April 7, 1959 G. C. SCHELLING 2,880,556

LENS SURFACING MACHINE

Filed Sept. 18, 1957 2 Sheets-Sheet 1

FIG. 2

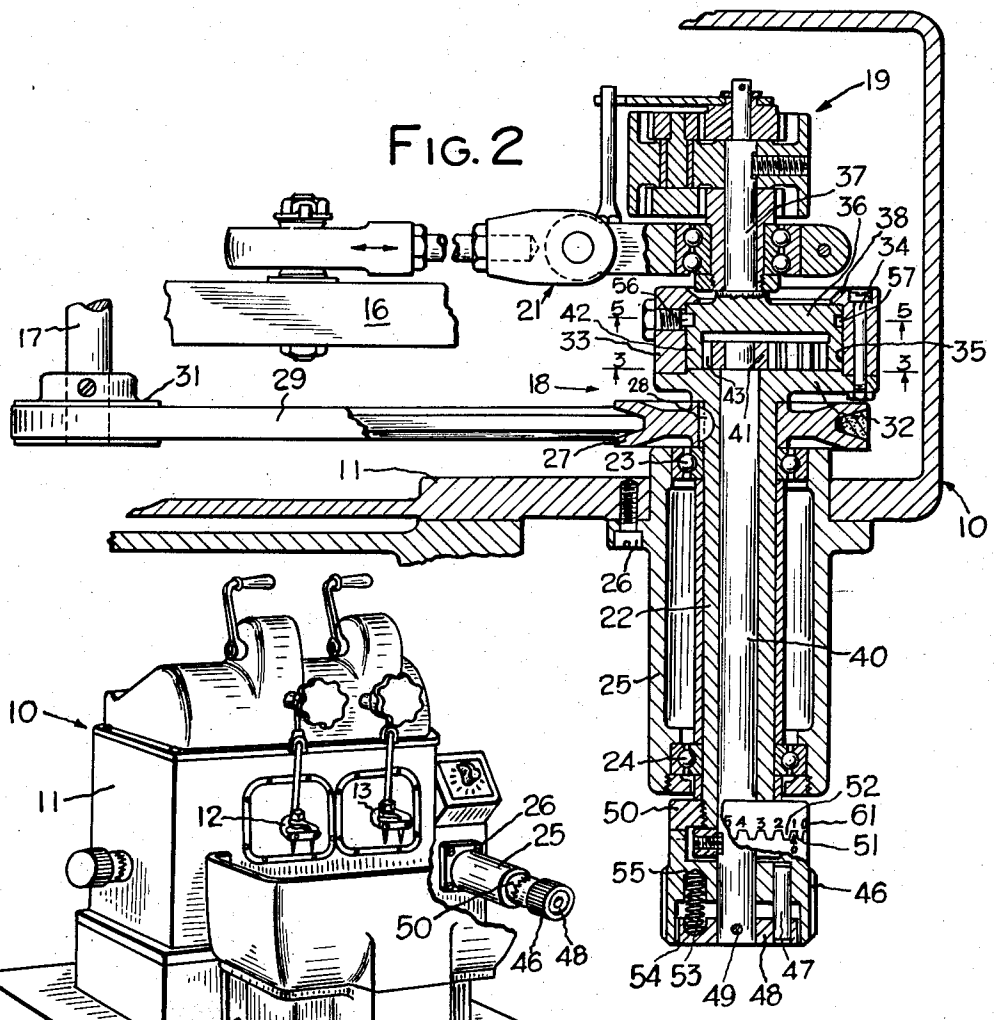


FIG. 1

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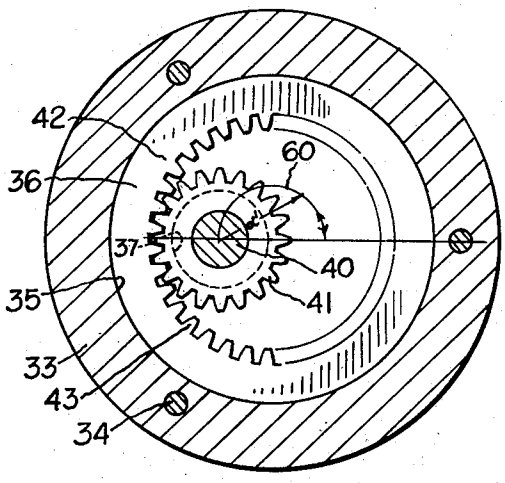


FIG. 3

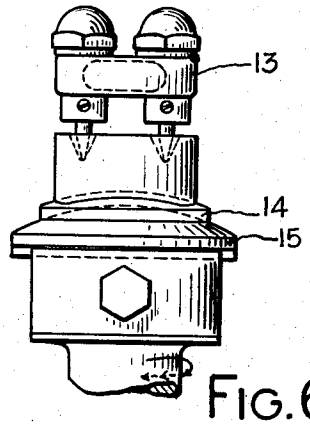


FIG. 6

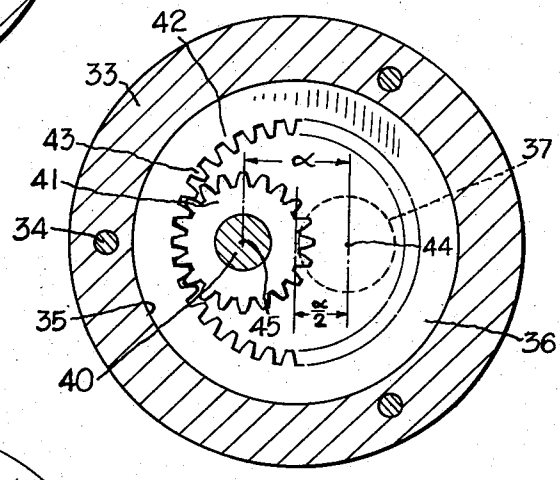


FIG. 4

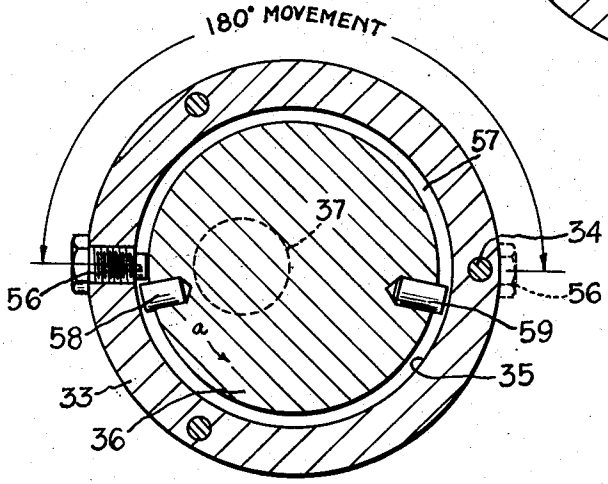


FIG. 5

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LENS SURFACING MACHINE

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Application September 18, 1957, Serial No. 684,758

3 Claims. (Cl. 51—124)

This invention relates to lens surfacing machines and more particularly it relates to mechanism by which the stroke length is changed in certain lens surfacing movements that are used in forming the lens.

It is the principal object of this invention to provide improved mechanism for changing the length of stroke of the lens surfacing movements which will be smooth and reliable in action, simple and sturdy in construction as well as easy to assemble, operate and service.

Further objects and advantages will be found in the form, arrangement and combination of parts and in the details of construction found therein by reference to the specification herebelow and the accompanying drawings wherein:

Fig. 1 is a general perspective view of a lens surfacing machine embodying my invention,

Fig. 2 is a substantially midsectional view of one form of my invention, certain parts thereof being broken away and fragmentarily shown for purposes of illustration,

Fig. 3 is a cross-sectional view taken on the line 3—3 of Fig. 2 of certain parts of my invention shown in one operative position,

Fig. 4 is a cross-sectional view similar to Fig. 3 showing the same parts in a second operative position,

Fig. 5 is a cross-sectional view taken on the line 5—5 of Fig. 2, and

Fig. 6 is a front elevation of the lens holding parts and the lens surfacing tool shown in one operative position.

With reference to Fig. 1 of the drawings, there is illustrated a lens surfacing machine **10** wherein my invention is embodied, said machine having a casing **11** from which projects on the operator's side a pair of work arms or spindles **12** and **13**. In a manner well known in the are, each of the spindles is adapted to move a lens blank **14** with complex surfacing motions back and forth across a revolving surfacing tool **15** as shown in Fig. 6. The spindles **12** and **13** are actuated by an interior oscillating mechanism, a part of which is shown fragmentarily at **16**, from a motor shaft **17**, Fig. 2, through a stroke changing mechanism generally designated by numeral **18**, and through a "motion break-up" device, generally designated by the numeral **19**, which is drivingly connected in tandem thereto. A swivel joint **21** is provided for connecting the part **16** of said oscillating mechanism to said "motion break-up" device **19**.

Said stroke changing mechanism **18** is constructed upon a rotatable hollow drive sleeve or quill **22** which is rotatably mounted on spaced ball bearings **23** and **24** which are fitted at its opposite ends. These bearings are preferably held in opposite ends of a casing extension **25** which is attached by the screws **26** to the casing **11** whereby the sleeve is rotatably supported by an outboard bearing exteriorly of the casing. Adjacent to the inner end of the sleeve **22**, a pulley **27** is non-rotatably keyed thereon as shown at **28** and said pulley is connected by a flexible belt **29** to a drive pulley **31** which is suitably fixed to the drive shaft **17**.

On the inner end of the drive sleeve **22** is formed an eccentric flange **32** whereto a cylindrical shell **33** is fixed by means of several bolts extending therethrough, one of which is shown at **34**. Within the shell **33**, there is formed a cylindrical bore **35** having its axis offset laterally of the axis of the drive sleeve **22**. Rotatably seated in said bore **35** is a cylindrical shaft head **36** from which extends an axially offset integral shaft **37** whereby power is transmitted from the stroke changing mechanism **18** to the "motion break-up" device **19**. To retain the cylindrical head **36** in the bore **35**, an inwardly directed annular lip **38** is formed on the inner end of the shell **33**.

According to this invention, gearing means are provided for rotating the head **36** within the shell **33** so as to change the length of stroke of said mechanism **18** comprising a shaft **40** which is rotatably fitted within a concentric bore in the drive sleeve **22** and projects at its inner end into said cylindrical shell. On said inner end of shaft **40**, a pinion **41** is fixed in any suitable manner, such as by pressing or brazing. The rotatable head **36** is provided on the side adjacent to said pinion **41** with an annular rim **42** having an inner cylindrical portion whereon an internal gear **43** is formed in position to mesh with the pinion **41** so that rotation of shaft **40** causes rotation of the head.

One extreme angular operative position of the head **36** is shown in Fig. 4 wherein its integrally extending shaft **37** is shown by a dotted circle. The center **44** of said shaft **37** is there shown as being separated by a distance α from the center of rotation **45** of the shaft **40** and of the shell **33**. The distance α may be called the "crank arm" of the stroke changing mechanism and its length may be varied continuously between minimum and maximum lengths by rotation of the shaft **40**. In Fig. 3, the opposite extreme angular position of the head **36** is shown wherein the shaft **37** is shown by a dotted circle which is concentric with the shaft **40** since in this instance the shaft **37** is eccentric with respect to the head **36** by a distance

$$\frac{\alpha}{2}$$

The shaft **40** is rotated from outside of the machine **10** by a knob **46** which is slidably mounted thereon and is keyed for rotation therewith by an axial pin **47** which is anchored at one end in the knob and has a sliding engagement with an opening in a disk **48** at the other end. Said disk **48** is anchored to shaft **40** by a crosspin **49** extending through aligned and fitted openings in both members. On the outer end of the drive sleeve **22** a drive plate **50** is suitably anchored adjacent to the knob **46** and mating teeth **51** and **52** are formed on the abutting parts of the knob and plate, respectively, whereby a disengageable clutch connection is effected and the mating teeth are normally held in engagement by one or more compression springs **53** seated in opposite blind holes **54** and **55** formed in the knob and plate, respectively.

Since only 180° of rotation of the head **36** relative to the shell **33** is required to produce the maximum axial separation α, as shown in Fig. 5, stop means are provided limiting said rotation to that extent consisting preferably of an abutment lug or screw **56** which is threaded in an opening through the shell so as to project into a free fitting groove **57** formed in the head, and consisting further of two circumferentially spaced abutment elements such as the pins **58** and **59** which are fixed in said head in abutting relation to said screw at opposite ends of its travel.

When it is desired to change the length of stroke of the base curve or cross curve movement of the lens holding arms **13** and **14**, the machine **10** is stopped, the knob **46** is pulled outwardly to disengage the clutch teeth **51** and **52**. The knob is then rotated to the desired setting on

scale 61 and released to reengage the clutch. When the knob 46 rotates the shaft 40 and pinion 41, the internal gear 43 and consequently the shaft head 36 is rotated in the shell 33, thus carrying the axis of the shaft 37 in an arc 60, Fig. 3, having a diameter equal to the maximum value of the "crank arm" α. Any "crank arm" or "throw" less than maximum such as shown at α, Fig. 3, terminates as shown on the arc 60 as the mechanism is adjusted for shorter strokes.

Although but a single form of my invention has been shown and described in detail, it will be understood that an effective stroke changing mechanism has been provided in fulfullment of the objects of my invention, and changes and substitutions may be made in the precise form shown without departing from the spirit of the invention as claimed below.

I claim:

1. In a lens surfacing machine, the combination comprising a lens surfacing mechanism for producing oscillatory lens surfacing movement, a casing for covering the same, a rotatably mounted drive sleeve and a shaft rotatably journaled therein and projecting through an opening in the casing, a cylindrical shell formed on the inner end of said sleeve and having a bore therein with its axis eccentric and parallel to the sleeve and further comprising a driven shaft extending away from the sleeve from a point adjacent to the inner end of the first shaft and parallel thereto, said driven shaft having a head portion fixed thereon which is journaled in the bore of said shell, an annular flange formed peripherally on said head portion on the side opposite to said driven shaft, and gearing means operatively formed on said flange and on the adjacent end of the first said shaft for rotating said head portion within said shell whereby the axial separation between the first and the second-named shafts is changed whenever the first shaft is rotated relative to said sleeve, and means operatively connecting said second shaft to the surfacing mechanism whereby relative rotation between said sleeve and the first shaft causes a change in the length of stroke of the mechanism.

2. In a lens surfacing machine, the combination comprising a lens surfacing mechanism for producing oscillatory lens surfacing movement, a casing for covering the same, a rotatably mounted drive sleeve and a shaft rotatably journaled therein and projecting through an opening in the casing, a cylindrical shell formed on the inner end of said sleeve and having a bore therein with its

axis eccentric and parallel to the sleeve and comprising a driven shaft extending away from the sleeve starting in the proximity of the inner end of the first shaft and parallel thereto, said driven shaft having a head portion fixed thereon which is journaled on the surface of said bore, an annular flange formed peripherally on said head portion oppositely to said driven shaft, gearing means operatively formed on said flange and on the adjacent end of the first said shaft for rotating said head portion within said shell, and rotational stop means for said head portion including an abutment lug located between two circumferentially spaced abutment surfaces, said lug and surfaces being located in cooperative relationship to each other on said shell and said head portion whereby the axial separation between the first and the second-named shafts is changed whenever the first shaft is rotated relative to said sleeve.

3. In a lens surfacing machine, the combination comprising a lens surfacing mechanism for producing oscillatory lens surfacing movement, a casing for covering the same, a rotatably mounted drive sleeve and a shaft rotatably journaled therein, said shaft and sleeve extending outwardly through said casing, disengageable clutch means formed on the respective outer ends of said sleeve and shaft for changing the relative angular relation between the members, a cylindrical shell fixed co-extensively to the inner end of said sleeve and having a bore located therein eccentrically and parallel to said sleeve, a head member having a cylindrical surface thereon which is rotatably fitted within said bore and having a cylindrical recess thereon on one side concentric with said surface, a second shaft projecting from said head member parallel to said sleeve on the side opposite to said recess and located eccentrically of said cylindrical surface, an internal gear formed on the cylindrical part of said recess in said member, a pinion fixed to the inner end of the first said shaft in meshing relation with said internal gear, and means operatively connecting said second shaft to said mechanism whereby relative rotation between said sleeve and the first shaft causes a change in the length of stroke of said mechanism.

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