

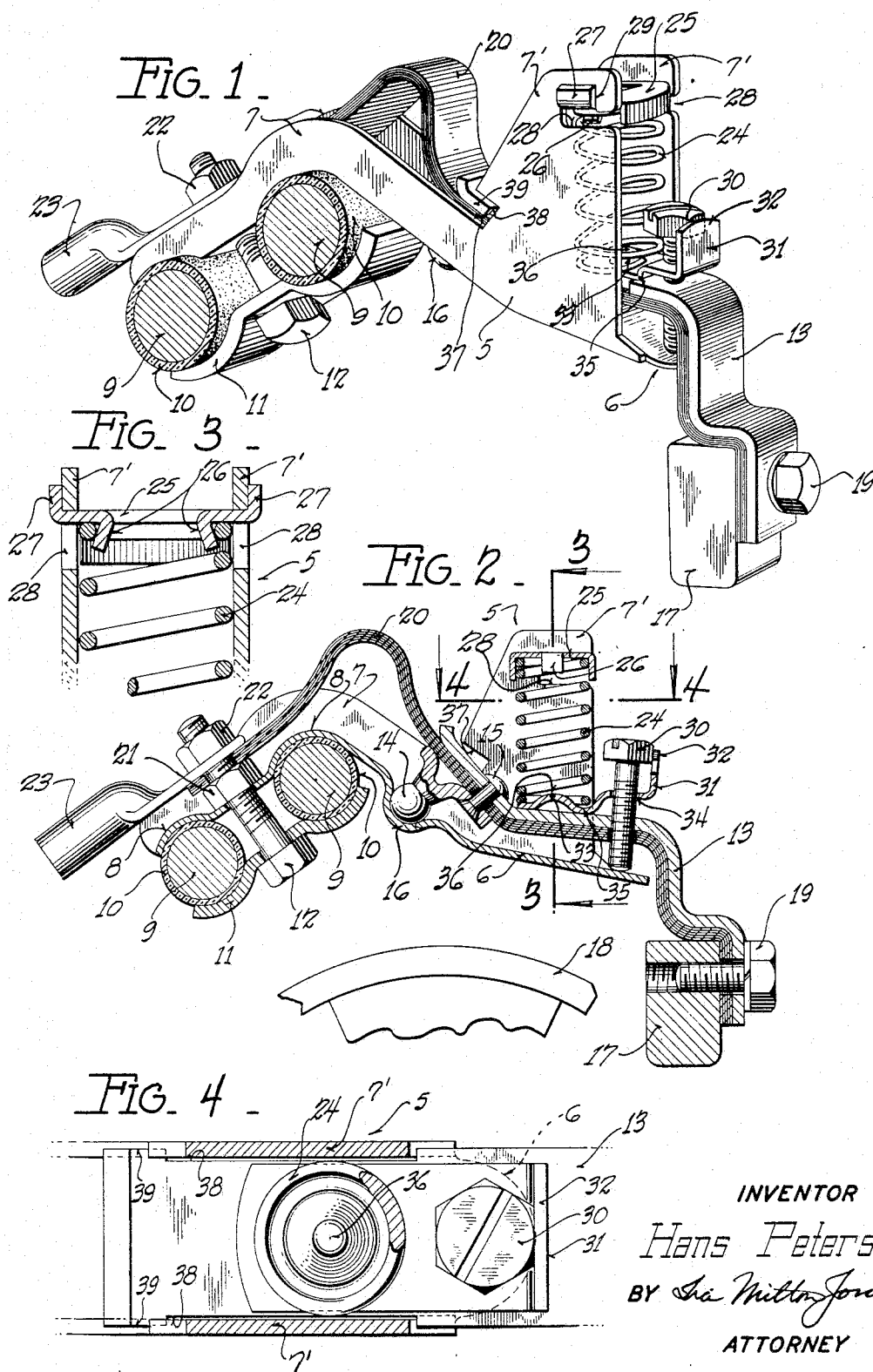
Dec. 5, 1933.

H. PETERSEN

1,938,438

CONTACT FINGER

Filed July 10, 1931



INVENTOR

Hans Petersen

BY *Isa Milton Jones*

ATTORNEY

UNITED STATES PATENT OFFICE

1,938,438

CONTACT FINGER

Hans Petersen, Wauwatosa, Wis., assignor, by
mesne assignments, to Allen-Bradley Company,
Milwaukee, Wis., a corporation of Wisconsin

Application July 10, 1931. Serial No. 549,970

15 Claims. (Cl. 200—166)

This invention relates to improvements in contact devices and refers more particularly to contact fingers for use with electric controllers of the drum type.

5 It is an object of this invention to provide an improved mounting for a movable contact finger which permits full pivotal movement thereof to insure self-alignment of the contact finger with a segment or other element cooperating there-
10 with.

Another object of this invention is to provide an improved manner of connecting the movable contact element with a fixed terminal by means of a flexible current conductor.

15 Another object of this invention resides in a novel mounting for the compression spring which biases the movable contact to a predetermined position.

A further object of this invention resides in the specific manner in which the compression spring is readily removably maintained in operative relationship to the supporting member and the movable contactor.

20 And a still further object of this invention resides in the provision of locking means for the adjusting screw of the movable contact, which is maintained in operative relationship to the adjusting screw by the compression spring which biases the movable contactor.

30 With the above and other objects in view which will appear as the description proceeds, this invention resides in the novel construction, combination and arrangement of parts substantially as hereinafter described and more particularly defined by the appended claims, it being understood that such changes in the precise embodiment of the herein-disclosed invention may be made as come within the scope of the claims.

40 In the accompanying drawing, one complete example of the physical embodiment of this invention is illustrated according to the best mode so far devised for the practical application of the principles thereof, and in which:

45 Figure 1 is a perspective view of a contact device embodying this invention;

Figure 2 is a transverse sectional view taken through the contact device and illustrating its relationship to a drum segment;

50 Figure 3 is a detail sectional view taken through Figure 2 on the plane of the line 3—3; and

Figure 4 is a sectional view taken through Figure 2 on the plane of the line 4—4.

55 Referring now more particularly to the ac-

companying drawing, the numeral 5 represents a supporting member which is formed from bendable metal and is substantially channel shaped in cross section to provide a bottom wall 6 and spaced parallel side walls 7. One end portion 8 of the supporting member is indented to engage and be secured to stationary rods 9. The rods 9 are formed of metal and to insulate the supporting member 5 therefrom have insulating sleeves 10 mounted thereon. A clamping member 11 bridging the rods 9 cooperates with a screw 12 to secure the supporting member to the rods.

Mounted between the spaced parallel side walls 7 of the supporting member is a movable contact 13 the inner end of which has a ball member 14 fixed thereto by a rivet 15 to engage in a socket 16 formed in the bottom wall 6 of the supporting member 5 and pivotally mount the contact 13 from the supporting member. 75 The outer end of the movable contact mounts a contact tip 17 which is adapted for engagement with a drum segment 18. In the present instance the contact device is stationary and the segment 18 moves into engagement with the contact tip 17.

The contact tip 17 is fixed to the movable contact 13 by a cap screw 19 which is threaded in an opening in the tip 17. It is observed that the threaded opening extends entirely through 85 the tip 17 so that it may be readily reversed to provide a plurality of wearing surfaces.

Good electrical connection between the contact tip and an external conductor (not shown) is afforded by a flexible conductor strip 20. One end of the strip 20 is clamped between the contact tip 17 and the adjacent portion of the movable contact and its opposite end is clamped between a nut 21 on the screw 12 serving to hold the supporting member on the rods 9, and a second nut 22 likewise threaded on the screw. A terminal 23 is clamped between the nuts 21 and 22 together with the adjacent end of the conductor strip 20.

It is noted that the flexible strip 20 passes 100 between the ball member 14 and the adjacent inner end portion of the movable contact and is rigidly clamped therebetween by the rivet 15 so that the flexible conductor strip is not subjected to wearing friction by the pivotal movement of the movable contact.

The movable contact is yieldably urged toward the supporting member, and the ball member 14 retained in the socket 16 by a compression spring 24 disposed between upward exten- 110

sions 7' on the supporting member side walls 7 and confined between the movable contact and a cap member 25.

The cap member 25 is of novel construction and has a readily detachable connection with the outermost ends of the projections 7'. As best illustrated in Figure 3 the cap member is fixed to the outer end of the spring 24 by tangs 26 which are struck down to engage under the adjacent coil of the spring and has outwardly directed arms 27 which engage in bayonet slots 28 formed in the walls 7'. When the cap is fully engaged with the bayonet slots, its arms 27 engage in the innermost ends of the bayonet slots behind their abutments 29 to prevent accidental detachment.

However, it will be observed that the cap 25 may be readily disengaged from the supporting member bayonet slots by merely depressing the same against the force of the spring and moving it outwardly.

The compression spring yieldably urges the movable contact toward the supporting member bottom wall 6 and, to adjustably limit the movement of the movable contact by the spring and thus enable adjustment of the contact tip with respect to the segment 18, a stop screw 30 is provided. This screw is threaded in an aperture in the movable contact and bears against the bottom wall 6 of the supporting member.

A locking member 31 prevents accidental rotation of the stop screw 30. This member is bent medially upon itself to form two arms 32 and 33. The arm 32 is adapted to engage the head of the stop screw 30 and the arm 33 is apertured as at 34 to loosely receive the screw, so that the locking member is at all times maintained assembled with the screw. Beyond the screw 30 the arm 33 of the locking member is offset downwardly to form a fulcrum 35 and the end portion beyond the fulcrum has a raised tit 36 which forms a seat for the adjacent end of the compression spring.

From this it will be seen that the compression spring not only yieldably urges the movable contact toward the supporting member to afford contact pressure, but also serves to maintain the locking member 31 in operative engagement with the stop screw by holding the same in a position of rocking movement about the fulcrum 35 at which its end 31 is engaged with the head of the stop screw. Obviously the screw may be adjusted without removing the spring.

It is noted that at the juncture of the extensions 7' with the side walls 7 their rear edges are slotted as at 37 and as best illustrated in Figure 4, the movable contact portion disposed between the inner edge of the slots 37 and the opposite sides of the extensions 7' is reduced in width as at 38 so that abutments 39 are formed at the extreme inner end of the movable contact. These abutments are received in the slots 37 and the purpose of this connection is to necessitate a lateral movement on the part of the movable contact with respect to the supporting member to effect disengagement of the member 14 from the socket thereby precluding the possibility of a jar incidental to a quick engagement of the segment with the contact tip, disengaging the ball and socket joint.

From the foregoing description taken in connection with the accompanying drawing it will be readily apparent to those skilled in the art to which an invention of the character described

appertains that the contact device of this invention is particularly well suited to heavy current service and is capable of withstanding long and severe duty. It is also apparent that the novel manner in which the compression spring is retained in position facilitates disassembly and assembly of its parts and that the adjusting means is locked against accidental actuation by novel means which utilizes the action of the compression spring. It is further apparent that the contact tip may be readily turned about to present a new wearing surface or that a new contact tip may be readily installed.

What I claim as my invention is:

1. In a contact device of the character described, a supporting member, a movable contact, means pivotally connecting the movable contact with the supporting member whereby the movable contact is movable toward and away from the supporting member, an adjusting screw for limiting the movement of the movable contact toward the supporting member, lock means for the adjusting screw, and a compression spring for maintaining the lock means in operative relation to the adjusting screw and for yieldably urging the movable contact toward the supporting member.

2. A contact device of the character described, comprising a supporting member, a movable contact, a pivotal connection between the movable contact and the supporting member enabling the movable contact to move toward and away from the supporting member, an adjusting screw for limiting the movement of the movable contact toward the supporting member, a locking member for the adjusting screw having its medial portion bent to provide a fulcrum, said locking member having a part at one side of the fulcrum engageable with the adjusting screw, and a compression spring engaging a part of the locking member on the other side of the fulcrum to maintain said first mentioned locking member part in operative engagement with the adjusting screw, and to yieldably urge the movable contact toward the supporting member.

3. A contact device of the character described, comprising a supporting member, a movable contact, a pivotal connection between the movable contact and the supporting member enabling movement of the movable contact toward and away from the supporting member, an adjusting screw for limiting the movement of the movable contact toward the supporting member, a locking member for preventing accidental actuation of the adjusting screw and bent medially upon itself to form angularly disposed end portions, one end portion engaging the adjusting screw, the other end portion overlying part of the contact finger, and a compression spring confined between said overlying part of the locking member and an abutment carried by the supporting member whereby the compression spring yieldably maintains the locking member in its position engaging the adjusting screw and yieldably urges the movable contact finger toward the supporting member.

4. A contact device of the character described, comprising a supporting member, a movable contact, a pivotal connection between the movable contact and the supporting member enabling movement of the movable contact toward and away from the supporting member, an adjusting screw carried by the movable contact and engaging the supporting member to limit movement of the movable contact toward the

supporting member, a locking member for preventing accidental movement of the adjusting screw and bent medially upon itself to dispose its end portions angularly with respect to each other with its medial portion forming a fulcrum engageable with the movable contact and about which the locking member is rockable to move one end portion thereof into and out of engagement with the adjusting screw, a spring seat formed on the opposite end portion of the locking member, a spring seat carried by the supporting member, and a compression spring confined between said spring seats whereby the compression spring holds the locking member in the position of rocking movement about its fulcrum engaging the same with the adjusting screw and also yieldably urges the movable contact toward the supporting member.

5. In a contact device of the character described, a supporting member a contact member movable toward and away from the supporting member, a spring for yieldably urging the contact member toward the supporting member, an adjusting screw for limiting the movement of the contact member toward the supporting member, a locking member bent medially upon itself to provide a fulcrum and having an opening loosely receiving the adjusting screw whereby the locking member is maintained assembled with the adjusting screw with part of the locking member at one side of its fulcrum engageable with the adjusting screw to prevent accidental rotation thereof, and a spring seat on the locking member part at the opposite side of the fulcrum engageable by the compression spring whereby the compression spring maintains the locking member in a position of movement about its fulcrum engaging the same with the adjusting screw.

6. A contact finger of the character described, comprising a supporting member formed from bendable metal and provided with a socket in one wall, a movable contact, mounting means for the supporting member, a flexible conductor extending from the mounting means to the outer end of the movable contact, a ball member engageable in the socket, means for securing the ball member to the movable contact with the adjacent portion of the flexible conductor clamped therebetween, and a compression spring for yieldably urging the movable contact to a predetermined position with respect to the supporting member.

7. A contact device of the character described, comprising a supporting member formed from bendable metal and having a pair of substantially parallel walls connected by a third wall, a movable contact having a part disposed between said substantially parallel walls, a ball and socket connection between the movable contact and the third wall permitting movement of the movable contact toward and away from the supporting member third wall, a compression spring having one end engageable with the movable contact for yieldably urging the same toward the third wall, and a spring rest engageable with the other end of the compression spring and readily detachably engaged with the outer end portions of said substantially parallel spaced walls.

8. In a contact device of the character described, a supporting member having spaced walls, a movable contact having a part disposed between said spaced walls and movable with respect to the supporting member, a compression

spring between said spaced walls and engaging the movable contact to yieldably urge the same in one direction, a spring rest engaging the other end of the compression spring, and means formed on said spring rest and readily detachably engaged with said spaced walls.

9. In a contact device of the character described, a supporting member having spaced walls, a movable contact having a part disposed between said spaced walls and movable with respect to the supporting member, a compression spring between said spaced walls and engaging the movable contact to yieldably urge the same in one direction, a member attached to the other end of the compression spring, and projections extending from said member and readily detachably engageable in slots formed in the spaced walls whereby said member receives support from the spaced walls and the spring is readily detachably held in its operative position.

10. In a contact device of the character described, a supporting member having spaced walls, a movable contact having a part disposed between said spaced walls and movable with respect to the supporting member, a compression spring between said spaced walls and engaging the movable contact to yieldably urge the same in one direction, a cap member engaged over the other end of the spring, means for securing the cap member to the spring, said cap member being received between the spaced walls, and projections extended from opposite sides of the cap member and readily detachably engaged in slots formed in the spaced walls.

11. In a contact device of the character described, a supporting member having spaced walls provided with bayonet slots, a contact member having a part received between the spaced walls and movable with respect to the supporting member, a compression spring having one end engaged with the movable contact, a cap member connected with the opposite end of the spring, and means carried by the cap member and engaged with the bayonet slots in the spaced walls whereby the spring is readily detachably maintained in operative position yieldably urging the movable contact toward a predetermined position.

12. In a contact device of the character described a supporting member having spaced substantially parallel walls connected by a third wall, said third wall having a socket and the spaced parallel walls having slots adjacent said socket, a movable contact having a part disposed between the spaced substantially parallel walls, a ball member carried by the movable contact and engaged in the socket to pivotally connect the movable contact with the supporting member, a compression spring yieldably urging the movable contact to a predetermined position with respect to the supporting member, and means carried by the movable contact and engaging in the slots in the spaced substantially parallel walls to necessitate lateral motion on the part of the movable contact to release the ball member from the socket, whereby accidental disengagement of the ball member from the socket is prevented.

13. In a contact device of the character described, a contact arm having a stepped end portion providing an abutment, a flexible conductor having a part overlying the stepped end portion of the contact arm, a contact tip having a single threaded opening, an attaching screw passed through an opening in the contact arm and

- threaded in the opening in the contact tip, said threaded opening being so located as to secure the tip to the arm in a position with one end of the tip clamping the flexible conductor between it and the abutment on the contact arm whereby the abutment serves to hold the tip against rotation about the attaching screw and said threaded opening extending entirely through the contact tip and the contact tip being symmetrical to enable the same to be mounted so as to present either of two surfaces to an element engageable therewith.
14. In a contact device of the character described, a supporting member, a contact supported from and movable with respect to the supporting member, an adjusting screw to define one of the limits of movement of the movable contact, a locking member fulcrumed to move to and from operative engagement with the adjusting screw to hold the adjusting screw against accidental actuation, and a spring to hold the locking member in operative engagement with the adjusting screw and to yieldably urge the movable contact to its limit of movement defined by the adjusting screw.
15. In a contact device of the character described, a supporting member, a contact supported from and movable with respect to the supporting member, an adjusting screw movable with the contact and bearing against the supporting member to define one of the limits of movement of the contact, a locking member engaging the adjusting screw to hold the same against accidental actuation, said locking member having a part extending laterally away from the adjusting screw, and a spring bearing against said locking member part and the contact to simultaneously hold the locking member in engagement with the adjusting screw and to yieldably urge the movable contact to its limit of movement defined by the adjusting screw.
- HANS PETERSEN.

25	100
30	105
35	110
40	115
45	120
50	125
55	130
60	135
65	140
70	145
75	150