

Feb. 13, 1940.

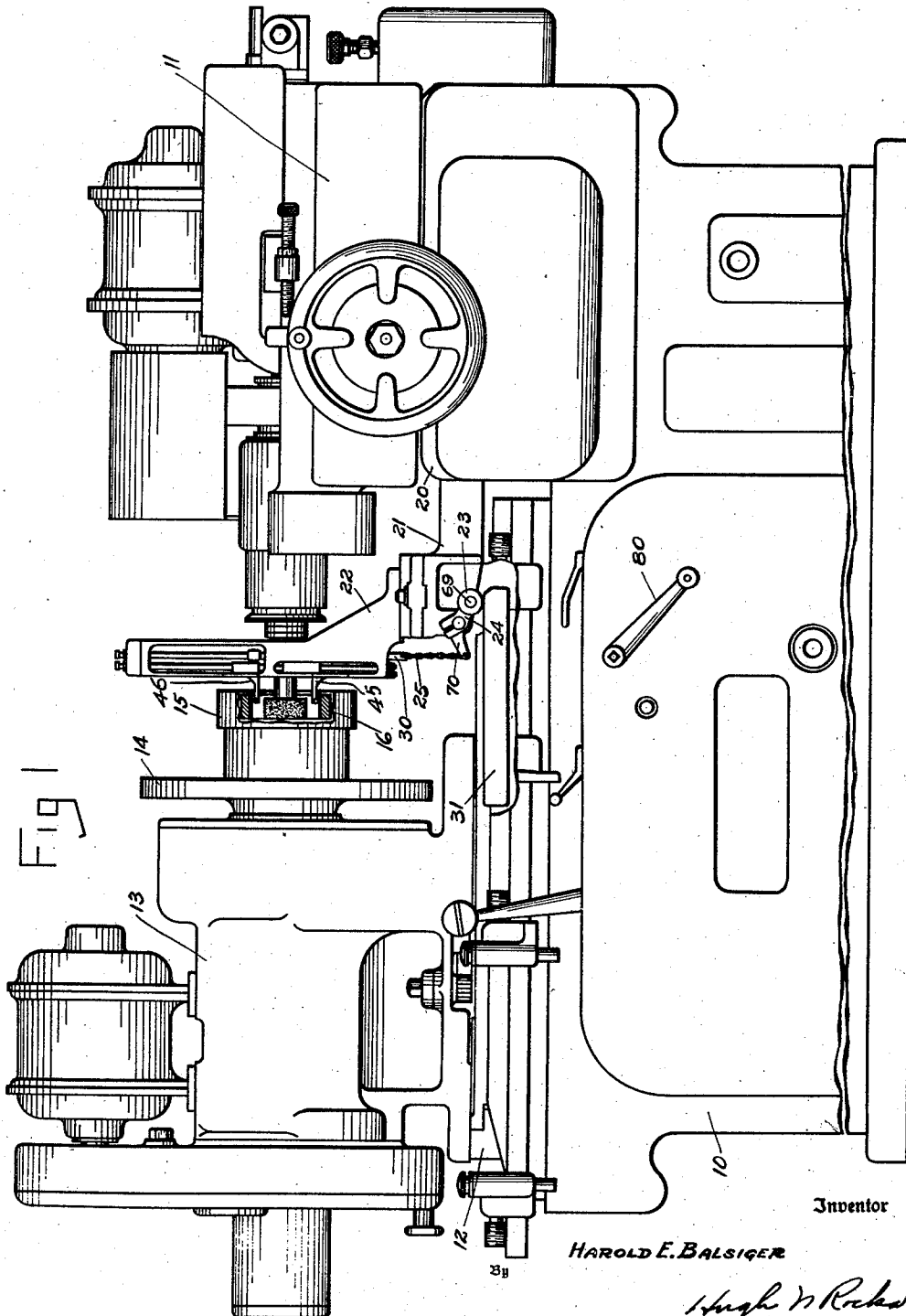
H. E. BALSIGER

2,190,306

SIZING DEVICE

Filed May 3, 1938

2 Sheets-Sheet 1



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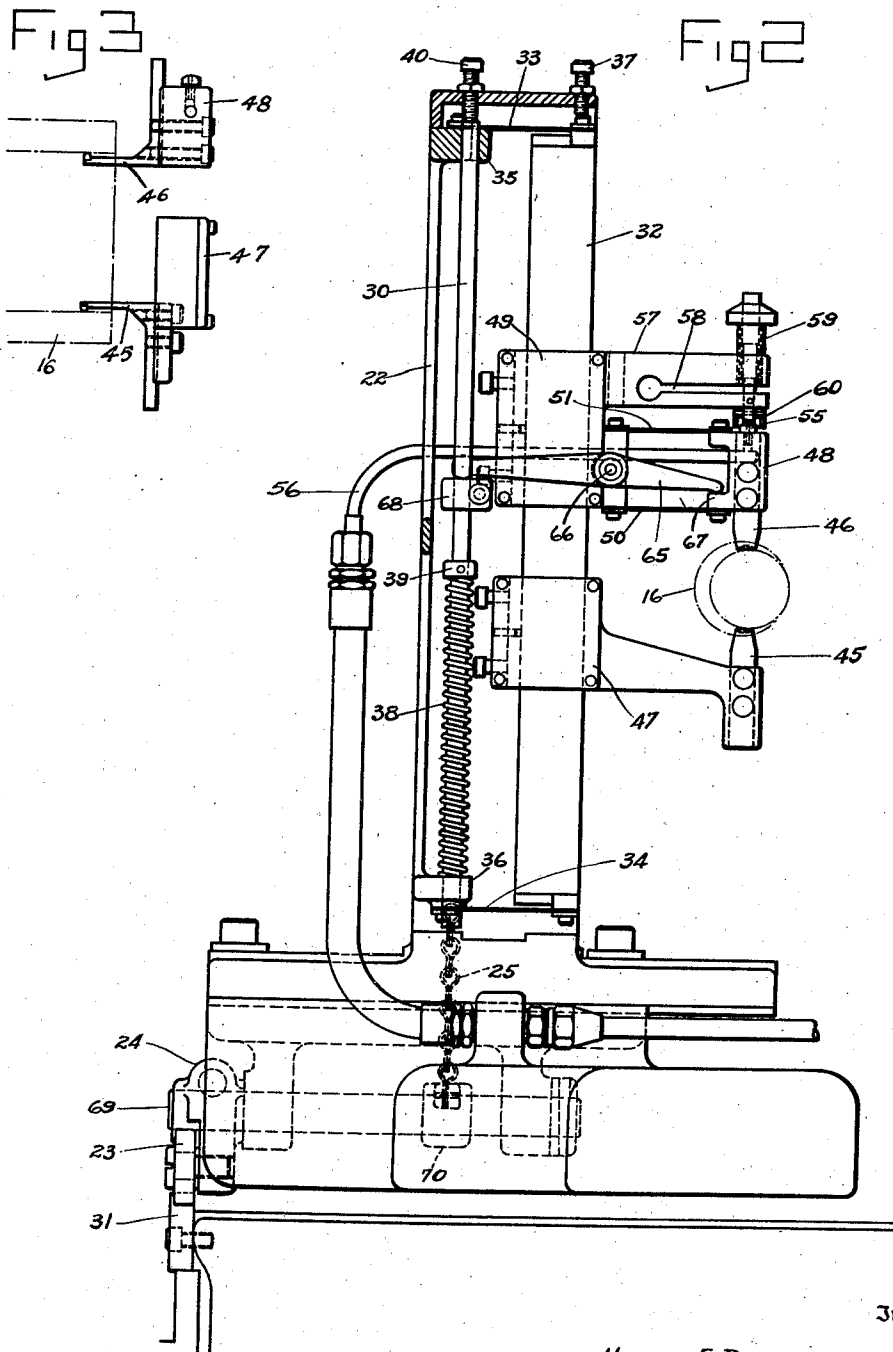
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2,190,306

SIZING DEVICE

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Application May 3, 1938, Serial No. 205,749

6 Claims. (Cl. 51-165)

My invention relates to sizing device calipers particularly those used in connection with internal surfaces.

It is an object thereof to provide a floating mounting for a caliper of this type.

A further object is to provide resilient support members for the feelers or work engaging portions of said caliper.

A further object is to provide means for withdrawing said feelers radially out of contact with the surface of the work when the work and wheel are separated and to cause said feelers to move radially into engagement with the surface of the work when said wheel and work are brought together in grinding position.

This caliper is an improvement over the single feeler type of caliper in that it gauges the distance between opposite points on the surface being ground rather than the distance between the surface being ground and another fixed surface either on the work itself or on the machine. It is not affected by irregular or eccentric rotation of the work because it moves with the work under such conditions. The only movement which is effective to control size is the relative movement of the feelers in response to an actual change in diameter of the work piece. Such a result is possible only when the feelers are permitted to float relative to the caliper frame.

Figure 1 is a front elevation of an internal grinding machine showing the sizing device in operative position.

Figure 2 is a right hand end elevation of my device with the parts in inoperative position.

Figure 3 is an enlarged end elevation of a portion of my device.

In the drawings Figure 1, numeral 10 indicates the bed of an internal grinding machine of the type shown in my Patent 2,088,682 granted August 3, 1937. A carriage 12 upon which is mounted a headstock 13 is slidably mounted for movement longitudinally of said bed. Said carriage may be moved manually by means of crank 30 or by power as disclosed in my Patent 2,088,682. A wheel base 11 is slidably mounted for movement transversely thereof on a bridge 20 which spans carriage 12. A face plate 14 rotatably mounted on said headstock carries a chuck 15. A work piece 16 is secured in said chuck. Attached to the left hand side of bridge 20 is a bracket 21 upon which is mounted a caliper frame 22. A roller 23 is mounted on one end of an arm 24 which in turn is secured to a shaft 69 in bracket 21. A chain 25 has its lower end attached to the end of another arm 70 also se-

cured to shaft 69. The other end of said chain is attached to a rod 30 the function of which will be described later. A cam 31 may be adjustably mounted on carriage 12 for engaging roller 23 upon movement of the carriage to bring work into grinding position and causing it to rotate on its arm in a counter-clockwise direction.

The caliper consists of the frame 22 from which is suspended a bar 32 by means of resilient strips 33 and 34 secured to lugs 35 and 36 respectively on frame 22. The vertical position of said bar may be adjusted by means of screw 37. A rod 30 is slidably mounted in said lugs 35 and 36 and urged upwardly by a spring 38 one end of which bears against lug 36, the other end against a collar 39 on rod 30. Upward movement of said rod is limited by a stop screw 40.

Feelers 45 and 46 engage the work 16 at points which are preferably diametrically opposite each other. Feeler 45 is supported on the extended arm of a bracket 47 which is adjustably secured to bar 32.

Feeler 46 is attached to a block 48 which in turn is suspended from bracket 49 by parallel resilient strips 50 and 51. Bracket 49 is adjustably secured to bar 32.

A nozzle 55 is inserted in block 48 and attached to a supply line 56 for air or other fluid under pressure. An arm 57 on bracket 49 has a saw slot 58 which may be spread by an adjustable member 59. The lower portion of said slotted arm carries a member 60 which may be adjusted toward or away from nozzle 55 by adjustable member 59.

An arm 65 is pivoted at 66 to bracket 49. One end of said arm rests on a ledge 67 on block 48. The other end rests on a dog 68 which is adjustably secured to rod 30.

Operation

During a grinding operation the feelers 45 and 46 are held in contact with the surface of the work 16 by means of resilient strips 33 and 34, and 50 and 51. As the work approaches the desired size, nozzle 55 approaches member 60 and the fluid escaping from the nozzle is gradually restricted. The effect of this restriction is described in my Patent 2,001,447 granted May 14, 1935, and will not be discussed here except to note that one of its functions in this case may be to cause an axial separation of the work and wheel as disclosed in my Patent 2,088,682. In this case the work carriage 12 moves to the left. Cam 31 on said carriage permits roller 23 to drop and rotate shaft in a clockwise direction

due to the action of spring 38. Said spring moves rod 30 upwardly and with it the dog 68. Said dog engages lever 65 and tends to rotate it about its pivot 66 in a clockwise direction. The result of this movement of lever 65 is that bar 32 is moved upwardly against the resilience of strips 33 and 34 to separate feeler 45 from the surface of the work 16. The end of the lever 65 which rests on ledge 67 moves downwardly to cause feeler 46 to be separated from the work piece. Said feelers will remain in this condition until the carriage is moved to the right to bring a new work piece into grinding position. Because of the retracted position of the feelers the work may be passed over them without interference. However, as soon as cam 31 lifts roller 23 the above described operation will be reversed and the feelers will again engage the inside surface of the work.

I claim:

1. In a sizing device a supporting frame, a bar resiliently attached to said frame and having a movement relative thereto, a pair of brackets mounted on said bar, a work engaging feeler on each of said brackets, one of said feelers being resiliently attached to its bracket.

2. In a sizing device, a supporting frame, a bar resiliently attached to said frame and having a movement relative thereto, a pair of brackets mounted on said bar, a work engaging feeler on each of said brackets, one of said feelers being resiliently attached to its bracket and means for moving said bar in one direction and said resiliently mounted feeler in the opposite direction whereby to move said feelers into and out of contact with the work piece.

3. In a sizing device, a supporting frame, a pair of brackets resiliently suspended in said frame and restricted to movement in one plane, a feeler rigidly secured to one bracket, another feeler resiliently secured to the second bracket and movable relative thereto in one plane only, a lever pivoted in said second bracket and having one end thereof resting on a portion of the

resiliently mounted feeler and means whereby a force applied at the other end of said lever results in a movement of both brackets in one direction to separate the rigidly secured feeler from the work surface and at approximately the same time a movement of the resiliently secured feeler in the opposite direction.

4. In a sizing device, a supporting frame, feeler members resiliently mounted on said frame for movement in one plane only whereby to maintain floating contact with a work piece, one of said feelers being rigidly mounted and another being resiliently mounted respectively relative to each other, and means for moving said feelers toward and from each other whereby to engage or withdraw same from the surface of the work.

5. In a grinding machine for grinding the internal surfaces of cylindrical work pieces, a work support, a grinding wheel support, mechanism for effecting a relative longitudinal movement of said supports for placing said wheel and a work piece in working position, a sizing device on a fixed support separate from said work support and having a pair of resiliently mounted work engaging feelers located in alignment with said work, and means controlled by said longitudinal movement for urging said feelers toward each other until the work and wheel are in working position.

6. In a grinding machine, a bed, a work carriage slidably mounted thereon for movement toward and away from working position, means on said carriage for rotatably supporting a work piece, a sizing device having feelers for engaging the surface to be ground, resilient means for normally urging said feelers in a direction to engage the surface to be ground, other resilient means for holding said feelers out of work engaging position, and means actuated in timed relation with the movement of the carriage into working position to render said other resilient means operative or inoperative.

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