Feb. 2, 1960 C. F. BRITTON 2,923,056

WHEEL CYLINDER BAFFLE CONSTRUCTION AND METHOD OF MAKING SAME

Filed July 22, 1955 2 Sheets-Sheet 1

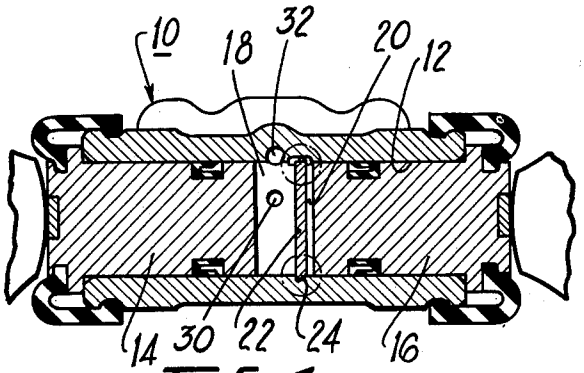


Fig. 1

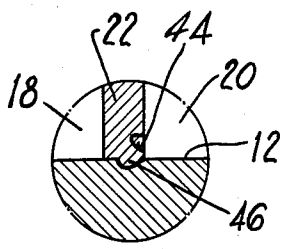


Fig. 2

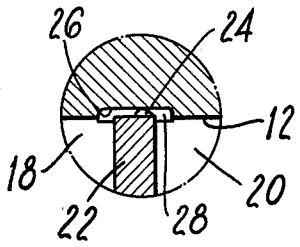


Fig. 3

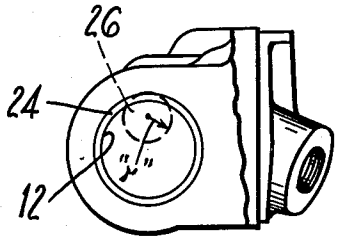


Fig. 4

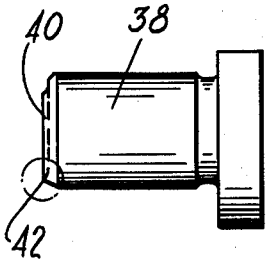


Fig. 5

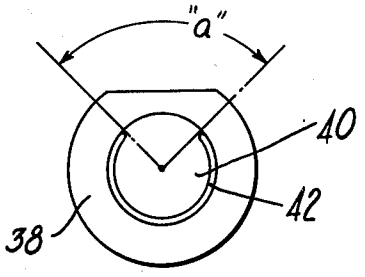


Fig. 6

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WHEEL CYLINDER BAFFLE CONSTRUCTION AND METHOD OF MAKING SAME

Filed July 22, 1955 2 Sheets-Sheet 2

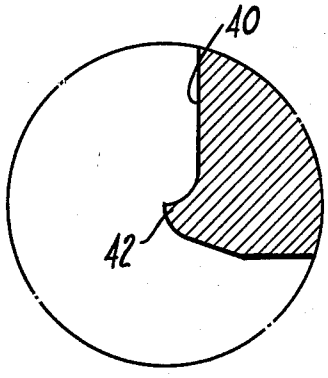


Fig. 7

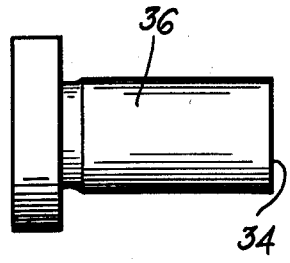


Fig. 8

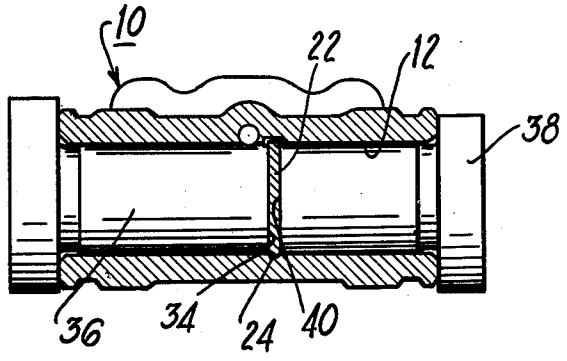


Fig. 9

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United States Patent Office 2,923,056 Patented Feb. 2, 1960

2,923,056

WHEEL CYLINDER BAFFLE CONSTRUCTION AND METHOD OF MAKING SAME

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Application July 22, 1955, Serial No. 523,821

3 Claims. (Cl. 29—522)

This invention relates to a wheel cylinder construction and method for making the wheel cylinder. The category of wheel cylinders considered in this invention are those wherein two oppositely-acting pistons are reciprocably received and are arranged to be spread apart or oppositely applied to actuate a brake or the like.

This invention is related to copending application 350,560, filed April 23, 1953. The present invention has generally the same objects as the referenced application and is further intended to provide an improved method of assembly, and greater structural rigidity to the fluid motor.

One of the objects of the invention is to positively locate a passage connecting two compartments in the fluid motor in order to ensure that the passage is always located at the uppermost part of the fluid motor. This location of the passage enables improved bleeding of air on both sides of the partition or baffle. When the passage between the compartments is formed by notching the partition or baffle, it is possible that the baffle can be accidentally rotated or turned angularly during assembly so that the passage separating the two compartments is no longer located at the uppermost part of the fluid motor. One of the prominent characteristics of the present invention is that the passage connecting the two compartments is always located at an optimum position regardless of the angular position assumed by the baffle during installation in the fluid motor.

An additional feature of the invention is to positively secure the baffle in place so that it cannot be accidentally dislodged by fluid pressure which is developed in the fluid motor during brake applications.

It is the aim of the present invention to permanently and positively secure the baffle within the fluid motor through methods which can be easily adapted for high scale production.

Other objects and features of the present invention will become apparent from a consideration of the following description which proceeds with reference to the accompanying drawings wherein:

Figure 1 shows a completed fluid motor;

Figures 2 and 3 are enlarged detail views of the encircled portions indicated in Figure 1;

Figure 4 is an end view of the fluid motor with the piston removed, looking from the right hand side of Figure 1;

Figure 5 is a detail view of the punch used in assembling the fluid motor;

Figure 6 is a left hand end view of Figure 5;

Figure 7 is an enlargement of the encircled portion of Figure 5;

Figure 8 is a detail view of the backup plug which supports the baffle while it is being punched; and

Figure 9 is a view of the tools used in assembling the wheel cylinder, said tools being shown in assembling location within the fluid motor.

A wheel cylinder indicated generally by reference numeral **10** (Figure 1) includes a cylinder bore **12** and

two oppositely-acting pistons **14** and **16** which are arranged to anchor on the remote ends of wheel cylinder **10**. This construction is sometimes referred to as a wheel cylinder anchor since the wheel cylinder is arranged to take braking torque by virtue of engagement of the pistons with the ends of the wheel cylinder. The wheel cylinder is divided into two compartments or chambers **18** and **20** by a transversely arranged partition **22** which consists of a flat disk or the like. The partition acts as a baffle for the hydraulic fluid in the cylinder and is secured in the bore **12** of the wheel cylinder.

Referring to Figures 1, 2, 3, and 4, an annular groove **24** is machined in the cylinder bore around the entire inner diameter of the cylinder bore. A cutter (not shown) of radius "*r*" (Figure 4) is then used to form a lunular notch **26** (Figures 1 and 3) which widens the groove **24** along an arcuate segment thereof. Notch **26**, as indicated in Figure 3, is also considerably greater in width than the partition **22**. The notch **26** is of equal or greater depth than groove **24** to form a passage **28** which connects the two compartments or chambers **18** and **20**.

An inlet port **30** and bleed port **32** are located in compartment **18** which is on the left hand side of the partition **22** in Figure 1.

The wheel cylinder is arranged in the position shown in Figure 1 when the brake is assembled. It will be noted that the notch **26** is located at the uppermost part of the cylinder bore when the fluid motor is positioned as shown in Figure 1. This is particularly significant since efficient bleeding of the brake requires thorough purging of air on either side of the compartment, and this necessitates circulating the fluid so that it leaves compartment **20** at the highest level thereof. Any entrained air bubbles which may have collected in the compartment **20** are thus carried out of the compartments and leave the wheel cylinder via bleed port **32**.

It will be noted that this proper location of the passage is established by machining the notch **26** in the cylinder bore; thus, its location is independent of the angular position of the partition **22**.

In assembling the partition within the fluid motor, a flat disk is inserted in the cylinder bore **12** and a locating plug **36** is inserted in the left hand side of the fluid motor (Figure 9). While the fluid motor is held in a fixture, end **34** of plug **36** is then brought into contact with the left hand side of the partition **22** (referring to Figure 9). A punch **38** (Figures 5 and 9) is then thrust into the right hand side of the fluid motor. At the face **40** (Figures 5, 6, and 7) of the punch, there is formed a corner **42** which is in the shape of an incomplete annulus indicated in Figure 6. The corner or ridge **42** contacts the right hand side of the partition **22** and when it is driven against the face of the partition by a suitable tool (hammer or the like), the right hand face of the partition is indented with a recess **44** corresponding in shape to that of the corner **42**. A bead **46** (Figure 2) at the edge of the partition is extruded into groove **24**, thus mortising the partition **22** and cylinder bore together. The bead **46** is also an incomplete annulus corresponding in length to that of the ridge **42** on the punch. The partition **22** is thus securely held in place within the bore **12** of the fluid motor.

The general purpose of the partition or baffle **22** is to prevent brake clicking which arises from sudden slamming of the pistons into the anchoring position wherein they contact the ends of the fluid motor. This is accomplished in the following manner: piston **14** is associated with the actuatable end of the primary shoe of a Duo-Servo brake and piston **16** is associated with the actuatable end of the secondary shoe. When the brake is applied, fluid pressure is built up at a faster rate in com-

partment 18, thus moving piston 14 ahead of piston 16. The primary shoe is thus fully applied before the piston 16 moves appreciably away from its anchoring position. If the piston 16 should move from anchored position, the impact of returning it to anchored position is cushioned by the restricted rate of fluid transfer through the passage 28 from compartment 20 to compartment 18. This principle is fully explained in copending application No. 350,560, previously identified in this disclosure.

As indicated from Figures 2 and 6, the joint formed between the partition 22 and cylinder bore 12 is obtained by extending an incomplete annular bead of material into the groove 24. The angular portion "*a*" indicated in Figure 6 is not extruded in a radial direction. Thus, the fastening operation does not seal the passage 28 which is formed between notch 26 and the outer edge of the partition within the angle "*a*." The bead 46 (Figure 2) does, however, form a seal between the partition and the bore 12 so that fluid can pass across the partition only at the passage 28 at the top of the cylinder bore. It is thus possible to control the restriction while maintaining its proper location.

Although a single selected embodiment of the invention has been chosen to illustrate the invention, it will be apparent to those skilled in the art that various modifications and changes may be made without departing from the underlying principles thereof. I intend therefore to include within the scope of the following claims, all such variations and modifications which can be expected to occur to those skilled in the art.

I claim:

1. In a method of making wheel cylinders, the steps which comprise: providing a wheel cylinder having a longitudinally extending cylinder bore, machining an annular groove in the cylinder bore approximately midway between the ends thereof, cutting an arcuate notch of greater width than said groove along a segment of said groove and located at the uppermost portion of said cylinder bore when the wheel cylinder is in operating position, locating a baffle within said cylinder bore with the outer edge thereof in alignment with said groove, simultaneously backing up and punching said baffle only along the periphery adjacent the narrower width portion of the groove whereby material is extruded into said narrower width groove portion to fixedly locate the baffle transversely within said bore while maintaining a clearance between said baffle and arcuate notch at the uppermost portion of said cylinder bore thereby providing a restricted passage across said baffle.

2. In a method for making wheel cylinders, the steps including: machining an annular groove in the wheel cylinder bore, forming a notch of greater width than said groove along a segment thereof and at the uppermost level of said cylinder bore, locating a partition transversely within said cylinder bore with the edges thereof in alignment with said groove, and punching only the margin of said partition adjacent the narrow width portion of said groove to extrude metal within said narrower width groove portion while maintaining clearance between said partition and notch of greater width to thereby provide fluid transfer across said partition at the region between said partition and notch.

3. In a method of making fluid motors, the steps including: forming an annular groove in the wall of the cylinder, machining a notch along a segment of said groove to increase the width thereof, transversely locating a partition within said cylinder, and punching only the marginal portion thereof adjacent the narrower width portion of said groove to extrude material into said narrower width portion of said groove to sealingly mortise the partition and cylinder bore and provide fluid passage across said partition through the clearance between the partition and said notch.

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UNITED STATES PATENT OFFICE

CERTIFICATE OF CORRECTION

Patent No. 2,923,056 February 2, 1960

Clayton F. Britton

It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction and that the said Letters Patent should read as corrected below.

Column 3, line 12, for "extending" read -- extruding --; line 43, after "periphery" insert -- thereof --.

Signed and sealed this 27th day of September 1960.

(SEAL)

Attest:

KARL H. AXLINE

Attesting Officer

ROBERT C. WATSON

Commissioner of Patents