17, 1946

Fig. 1.

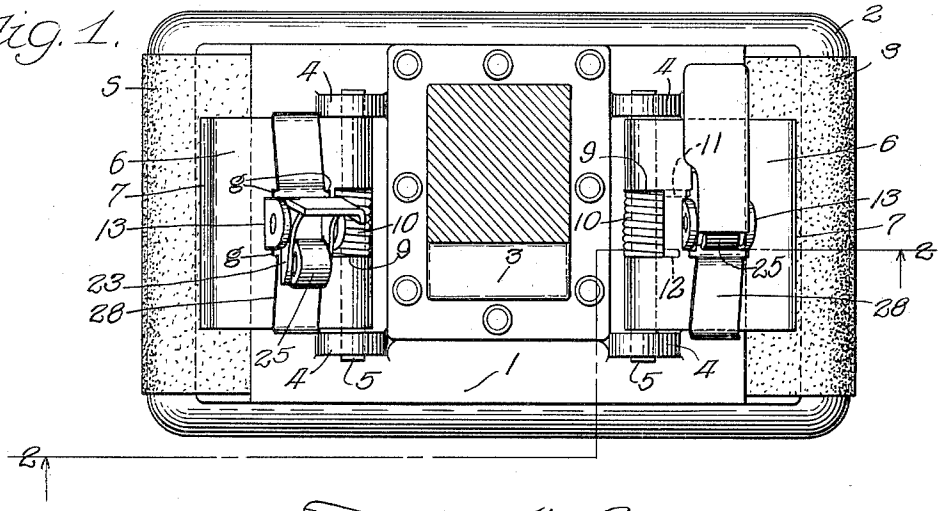


Fig. 2.

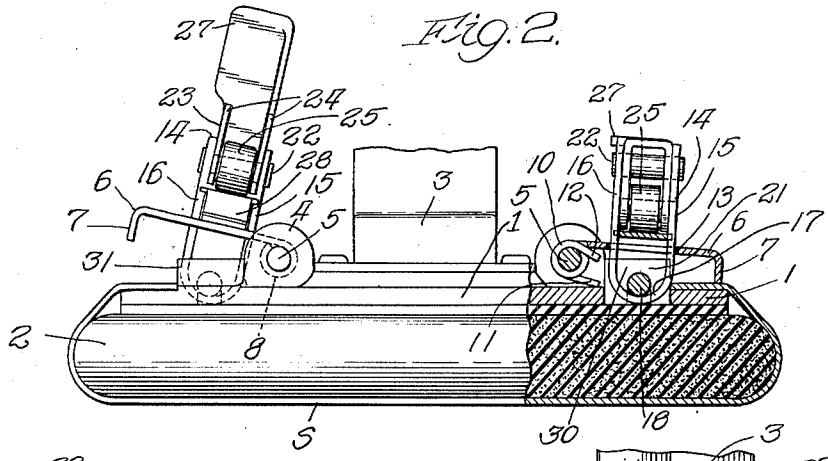


Fig. 3.

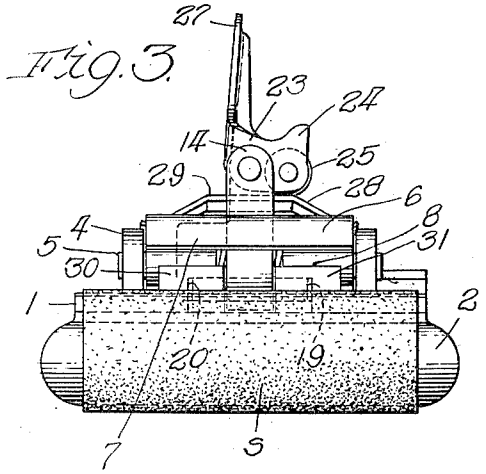
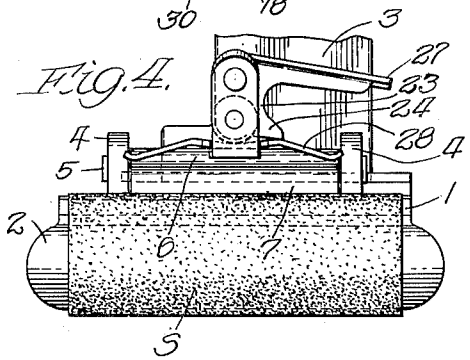


Fig. 4.



Inventor.
Charles D. McCarthy,
By Charlton, Schroeder, Merriam & Holgren,
Attys.

Patented Apr. 25, 1950

2,505,683

UNITED STATES PATENT OFFICE

2,505,683

ABRASIVE SHOE FOR RUBBING MACHINES

Charles D. McCarthy, St. Paul, Minn., assignor to Sundstrand Machine Tool Co., Rockford, Ill., a corporation of Illinois

Application May 17, 1946, Serial No. 670,469

12 Claims. (Cl. 51—189)

1

This invention relates generally to a clamping device for rubbing machines and more particularly to an improved construction of such clamping device for clamping against a rubbing shoe, sheets of sandpaper, emery cloth or other rubbing material.

Among the objects of my invention are: to provide a novel and improved clamp device for rubbing machines; to provide a clamping device having a cam capable of swinging in both a transverse and longitudinal direction with relation to a supporting plate; to provide a clamping device having a clip, and a cam bracket slidable therethrough; to provide a clamp device having a clip formed with an opening therethrough and a cam bracket swingably positioned on a supporting plate and mounted for sliding movement in said opening with relation to said clip; to provide a clamp device for rubbing machines and having a swingable clip, and a cam bracket and cam member mounted for swinging movement with said clip; and to provide a clamp device easy to manipulate and efficient in operation for clamping sheets of rubbing material against a rubbing shoe.

Other objects and advantages will become readily apparent from the following detailed description taken in connection with the accompanying drawing herein, in which

Fig. 1 is a top plan view of a rubbing shoe and supporting plate having my improved clamp device mounted thereon, the right hand clamp device being shown closed and the left hand clamp device being shown open.

Fig. 2 is a longitudinal vertical section on the line 2—2 of Fig. 1.

Fig. 3 is an end elevation looking toward the left hand end of Fig. 2, but omitting the right hand clamp device of Fig. 2 for the sake of clearness.

Fig. 4 is an end elevation looking toward the right hand end of Fig. 2, but omitting the left hand clamp device of Fig. 2 for the sake of clearness.

While my invention resides in the combination construction and arrangement of parts illustrated in the accompanying drawings, I have therein, for illustrative purposes, shown a preferred embodiment and I wish it understood that the same is susceptible of modification and change without departing from the spirit and scope of the appended claims.

The present invention is an improvement over that shown in the copending application of John B. Hoy, Serial No. 619,360, filed September 29, 1945, for "Clamp device for rubbing machines."

2

In the form shown in the drawings, my improved clamp device is preferably attached to a supporting plate 1 of a rubbing machine, said supporting plate having mounted on the lower face thereof a rubbing shoe 2 of sponge rubber or other suitable yieldable material. The supporting plate 1 is attached in any suitable manner to a reciprocating member 3 of a rubbing machine (not shown). Integrally or otherwise fixed to the supporting plate 1 are two pairs of upstanding spaced lugs 4 having apertures to receive the ends of pins 5, it being understood that these pins are each mounted between a pair of said lugs 4 as seen in Fig. 1. These clamp devices are arranged one upon each of the opposite ends of the supporting plate. As these clamp devices are identically alike, except for the cam levers being reversed in direction of operation, only one of these clamp devices will be described in detail.

Clip 6, formed of sheet metal or other suitable material, is provided at its outer end with a flange 7 to serve as a clamping jaw to contact the end portions of the sheets of rubbing material being clamped in the device. The inner end of the clip 6 is mounted upon the pin 5 either for rotation thereon, or fixed for rotation therewith as desired. This mounting of clip 6 upon pin 5 is effected by bending the rear edge of the clip into cylindrical form as shown at 8 in Fig. 2.

Clip 6 at its inner edge is formed with a cut-away portion to receive a coil spring 10 encircling pin 5, this spring having at one end an extension 11 bearing against the upper surface of the supporting plate 1 and at its opposite end and extension 12 bearing against the under face of the upper portion of clip 6. This normally urges the clip to stand in open position as shown in the left hand side of Fig. 2. Clip 6 is also formed in its intermediate portion with a rectangular opening 13, within which is so positioned an upstanding U-shaped cam bracket 14 that the clip may move upwardly and downwardly over said bracket.

This bracket is formed of two upstanding flat side-arms 15 and 16, and its lower end is curved at 17 to slidably receive in the bight of the closed end a pin 18 mounted in openings 19 and 20 extending laterally from the two ends of the larger opening 21 within which the closed end of the U-shaped cam bracket is positioned.

The upper end of each of the side arms 15 and 16 of the cam bracket is formed with an

opening receiving the adjacent end of a pin 22, which pin is also mounted in complementary openings in the adjacent portion of the cam 23. This cam member as viewed in Figs. 2 and 3 has a pair of angularly extending portions 24, within which at the lower outer end thereof is rotatably mounted a roller 25. The end 26 of the extensions 24, on each side of the roller 25, is of a shape to hold the clip in position when the arm 27 of the cam is swung downwardly. Positioned between the upper surface of the clip 6 and the roller 25 is a bowed leaf spring 28 formed as shown in Figs. 1, 3, and 4. This leaf spring is of a length to contact the side edge portions of the upper surface of the clip with a sliding action when the bowed spring is flexed during the clamping action. It also is formed on each edge with a pair of spaced ears *g* to slidably hold the spring in proper position with relation to the cam bracket. The roller 25 rollably contacts the upwardly extending center portion 29 of the leaf spring as will be understood from Figs. 3 and 4. When the cam opens as shown in Fig. 3, the pressure will be relieved from the spring and the clip 6 will rise to open position under action of the coiled spring 10. When the cam arm 27 is pushed downwardly into closed position as shown in Fig. 4 the spring 28 will be flexed and apply the pressure from the roller 25 against the upper surface of the clip to close the clip and tightly grip the adjacent end of the sheet of rubbing material between the clip flange 7 and the top of the supporting plate 1.

Due to the rocking connection between the cam bracket 14 and the pin 18 the cam bracket and cam arm 27 will at all times occupy planes at right angles transversely of the clip regardless of whether the clip is being opened or closed. In addition to this right angular position of the cam bracket and cam arm with relation to the clip, the cam arm will also swing in the arc of a circle laterally with relation to the supporting plate. It is thus seen that the cam arm has a swinging movement in two different directions, one of these being in a plane longitudinal of the supporting plate, and the other being in a plane transverse of the supporting plate.

To facilitate assembly and ease of construction, the opening 21, within which the bottom curved end of the cam bracket is seated, extends vertically entirely through the supporting plate 1. To provide for the extending openings 19 and 20 within which the ends of the pin 18 are mounted, the supporting plate directly thereabove is provided with a pair of laterally alined upstanding lugs 30 and 31. These extended openings open through the bottom face of the supporting plate and are closed on their upper sides by the top portion of the lugs 30 and 31.

The pin 18 is loosely mounted therein and there held by the curved lower end of the cam bracket. The cam bracket is held upwardly against pin 18 by the leaf spring 28. This construction enables the cam bracket to have a rocking action with relation to the pin 18 as the clip 6 is opened and closed. For convenience the cam of clip 6 at one end of the supporting plate is rotated in one lateral direction to tighten the clip with relation to the supporting plate while the cam at the opposite end of the supporting plate is swung in the opposite lateral direction. To enable this, the cam arms are of right hand and left hand construction.

I claim:

1. A clamp device for rubbing machines comprising a supporting plate, a clip swingably mounted on said plate and having an opening extending upwardly therethrough, a cam bracket pivotally mounted on the supporting plate about an axis extending laterally of the plate, said cam bracket extending upwardly through the opening in the clip, and a cam pivotally mounted on said cam bracket, the pivotal axis of the cam on the cam bracket extending in a direction longitudinally of the supporting plate and the movement of the cam being in an arc transversely of the plate.

2. A clamp device as claimed in claim 1, in which the cam bracket is a U-shaped metal strip, and a pin loosely mounted in a recess in said supporting plate, the closed end of the U-shaped strip loosely receiving said pin, the cam bracket having rocking movement on the pin.

3. A clamp device as claimed in claim 1, in which the cam bracket is a U-shaped metal strip, and a pin loosely mounted in a recess in said supporting plate, the closed end of the U-shaped strip loosely receiving said pin, the cam bracket having rocking movement on the pin, and a bowed leaf spring extending transversely across the top face of the clip and flexing thereagainst as the cam is closed.

4. A clamp device for rubbing machines, comprising, a supporting plate, a clip swingably mounted on said plate, spring means for normally urging the clip to open positions, said clip having an opening extending upwardly therethrough, said plate having an opening extending therethrough, said plate opening being in registry with the clip opening, a fulcrum pin removably seated across the plate opening, a U-shaped cam bracket extending through the clip opening and into the plate opening with said pin loosely seated in the closed end of the U-shaped cam bracket, said cam bracket being swingable about said fulcrum pin, and a cam pivoted to the free ends of the U-shaped cam bracket.

5. A clamp device as claimed in claim 4, having a bowed leaf spring extending transversely across the upper face of the clip and resiliently bearing thereagainst when the cam is closed.

6. A clamp device as claimed in claim 4, having a bowed leaf spring extending transversely across the upper face of the clip and resiliently bearing thereagainst when the cam is closed, said pin, cam, and cam bracket being positioned transversely of the supporting plate whereby the cam swings sideways of the plate during opening and closing of the clip.

7. A clamp device for rubbing machines, comprising, a supporting plate, a clip swingably mounted on said plate, spring means normally urging said clip to open position, a cam bracket pivotally mounted on said plate about an axis extending laterally of the plate, said bracket loosely extending through the clip, and a cam pivotally mounted on said cam bracket for forcing the clip toward the plate as the cam is swung to closed position.

8. A clamp device as claimed in claim 7, having a bowed leaf spring extending transversely across the top of the clip and positioned between the clip and the cam, the ends of the bowed spring having sliding engagement with the top of the clip.

9. A clamp device as claimed in claim 7, the parts being so arranged that the cam during operation at all times swings in a plane at right

angles transversely of the clip, the axis of rotation of the cam being in a plane extending longitudinally of the supporting plate.

10. A clamp device as claimed in claim 7, the parts being so arranged that the cam during operation at all times swings in a plane at right angles transversely of the clip, said cam bracket during the opening and closing of the clip swinging with the clip.

11. A clamp device for rubbing machines and the like, comprising, a supporting plate, a clip swingably mounted on said plate, spring means normally urging the clip to open position, a cam bracket swingably mounted on the plate about an axis extending laterally of the plate, a cam pivotally mounted on the cam bracket about an axis extending longitudinally of the plate, a spring between the clip and the cam, said cam during opening and closing movement of the clip swinging in both a lateral and longitudinal direction with relation to the plate.

12. A clamp device as claimed in claim 11, in which the cam bracket extends loosely through an opening in the clip and always stands substantially at right angles to the top of the clip during opening and closing of the clip by the cam, the opposite edges of the opening in the clip in a direction longitudinally of the plate slidably engaging the adjacent sides of the bracket and swinging the bracket with the clip as the clip swings.

CHARLES D. McCARTHY.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
687,177	Caldwell	Nov. 19, 1901
1,657,342	Ayers	Jan. 24, 1928