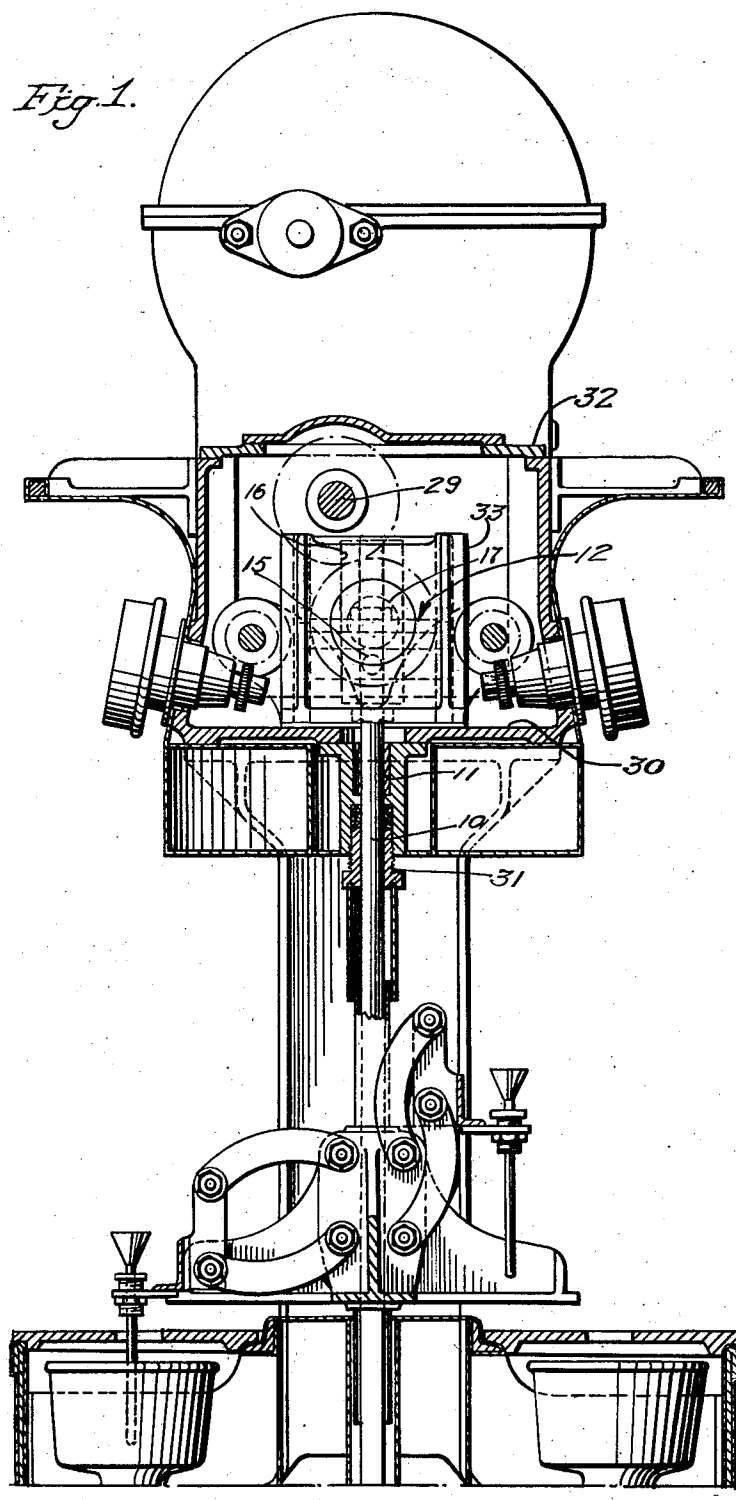
July 31, 1934. H. W. BUTTERWORTH, JR., ET AL 1,968,026

TRAVERSE DRIVE FOR SPINNING MACHINES

Filed May 9, 1933 4 Sheets-Sheet 1

Fig. 1.



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TRAVERSE DRIVE FOR SPINNING MACHINES

Filed May 9, 1933 4 Sheets-Sheet 2

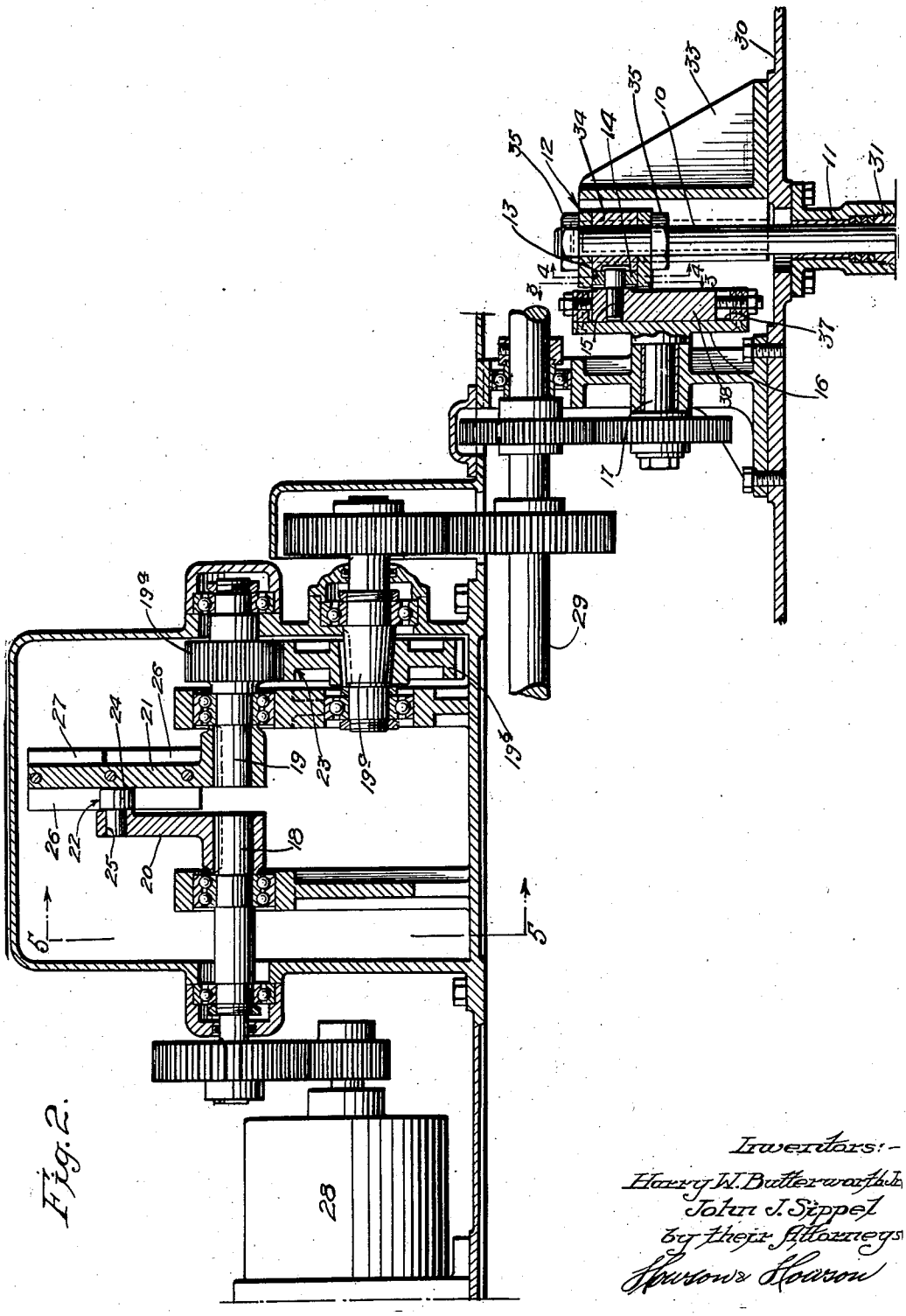


Fig. 2.

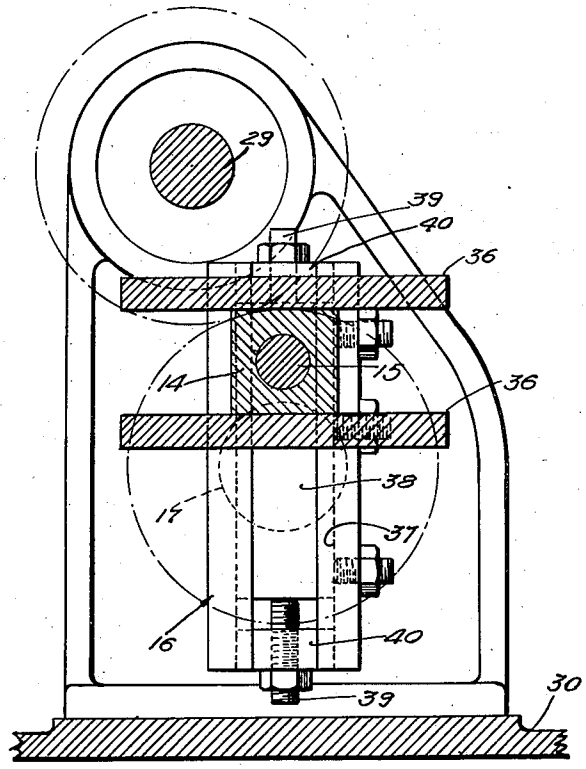
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TRAVERSE DRIVE FOR SPINNING MACHINES

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Fig. 3.



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TRAVERSE DRIVE FOR SPINNING MACHINES

Filed May 9, 1933 4 Sheets-Sheet 4

Fig. 5.

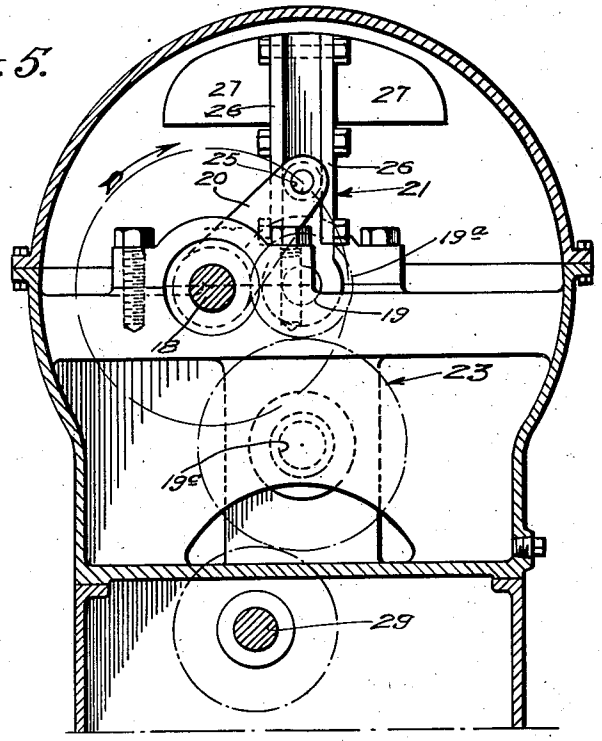
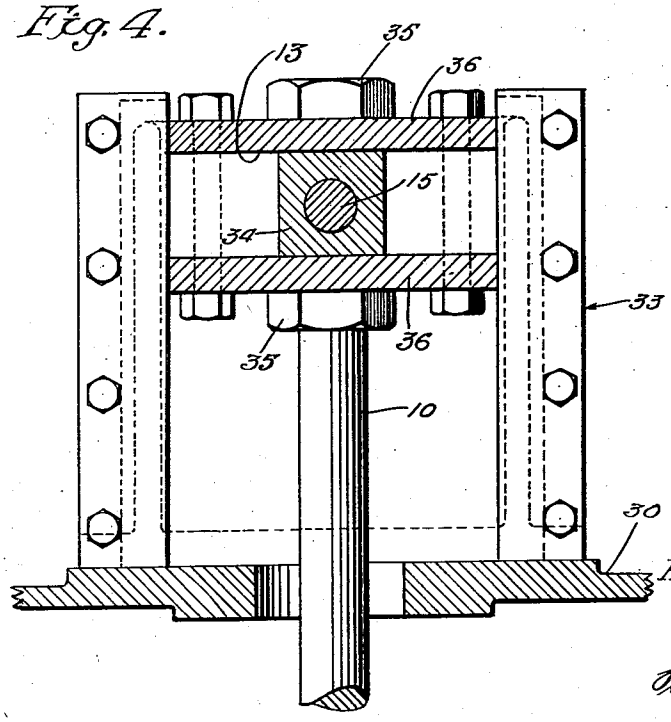


Fig. 4.



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UNITED STATES PATENT OFFICE

1,968,026

TRAVERSE DRIVE FOR SPINNING MACHINES

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Application May 9, 1933, Serial No. 670,206

13 Claims. (Cl. 74—14)

This invention relates to a drive for traverse mechanisms, and more particularly to a high speed traverse motion.

Traverse motions as applied to winding machines, rayon spinning machines and the like, must have a uniform, or substantially uniform, motion in reciprocation of the traverse arm. To produce such a motion, it is essential that the movement of the arm be reversed very abruptly. Such devices, as heretofore produced, have involved the use of cam or oddly shaped gearing, or a combination of these two elements. Any structure involving the use of a surface cam practically prohibits a positive drive of the traverse mechanism in opposite directions and, accordingly, in many winding and rayon spinning apparatuses gravity is depended upon as a means for maintaining the traverse mechanism in operative contact with a cam during a down stroke of this mechanism. This is highly unsatisfactory when the mechanism is operated at any appreciable speed for the throw of the cam at the points of rapid reversal tend to cause the mechanism to leave the cam and upon reengagement therewith to cause pounding and failure of proper timing. This failure of the cam at higher speeds has led to the production of the numerous combination devices above referred to, but in providing such devices resort has always been had to the use of malformed gears sometimes employed in connection with cams and at other times in connection with crank motions. In order that any gear may truly, or substantially, compensate for the variation in speed resulting from the use of an eccentric or crank, the gear must be of unusual shape for the reversal of motion provided by such a device is difficult of compensation by use of a gear. These oddly shaped gears are extremely expensive and, furthermore, do not coact properly in operation; in other words, there is no proper rolling of the gears upon one another, with the result that they are subject to high friction losses, to binding, and to other ills which reduce the effective life thereof and render the cost of both production and operation excessively high. When employed with a cam, in order that the gear may have less pronounced objectionable features, all of the disadvantages of the cam become immediately attendant.

An important object of this invention is the provision in a device of this character of an arrangement producing a uniform reciprocation of a traverse arm without the use of oddly shaped gearing or cams.

A further and more specific object of the invention is the provision of a drive providing substantially uniform reciprocation and in which the traverse arm is positively driven in its opposite directions.

A further object of the invention is to provide a structure of this character in which, by the use of a single mechanism and without replacement of any of the portions thereof, a variation may be had in the stroke of the traverse.

A still further object of the invention is the provision of a device of this character in which the construction of all wearing parts is such that they may be readily replaced at a relatively low cost.

These and other objects we attain by the construction shown in the accompanying drawings wherein, for the purpose of illustration, we have shown a preferred embodiment of our invention and wherein:

Fig. 1 is a vertical sectional view through a traverse drive mechanism constructed in accordance with our invention;

Fig. 2 is a longitudinal sectional view therethrough;

Fig. 3 is an enlarged detail sectional view on line 3—3 of Fig. 2;

Fig. 4 is a sectional view on line 4—4 of Fig. 2; and

Fig. 5 is a sectional view on line 5—5 of Fig. 2.

Referring now more particularly to the drawings, the numeral 10 generally designates a traverse arm mounted for reciprocation through a bearing 11. This arm is equipped at its upper end with a scotch yoke 12. Within the slot 13 of this yoke operates a bearing block 14 receiving an actuator at present illustrated as the pin 15 of a crank 16. Quite obviously, in lieu of crank 16, its direct equivalent, an eccentric, might be employed. Upon operation of the shaft 17 bearing crank 16, it will be obvious that a reciprocation will be provided of traverse arm 10 which, without modification of the rotation of shaft 17, would be of constantly varying character during either cycle thereof, the speed of movement at the center of the stroke being high and at the ends of the stroke being low.

In combination with this structure we employ a drive comprising a pair of eccentrically disposed shafts 18 and 19, said shafts having cranks 20 and 21 respectively. Said cranks 20 and 21 have a connection generally designated at 22 which is slidable on one crank and fixed on the other, said connection, because of the eccentricity of these shafts, causing an intermittent rotary

motion of the driven shaft 19 as a result of a uniform rotary motion of the driving shaft 18. By properly proportioning the eccentricity of these shafts and the effective length of the crank bearing the fixed element of the connection, the motion of shaft 19 can be made to substantially exactly offset the variation in timing produced by the rotation of the crank 16 through either cycle of its rotation. Having obtained this result, it is simply necessary that the rotation of shaft 19 be transmitted to the shaft 17 at the proportion of two rotations of shaft 19 to one rotation of shaft 17. For this reason, one-to-two gearing is interposed between the shafts 19 and 17 as indicated at 23, thus providing correction for both cycles of rotation of crank 16. This one-to-two gearing may, obviously, be disposed at any point in the chain of connections between shaft 19 and shaft 17, but it is preferred that this gearing incorporate a pinion 19—*a* on the shaft 19 and a gear 19—*b* mounted on a stub shaft 19—*c*. The entire mechanism thus far described may be very conveniently arranged within a sealed housing so that all portions thereof can operate in oil.

A structure of this character lends itself very readily to assembly and repair. In the pin and slot connection between shafts 18 and 19 the pin may be roller equipped as at 24 and the pin itself mounted for ready removal and replacement as indicated at 25. The slot in which the pin operates may be readily formed by equipping crank 21 with removable side plates 26. Side plates 26 may constitute media for the support of counterweights 27. In inspecting Fig. 5, it will be obvious that if rotation of crank 20 is in the direction of the arrow, the driving force transmitted through the connection is least when the cranks are aligned with one another and directed to the right in this figure, and greatest when the arms are aligned with one another and directed to the left in this figure. Counterweight 27 will, accordingly, act to assist driving transmission at the time when this driving force is the least and to oppose it when it is the greatest, thus smoothing to a certain extent the otherwise uneven loads imposed upon operating motor 28.

Transmission from stub shaft 19—*c* to shaft 17 is preferably made by way of an intermediate shaft 29 which may extend longitudinally of the machine and have driving connection with a plurality of the shafts 17, shaft 29 constituting the main drive shaft of the machine. Shaft 29, preferably, extends longitudinally of the upper end of a trough 30 in which the shafts 17 are mounted and at the bottoms of which bearings 11 are mounted. By providing bearings 11 with packing glands 31 as illustrated, the scotch yoke mechanism may likewise be operated in oil and by covering the trough 30 as indicated at 32, the mechanism becomes particularly well adapted for use in conjunction with the rayon spinning machines hereinbefore referred to, due to the fact that all operating mechanisms are encased and operating in oil, and are thus protected from the attacks of acids which lead to rapid deterioration of the mechanisms ordinarily employed.

The scotch yoke mechanism employed is preferably constructed as illustrated more particularly in Figs. 2, 3 and 4. A guide 33 is secured to the bottom of trough 30 in which the yoke 12 operates. The yoke comprises a block 34 vertically reciprocable in this guide and to which the upper end of the transverse arm 10 is rigidly secured. The securing means 35 for the arm perferably provide means for clamping to block 34 a pair of plates 36 which project to one side of the block and combine to produce groove 13. The crank 16 is constructed with a dovetailed slot 37 slidably mounting a block 38 bearing pin 15. Block 38 is adjustable through two set screws 39 extending through the end walls 40 of slot 37 and engaging the block. Employing this construction, it is possible to adjust the effective length of the crank 16 and thus permit adaptation of the drive for traverse motions of different lengths. The apparatus is, thus, again particularly adapted for use in conjunction with rayon spinning machines in which the same type of spinning machine is equipped with spinning pots of different depths depending upon the particular size of cake which the user desires to produce.

Since the construction is, obviously, capable of considerable modification without in any manner departing from the spirit of our invention, we do not wish to be understood as limiting ourselves thereto except as hereinafter claimed.

We claim:

1. In a traverse mechanism, a traverse arm, a rotatable shaft, a scotch yoke connection between said shaft and arm, means to rotate said shaft comprising a pair of eccentrically disposed shafts each having a crank and a pin and slot connection between the cranks of said shafts, and a driving connection between the driven shaft of said pair and said rotatable shaft whereby the rotatable shaft is rotated once for each two revolutions of the driven shaft of the pair.

2. In a traverse mechanism, a traverse arm and means to drive said arm comprising a crank, a pair of eccentrically disposed shafts and a connection between said eccentrically disposed shafts comprising a pair of cranks, a member fixed to one of said cranks and slidable upon the other thereof, said pair of shafts and said drive crank being arranged in series and a connection therebetween for rotating the drive crank from and once for each two revolutions of the shaft of the driven crank of said pair.

3. In a traverse mechanism, a traverse arm and means to drive said arm comprising a scotch yoke, a pair of eccentrically disposed shafts and a connection between said eccentrically disposed shafts comprising a pair of cranks and a member fixed to one of said cranks and slidable upon the other thereof, said pair of shafts and said scotch yoke being arranged in series, the connection between the scotch yoke and the driven shaft of said pair comprising means driving the operating member of the yoke once for each two revolutions of the driven shaft of the pair.

4. In a traverse mechanism, a traverse arm, a rotatable shaft, a scotch yoke connection between said shaft and arm, means to rotate said shaft, said means comprising a pair of eccentrically disposed shafts each having a crank and a pin and slot connection between the cranks of said shafts, means driving the operating member of the yoke from the driven shaft of the pair and once for each two revolutions of said driven shaft, said scotch yoke connection comprising a member of adjustable eccentricity whereby to permit adjustment of the stroke of the traverse arm.

5. In a traverse mechanism, a traverse arm, a rotatable shaft, a scotch yoke connection between said shaft and arm, means to rotate said shaft comprising a pair of eccentrically disposed shafts each having a crank and a pin and slot connection between the cranks of said shafts, means driving the operating member of the yoke from

the driven shaft of the pair and once for each two revolutions of said driven shaft, a covered trough enclosing said rotatable shaft, the scotch yoke connection and the upper end of said arm, and a bearing for the arm in the bottom of said trough and including a packing gland whereby said shaft and the scotch yoke connection may be operated in a lubricating bath.

6. In a traverse mechanism, a traverse arm, a rotatable shaft, a scotch yoke connection between said shaft and arm, a drive for said shaft comprising crank means constructed and arranged to produce a variable rotary motion which when impressed upon either cycle of operation of said scotch yoke connection through said rotatable shaft will produce uniform motion of said traverse arm, and a one-to-two gearing connecting said crank means and said shaft.

7. In a traverse mechanism, a traverse arm, a rotatable shaft, a scotch yoke connection between said shaft and arm, and a drive for said shaft comprising crank means constructed and arranged to produce a variable rotary motion which when impressed upon either cycle of operation of said scotch yoke connection through said rotatable shaft will produce uniform motion of said traverse arm.

8. In a traverse mechanism, a traverse arm, a rotatable shaft, a scotch yoke connection between said shaft and arm, means to rotate said shaft comprising a pair of eccentrically disposed shafts each having a crank and a pin and slot connection between the cranks of said shafts, counterweight means arranged to assist rotation when the leverage ratio between said shafts is high and oppose rotation when leverage ratio is low, and a driving connection between the driven shaft of said pair and said rotatable shaft whereby the rotatable shaft is rotated once for each two revolutions of the driven shaft of the pair.

9. In a traverse mechanism, a traverse arm and means to drive said arm comprising a scotch yoke, a pair of eccentrically disposed shafts and a connection between said eccentrically disposed shafts comprising a pair of cranks and a member fixed to one of said cranks and slidable upon the other thereof, said pair of shafts and said scotch yoke being arranged in series, and counterweight means arranged to assist rotation when the leverage ratio between said shafts is high and oppose rotation when leverage ratio is low, the connection between the scotch yoke and the driven shaft of said pair comprising means driving the operating member of the yoke once for each two revolutions of the driven shaft of the pair.

10. In a traverse mechanism, a traverse arm, a rotatable shaft, a scotch yoke connection between said shaft and arm, a drive for said shaft comprising a pair of shafts and variable leverage means constructed and arranged to produce a variable motion which when impressed upon either cycle of operation of said scotch yoke connection through said rotatable shaft will produce uniform motion of said traverse arm, and a one-to-two gearing connecting the driven shaft of said pair and the first-named shaft.

11. In a traverse mechanism, a traverse arm, a rotatable shaft, a scotch yoke connection between said shaft and arm, and a drive for said shaft comprising a pair of shafts and variable leverage means constructed and arranged to produce a variable motion which when impressed upon either cycle of operation of said scotch yoke connection through said rotatable shaft will produce uniform motion of said traverse arm.

12. In a traverse mechanism, a traverse arm, a rotatable shaft, a scotch yoke connection between said shaft and arm, a drive for said shaft comprising a pair of shafts and variable leverage means constructed and arranged to produce a variable motion which when impressed upon either cycle of operation of said scotch yoke connection through said rotatable shaft will produce uniform motion of said traverse arm, a one-to-two gearing connecting the driven shaft of said pair and the first-named shaft, and counterweight means arranged to assist rotation when the leverage ratio between said shafts is high and oppose rotation when leverage ratio is low.

13. In a traverse mechanism, a traverse arm, a rotatable shaft, a scotch yoke connection between said shaft and arm, a drive for said shaft comprising a pair of shafts and variable leverage means constructed and arranged to produce a variable rotary motion which when impressed upon either cycle of operation of said scotch yoke connection through said rotatable shaft will produce uniform motion of said traverse arm, and counterweight means arranged to assist rotation when the leverage ratio between said shafts is high and oppose rotation when leverage ratio is low.

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