No. 898,328. PATENTED SEPT. 8, 1908.

C. J. COULTER.

MECHANICAL MOVEMENT.

APPLICATION FILED MAR. 18, 1907.

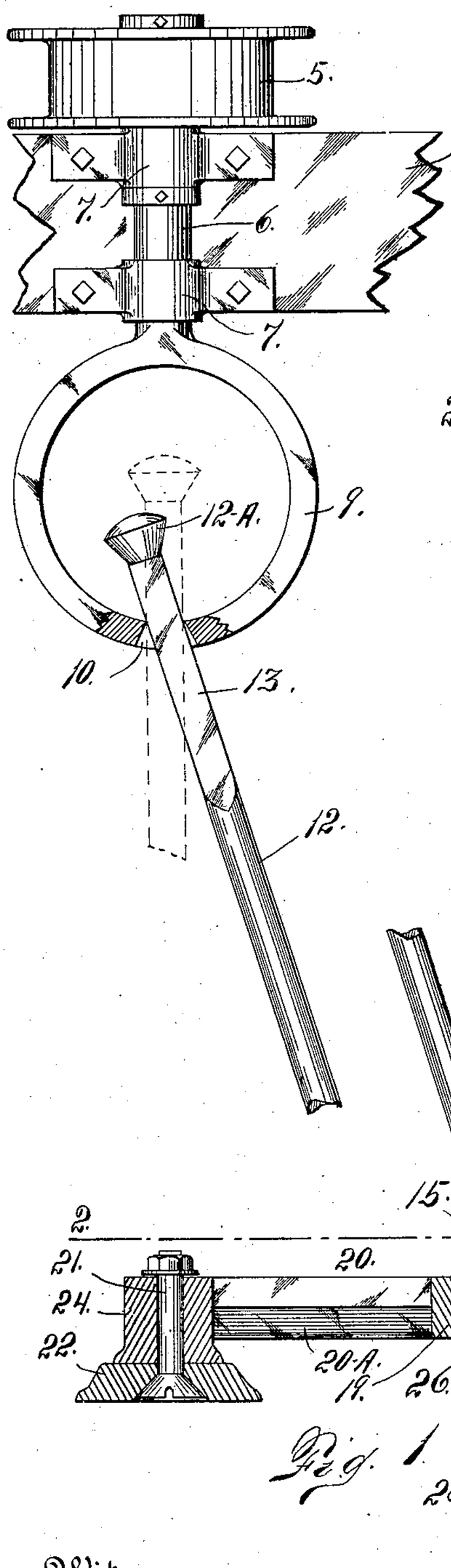

Fig. 1.

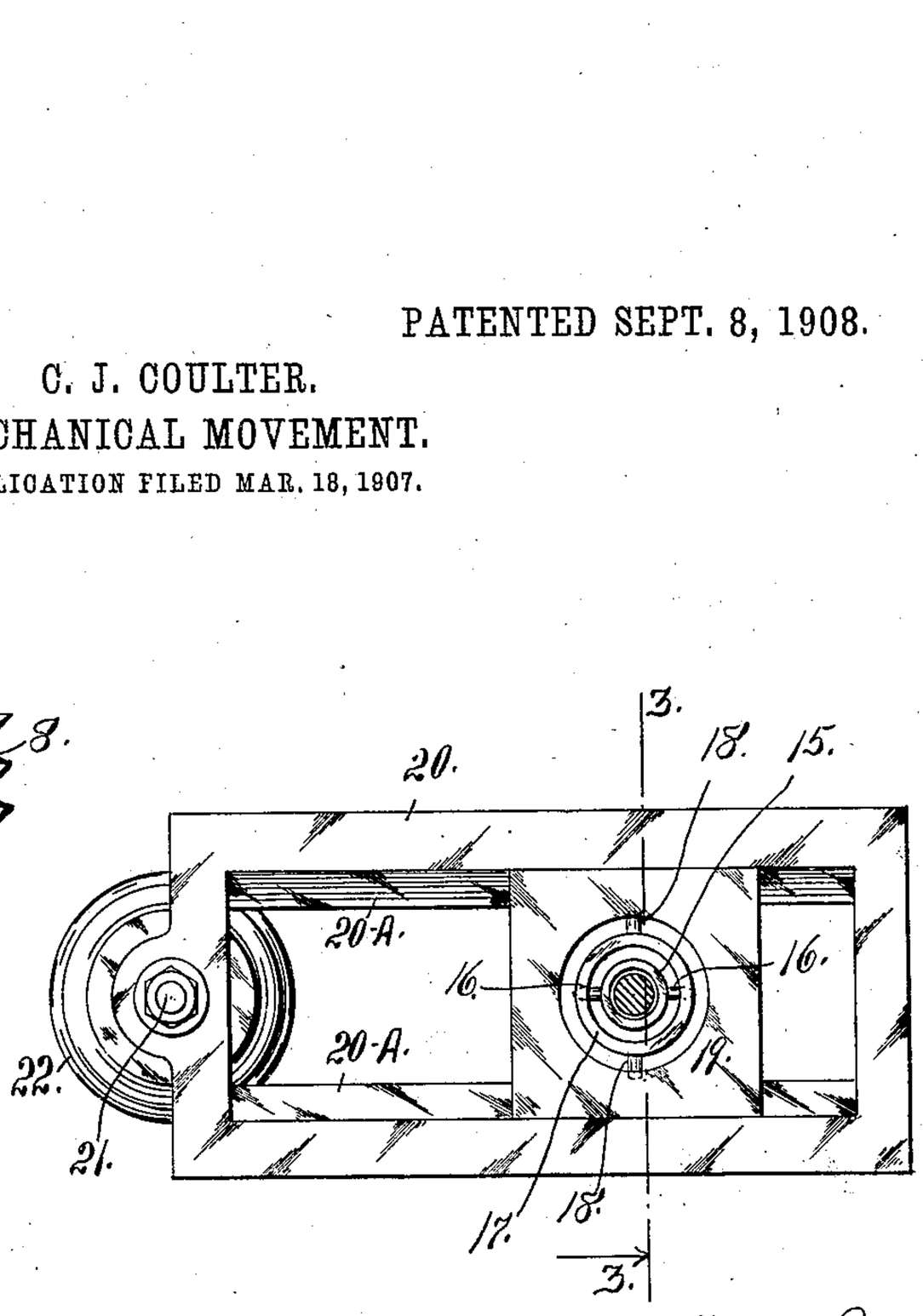

Fig. 2.

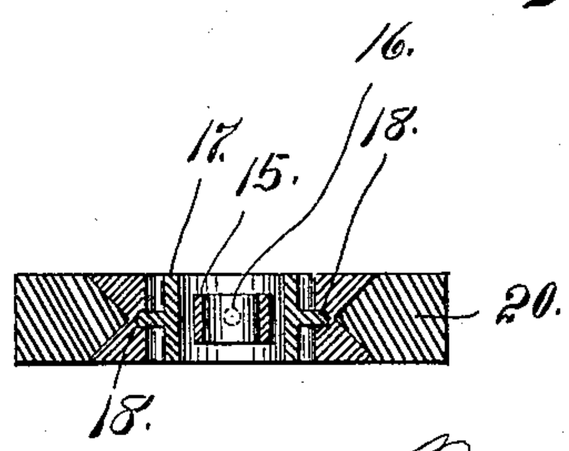

Fig. 3.

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MECHANICAL MOVEMENT.

No. 898,328. Specification of Letters Patent. Patented Sept. 8, 1908.

Application filed March 18, 1907. Serial No. 363,094.

To all whom it may concern:

Be it known that I, CHARLES J. COULTER, a citizen of the United States, residing at Longmont, in the county of Boulder and State of Colorado, have invented certain new and useful Improvements in Mechanical Movements; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the letters and figures of reference marked thereon, which form a part of this specification.

My invention relates to improvements in mechanical movements, my object being to obtain by the use of a rigid shaft, all of the various adjustments and changes of position which can now be obtained by the use of a flexible shaft. The flexible shaft while permitting a practically infinite variety of changes of the position of an operating tool without changing the location of the operating motor, is an exceedingly expensive article, and this is more especially the case where a comparatively large device is required as in the performance of work of considerable magnitude. By the use of my improved mechanism, the operating tool may be given practically the same range of movement and adjustment, without the expense incident to the initial cost of a flexible shaft or the cost of repairs incident to the use of the last named device.

Having briefly outlined in a very general way my improvement, I will proceed to describe the same in detail reference being made to the accompanying drawing in which is illustrated an embodiment thereof.

In this drawing, Figure 1 is a view illustrating my improvement, the shaft, however, being broken away intermediate its extremities by reason of lack of room on the sheet for better illustration. Fig. 2 is a section taken on the line 2—2 Fig. 1. Fig. 3 is a section taken on the line 3—3 Fig. 2.

The same reference characters indicate the same parts in all the views.

Let the numeral 5 designate an operating pulley which it may be assumed is connected with any suitable power. This pulley is mounted upon a shaft 6 journaled in bearings 7 mounted upon a stationary support 8. One extremity of the shaft 6 is provided with a ring 9 having an opening 10 through which the driven shaft 12 passes. The portion 13 of this shaft which passes through the opening 10, is angular, preferably square in cross section. The opening 10 is of the same shape as the shaft, at the inner surface of the ring, while from this edge, the opening is enlarged or outwardly flared to the periphery of the ring, whereby the shaft is allowed to oscillate freely. The construction, however, is such that as the ring is rotated with the driving shaft, the driven shaft is rotated regardless of the position which it occupies with reference to the axis of the driving shaft. In other words the shaft 12 will be operated equally well by the driving shaft, whether the driven shaft is in axial alinement with the shaft 6 or occupies any angle thereto. In order, however, that the driven shaft may be advantageously employed for doing work as in the operation of a tool conventionally shown in Fig. 1 and designated by the numeral 14, it is essential that it shall have an additional bearing. In the drawing this bearing consists of a sleeve 15 through which the shaft passes and in which it is freely journaled. This sleeve is pivoted at two opposite points designated 16, in an outer sleeve 17 which is pivoted at two opposite points 18, the axis of these pivots being at right angles to the axis of the pivots 16. The outer sleeve 17 is pivoted in a block 19 adapted to slide freely in a frame 20 pivoted at 21, whereby it is adapted to turn freely on a base 22.

By virtue of the construction of the bearing sleeves 15 and 17, and the sliding movement of the block 19, together with the rotary movement of the frame 20, it is evident that my improved construction will permit a wide range of movement to the tool 14. By virtue of the pivoted sleeve 17, the shaft 12 may be moved back and forth within the range permitted by the sliding block 19. It is evident that this frame may be of such length as to permit any desired degree of movement. Again by virtue of the pivotal mounting of the sleeve 15, it is evident that the driven shaft 12 together with the tool 14 may be moved in a circle around the pivot 21 on any radius within the range of movement of the sliding block.

Attention is called to the fact that the interior opposite edges of the frame 20 is provided with V-shaped tongues 20^A, which engage counterpart grooves formed in the opposite edges of the sliding block 19. Attention

is also called to the fact that the frame 20, is rigidly connected with a hub 24 mounted to rotate on the pivot 21.

In further explanation of my improved construction, attention is called to the fact that the extremity 25 of the shaft 12, connected with the tool 14, is angular in cross section and adapted to engage an opening 26 formed in the eye 27 of the tool, thus permitting substantially the same range of movement of the tool on the shaft, that is allowed the shaft 12 by the opening 10 of the ring 9. In other words if the tool 14 is for boring purposes, the bit may occupy a position parallel to the axis of the driving shaft 6, regardless of the angle at which the shaft 12 stands to the same axis. The extremity 25 of the shaft 12 is provided with an enlargement 28 which occupies a position within the opening of the eye 27. This enlargement or head 28, prevents the shaft from pulling out of the tool or in other words holds the tool in operative relation with the shaft. By making the angular portion of the shaft where it engages the ring 9 or the eye 27 as the case may be of considerable length, it is evident that any desired range of longitudinal adjustment of the shaft within the ring or of the eye upon the shaft may be obtained. By virtue of this construction, the shaft 12 may be employed to impart rotary movement to a machine having lateral vibration or reciprocation. It will thus be seen that this device permits practically all of the various adjustments allowed by the flexible shaft as heretofore explained.

While the opening 10 in the ring 9 has its knife edge which engages the shaft, at the inner surface of the ring, it is evident that this edge may be located at the periphery of the ring or intermediate its inner surface and periphery. If the knife edge is located at the periphery, the opening will be inwardly flared or enlarged; while if the knife edge is located intermediate its inner surface and periphery, the opening will be enlarged or flared in both directions. It is evident that in either of the cases last specified the operation of the shaft will be substantially the same.

Having thus described my invention, what I claim is:

1. The combination with a driving shaft, a ring provided with an opening angular in shape and flaring, the shaft having a portion of counterpart shape passing through the said opening, a frame, and a bearing mounted in said frame and pivoted at two opposite points and through which the said shaft passes and in which the latter is journaled.

2. The combination of a driving shaft, a driven shaft having a universal joint connection with the driving shaft, a frame a block slidably mounted in said frame, and a bearing through which the shaft passes, the said bearing being pivoted at two opposite points to allow the shaft to oscillate or occupy various angles with reference to the axis of the driving shaft, substantially as described.

3. The combination with a driving shaft, of a driven shaft having a universal joint connection with the driving shaft, a frame a block slidable in the frame, two sleeves the first of which is pivoted in the block at two opposite points, while the second is pivoted in the first at two opposite points, the axes of the pivots of the two rings extending at right angles to each other, one sleeve being located within the other, and the driven shaft taking bearing in the inner sleeve, substantially as described.

4. The combination with a driving shaft, of a driven shaft having a universal joint connection with the driving shaft, a pivotally mounted frame, a block slidably mounted in the frame, a bearing for the said driving shaft mounted in the block and in which said shaft is adapted to rotate, the said bearing having a universal joint connection with the block.

5. The combination with a driving shaft, of a driven shaft having a universal joint connection with the driving shaft whereby the two shafts are connected to rotate in unison, a frame, a block slidably mounted in the frame, a bearing having a universal joint connection with the block, through which bearing the shaft passes and in which it is journaled, the frame being mounted to swing in a plane at right angles to the axis of the driving shaft, an operative connection between the driven shaft and a tool, the latter having an eye provided with an opening in its ring or periphery of angular shape and outwardly flared, the driving shaft passing through said opening and having an angular portion, the counterpart of the opening in the ring.

In testimony whereof I affix my signature in presence of two witnesses.

CHARLES J. COULTER.

Witnesses:

DENA NELSON,

A. J. O'BRIEN.