Dec. 6, 1927. 1,651,603

G. F. HUTCHINS

PICKING SHOE FOR LOOMS

Filed Oct. 28, 1925 2 Sheets-Sheet 1

Fig. 1.

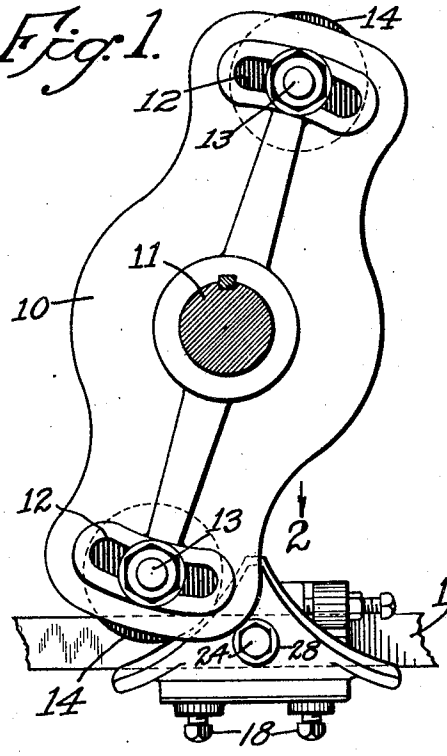
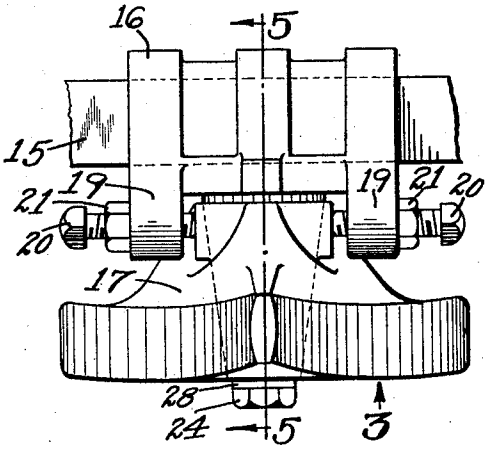


Fig. 2.



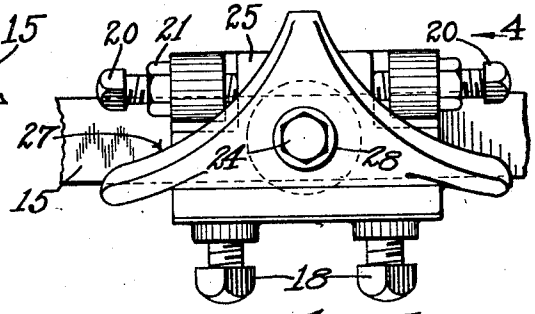


Fig. 3.

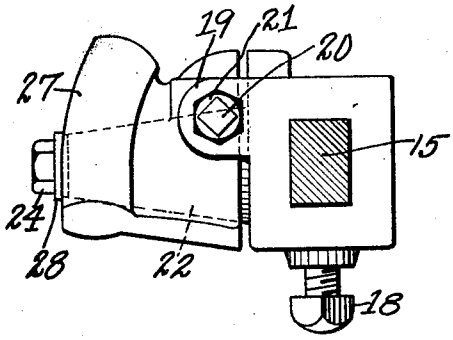


Fig. 4.

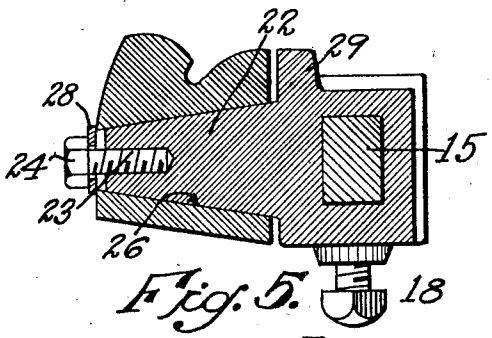


Fig. 5.

INVENTOR

GEORGE F. HUTCHINS

Coulthgate Frayt & Hawley

ATTORNEYS

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G. F. HUTCHINS

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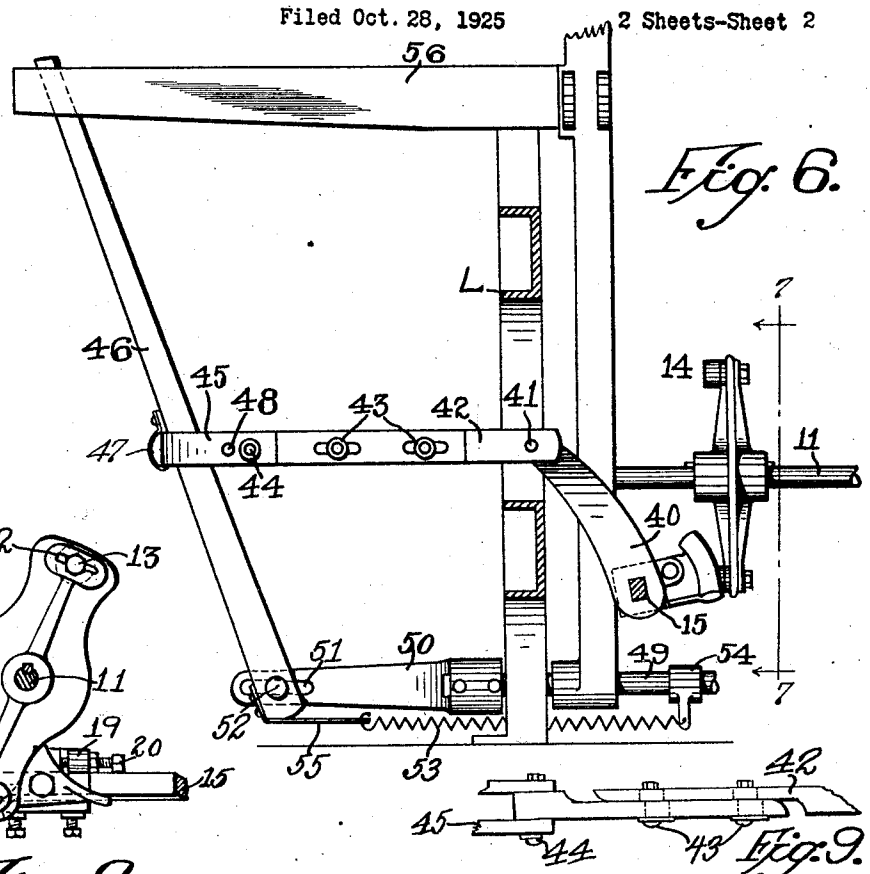


Fig. 6.

Fig. 8.

Fig. 9.

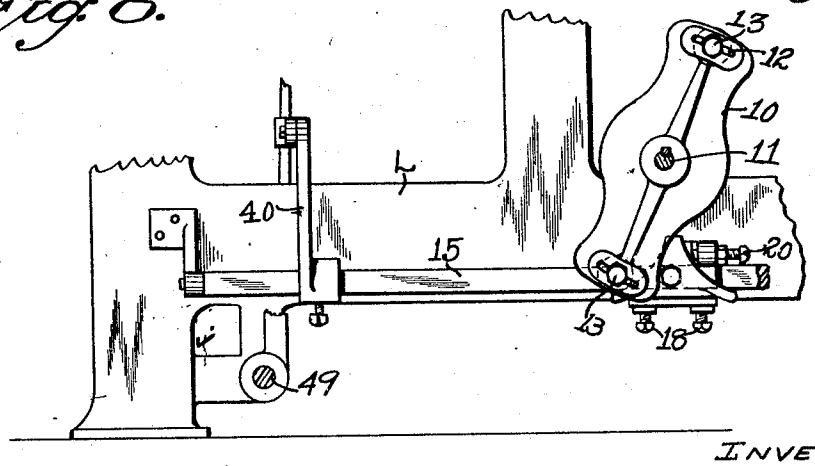


Fig. 7.

INVENTOR

GEORGE F. HUTCHINS

Southgate Fay & Hawley

ATTORNEYS

Patented Dec. 6, 1927. 1,651,603

UNITED STATES PATENT OFFICE.

GEORGE F. HUTCHINS, OF WORCESTER, MASSACHUSETTS, ASSIGNOR TO CROMPTON & KNOWLES LOOM WORKS, OF WORCESTER, MASSACHUSETTS, A CORPORATION OF MASSACHUSETTS.

PICKING SHOE FOR LOOMS.

Application filed October 28, 1925. Serial No. 65,473.

This invention relates to improvements in picking shoes for looms and it is the general object of the invention to provide means for adjusting the cam surface of the shoe with respect to the supporting portion thereof in order to alter the charcter of the pick and also to correct certain defects which exist in the present form of shoe.

The usual form of picking shoe of the type shown herein is made as a single casting held in adjusted position on the picking shaft and has a cam face which is engaged by the picking ball rotating with the bottom shaft. When a sharper pick is desired the shoe is moved along the picking shaft toward the direction from which the picking ball approaches the cam face, and in order to effect any appreciable increase in the pick the shoe must be moved so far as to bring the pick too early. It is an important object of my invention to construct a picking shoe with the cam portion adjustable angularly with respect to the picking and bottom shafts to the end that the pick may be varied as to character without interfering with the proper timing of the pick. The angular adjustment of the cam face will cause a change in the radial distance of the starting point of the cam with respect to the bottom shaft, and in order to insure the proper positioning of the cam and the picking ball I provide adjustable connections between the picking shaft and the picker stick so that the starting point may be raised or lowered, as required.

Another feature of my invention is the provision of an angularly adjustable picking cam face movable to effect an alteration in the radial distance between the starting and finishing points of the cam simultaneously with a change in the angle defined by lines joining these points with the center of the bottom shaft. The angle determines the time in which the pick is completed and therefore the sharpness of the pick.

The cam face of the ordinary picking shoe which cooperates with the picking ball is usually chilled to resist wear. I find that molders wrap the pattern when it is in the sand so that it may easily be removed, a procedure which makes the space to be occupied by the chill somewhat larger that it should be. For this reason it is impossible for the molder to place the chill accurately with respect to the body of the shoe, with the result that slight variations occur in the position of the cam face with respect to the shoe. It is a further object of my invention to avoid these variations by making the chilled part of the shoe separate from the supporting structure and rigidly connecting the same together so that they will operate in effect as though they were one piece.

It is a more particular object of my invention to provide a multi-part picking shoe having interengaging conical surfaces so related as to define a space between the parts for the entry of a tool by means of which they may be separated and the wearing part removed and replaced without disturbing the picking shaft.

With these and other objects in view which will appear as the description proceeds, my invention resides in the combination and arrangement of parts hereinafter described and set forth in the claims.

In the accompanying drawings wherein I have shown a convenient embodiment of my invention,

Fig. 1 is a side elevation of a picking arm and a picking shaft, showing the shoe in operative relationship with respect to the arm as they appear at the beginning of a picking stroke,

Fig. 2 is an enlarged top plan view of the picking shoe looking in the direction of arrow 2, Fig. 1,

Fig. 3 is a side elevation of the shoe looking in the direction of arrow 3, Fig. 2,

Fig. 4 is a front elevation of the shoe looking in the direction of arrow 4, Fig. 3,

Fig. 5 is a vertical section on line 5—5 of Fig. 2 looking in the direction of the arrows,

Fig. 6 is a front elevation of one end of a loom showing the mounting and connections for the picker, together with my improved picking shoe,

Fig. 7 is a vertical section on line 7—7 of Fig. 6,

Fig 8 is a view similar to a part of Fig. 7, but showing the cam face adjusted to give a different character of pick, and

Fig. 9 is a detail top plan of the picker stick connector taken in the direction of arrow 9, Fig. 6.

I will first describe my improved picking shoe and then set forth the advantages of its adjustments in relation to the picker stick and actuating connections for the latter.

Referring to the drawings it will be seen that I have secured a picking ball arm 10 to the bottom shaft 11 of a loom and have provided each end of said arm with a slot 12 through which extends a stud 13. Each of said studs has rotatably mounted thereon a picking ball 14 and as the shaft 11 rotates the balls will be brought successively into contact with my improved picking shoe about to be described. The arm illustrated is for a so-called pick and pick loom, but by omitting one of the rolls the arm could be applied to a loom having a single box at one side.

A picking shaft 15 preferably rectangular in cross section is rotatably mounted in the loom frame L to extend substantially at right angles to and below the shaft 11. The picking shoe is formed of a supporting member 16 and a cam section or member 17. The supporting member 16 has extending therethrough an opening substantially the same size as the cross section of the picking shaft and is held in fixed position on the latter by means of a pair of set screws 18. As shown in Figs. 2 and 3 said supporting member 16 is provided with a pair of ears 19 through which extend set screws 20 which may be held in adjusted position by lock nuts 21. As shown in Fig. 5 there is projecting laterally from the supporting member a conical journal 22 the outer end of which has a threaded hole 23 therein to receive a screw 24.

The cam member 17 is provided with an upstanding arm 25 having substantially parallel vertical faces which are engaged by the set screws 20 and said cam member 17 is provided with a conical bore 26 fitted closely over the journal 22. Said cam member is also provided with the usual cam surfaces 27 which are chilled to resist wear. A washer 28 extends across the small end of the bore 26 and cooperates with the head of screw 24 to hold the member 17 tightly against the journal 22. In order to facilitate removal of the cam member 17 from the journal 22 I provide the supporting member 16 with a lug 29 between which and the adjacent surface of section 17 an appropriate tool such as a screw driver may be inserted to disengage the members.

The relation of the picking shoe to the picker stick and connections therefor are shown in Figs. 6, 7, and 8, where it will be seen that I have secured to the picking shaft 15 a sweep arm 40 the upper end of which is connected as at 41 to a power stick or picker stick connector 42. As shown in Figs. 6 and 9 the power stick 42 is formed of two parts which are held together in adjusted relation by bolts 43 to vary the length of said power stick. The outer end of the power stick is connected by a bolt 44 to a lug strap 45 which extends around picker stick 46 and is held to the latter by a flexible holder 47 secured to the picker stick. The lug strap 45 is provided with an extra hole 48 to receive the bolt 44 when the connections to the picker stick are to be shortened.

A rock shaft 49 located at the bottom of the loom has secured thereto a rocker iron 50 slotted as at 51 to receive a stud 52 which passes through the lower end of the picker stick 46 and forms a pivotal support for the same. A tension spring 53 is connected at the inner end to an arm 54 secured to the rock shaft 49 and the other end of said spring is connected by a leather strap 55 to the picker stick. The normal action of the spring 53 is to move the picker stick to the outward position shown in Fig. 6, the upper end of the picker stick being limited in its outer motion by the end of the lay 56 which moves about the rock shaft 49.

During the normal operation of the loom the bottom shaft 11 will rotate constantly to bring a picking ball 14 into operative relationship with one of the cam faces 27 of the cam member 17. In this way the picking shoe is moved downwardly to cause a right hand movement of the picker shaft 15 as shown in Fig. 6 and a corresponding inward movement of the picker stick. When it is desired to alter the character of the pick, as for instance to render the same sharper or quicker, the screws 20 and 24 will be loosened and the cam member 17 given a slight counterclockwise movement from the position shown in Figs. 1 and 7 to that shown in Fig. 8. The screws 20 and 24 may then be tightened to hold the parts of the picking shoe together rigidly.

It will be noted by referring to Fig. 8 that the adjustment described moves the starting point of the cam face downwardly and slightly to the right and also moves the finishing point of the cam to the left. The effect of this is to reduce the angle defined between lines joining the starting and finishing points of the cam with the axis of the bottom shaft 11 so that the pick is completed in a shorter time than is the case with the shoe set in the position shown in Fig. 7. It will further be noted that the adjustment is accompanied by an increase in the radial distance of the starting and finishing points from the axis of the bottom shaft 11, thus requiring the shaft 15 to move through a slightly greater angle. Thus it will be seen

that the adjustment from the position shown in Fig. 7 to that shown in Fig. 8 makes a more powerful pick for two reasons, namely, the picking motion is completed in a shorter time and the picking cam and shaft are moved through a greater distance.

When the adjustment described is made it is found that it is necessary to raise the picking shoe slightly so that the picking ball will strike the cam at the starting point and this result may be accomplished by shortening the distance between the picker stick and the sweep arm either by changing the length of the picker stick connector 42 or by changing the position of bolt 44. The same result might be accomplished by leaving the connector and lug strap unchanged and moving the stud 52 outward slightly in slot 51.

From the foregoing it will be seen that I have provided a picking shoe made in two parts and having the cam portion thereof adjustable with respect to the picking shaft so as to obtain any desired character of picking motion without moving the picking shoe along the picking shaft. It will further be noted that the adjustments of the picking member to vary the angle during which the picking shoe is acted upon is accompanied by a simultaneous change in the amount of motion of the picking shoe. Also, it will be noted that the wearing portion of the shoe may be readily removed from the picking shaft without disturbing the setting of the latter and that slight variations due to improper setting of the chill for the cam face can be compensated for by the adjusting screws 20.

Having thus described my invention it will be apparent that changes and modifications may be made therein by those skilled in the art without departing from the spirit and scope of the invention, and I do not wish to be limited to the details disclosed herein but what I claim is:

1. In a picking motion for looms, an actuating member movable about a fixed center, a member to be actuated thereby movable about a second center, and a cam supported by one of said members and movable about a third center and capable of assuming all angular positions within predetermined limits with respect to the first and second named centers.

2. In a picking motion for looms, an actuating member movable in a fixed path, a member to be engaged and actuated thereby, a picker stick, adjustable connections between the picker stick and the member to be actuated, a cam face supported by one of said members to engage the other member, and means to vary the position of the cam face with respect to the supporting member therefore and also the fixed path to render said cam face capable of asuming all angular positions within predetermined limits to alter the kind of motion imparted to the picker stick when the members engage each other.

3. In a picking motion for looms, an actuating member movable about a fixed center, a member to be actuated thereby, a picker stick operatively connected to the member to be actuated, a cam supported by one of said members, and means to vary the position of the cam with respect to the fixed center to render said cam capable of assuming all angular positions within predetermined limits while the supporting member for said cam retains the same relative position with respect to the fixed center.

4. In a picking motion for looms, an actuating member movable about a fixed center, a member to be actuated thereby, a picker stick, a cam supported by one of said members, means to vary the position of the cam with respect to the fixed center while the supporting member for said cam remains unchanged in its position with respect to the fixed center, and connections between the picker stick and the member to be actuated variable as to length to move the cam with respect to the actuating member to move the starting point of the cam to approximately the same position for all adjusted positions of the cam.

5. In a picking motion for looms, an actuating member movable about a fixed center, a member to be actuated thereby movable about a second center, a cam supported by one of said members and movable about a third center to assume different angular positions with respect to the first and second named centers, and means independent of the members to move the cam about the center of the member on which said cam is supported to position the starting point of the cam in approximately the same place for the various angular positions the cam may assume.

6. In a picking motion for looms, an actuating member rotating about a fixed center, a member to be engaged by the actuating member during a portion of the movement of said actuating member, and means to render the second named member capable of asuming all angular positions within predetermined limits relatively to the fixed center to effect a change in the time of engagement between the members simultaneolsly with a change in the extent of movement imparted by the actuating member to the member to be actuated.

7. In a picking motion for looms, an actuating member movable about a fixed center, a member to be actuated by the actuating member having a surface to be engaged by the actuating member and having starting and finishing points, and means to render the second named member capable of assuming all angular positions within prede-

termined limits relatively to the fixed center to effect a change in the angle defined by lines joining the starting and finishing points with the fixed center while the member to be actuated remains in the same relative position with respect to the actuating member.

8. In a picking motion for looms, an actuating member movable about a fixed center, a member to be actuated by said actuating member having a face to be engaged by the actuating member during a portion of the movement of the latter and having a starting and a finishing point, and means to render the second named member capable of assuming all angular positions within predetermined limits relatively to the fixed center to effect a change in the radial distance of the finishing and starting points of the face with respect to the fixed center while the members retain the same relative position.

9. In a picking motion for looms, an actuating member movable about a fixed center, a member to be actuated thereby having a cam face with a starting and a finishing point, and means to render the second named member capable of assuming all angular positions within predetermined limits relatively to the fixed center to effect a change in the angle defined between lines joining the fixed center with the starting and finishing points simultaneously with a variation in the radial distance between said starting and finishing points with respect to the fixed center while the members retain the same relative position.

10. In a picking motion for looms, an actuating member movable about a fixed center, a member to be actuated thereby, a cam having starting and finishing points mounted on one of said members for relative movement with respect to the same, and means to render the second named member capable of assuming all angular positions within predetermined limits relatively to the fixed center to effect a change in the angular distance between the starting and finishing points of the cam with respect to the fixed center simultaneously with a variation in the radial distance between the starting and finishing points of the cam with respect to the fixed center of the actuating member.

11. In a picking motion for looms, an actuating member movable about a fixed center, a member to be actuated thereby, a cam capable of assuming all angular positions between predetermined limits and having starting and finishing points mounted on one of said members and movable with respect thereto to effect a reduction in the angular distance between the starting and finishing points with respect to the fixed center simultaneously with an increase in the radial distance between the starting and finishing points with respect to the fixed center.

12. A picking shoe for a loom having a supporting member and having a cam member mounted on the supporting member to assume all angular positions relatively to the supporting member within predetermined limits and secured to said supporting member.

In testimony whereof I have hereunto affixed my signature.

GEORGE F. HUTCHINS.