June 12, 1956 G. SAUER 2,749,859

SEWING MACHINES

Filed April 18, 1951 4 Sheets-Sheet 1

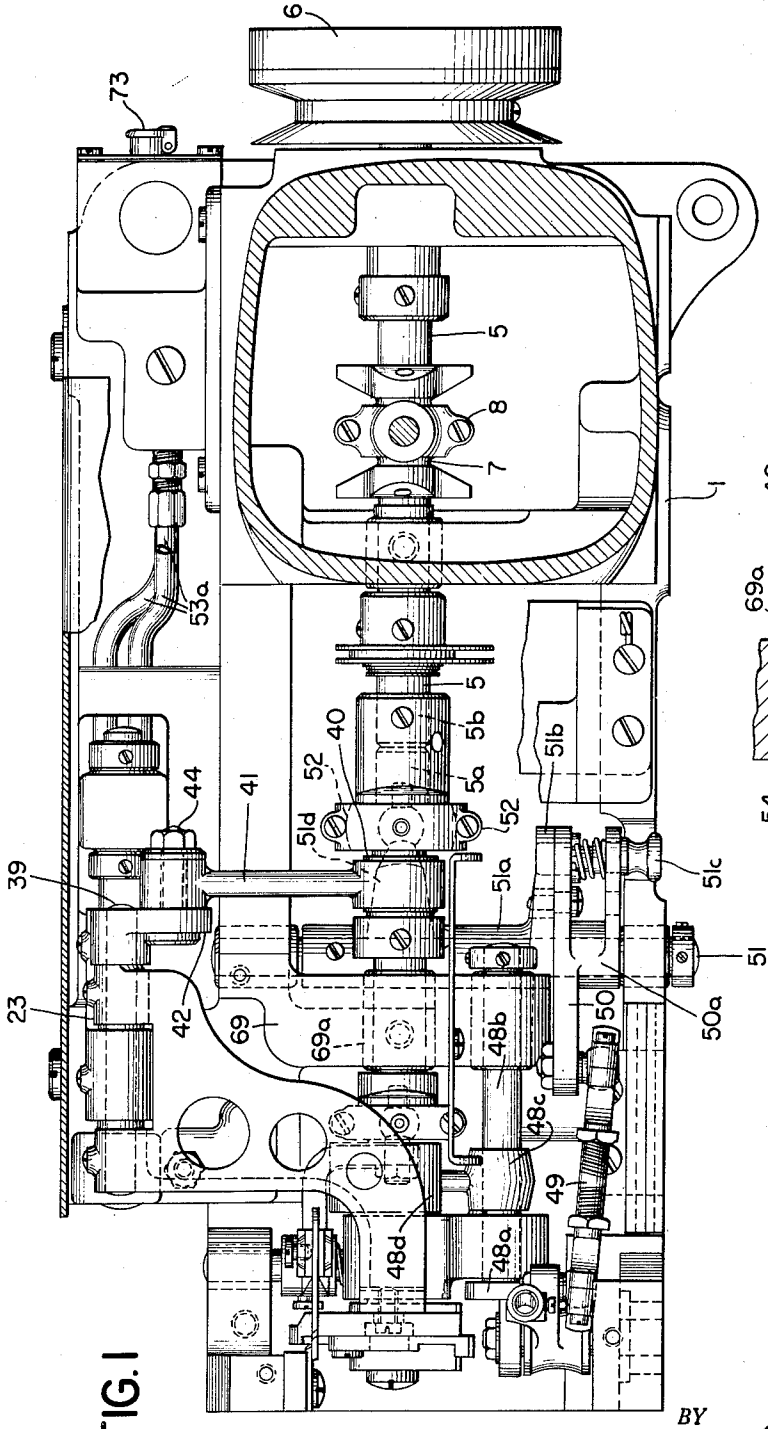

FIG. 1

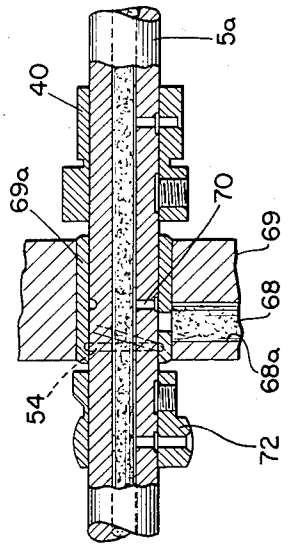

FIG. 7

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SEWING MACHINES

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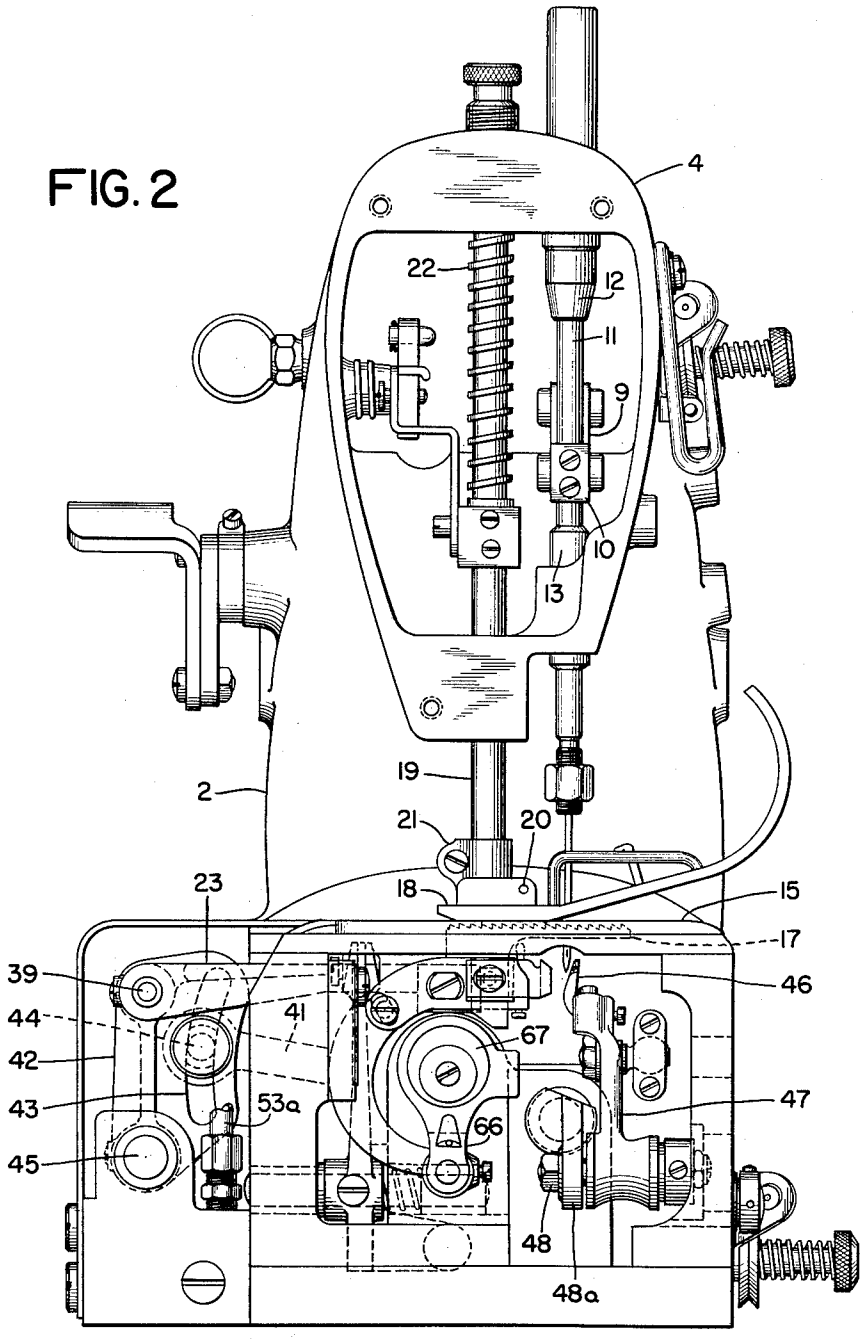
FIG. 2



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SEWING MACHINES

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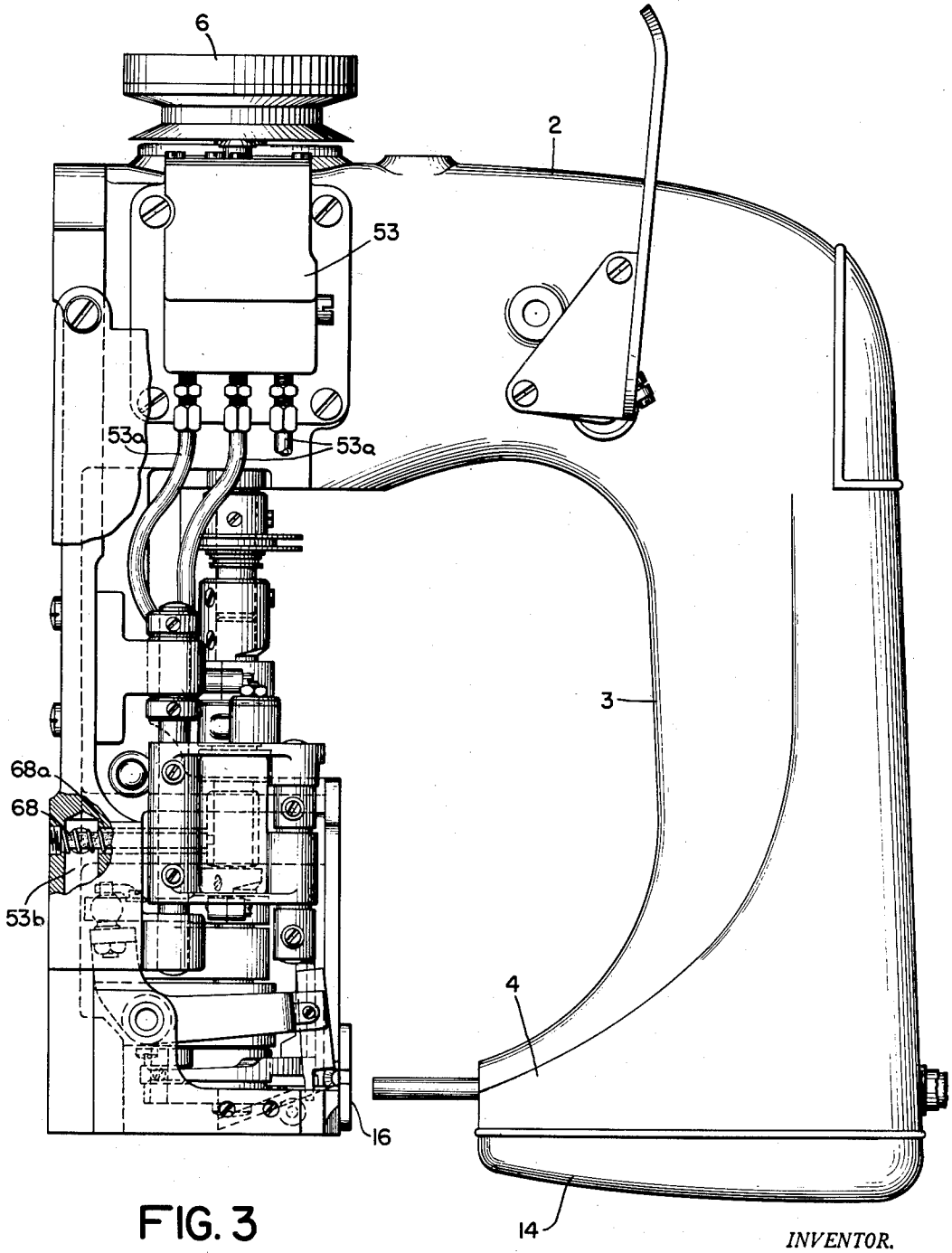

FIG. 3

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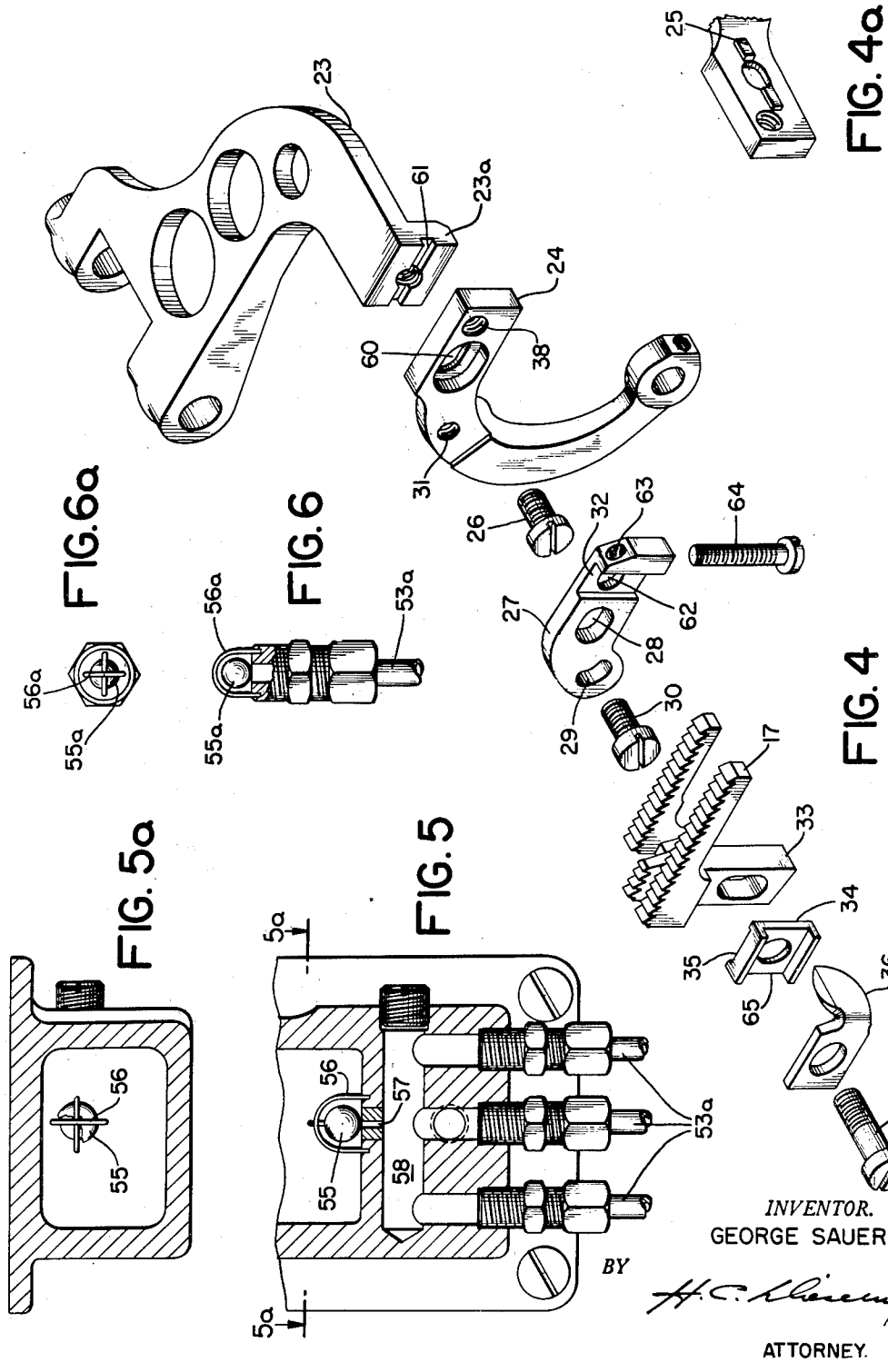

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SEWING MACHINES

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Application April 18, 1951, Serial No. 221,562

6 Claims. (Cl. 112—210)

This invention relates to sewing machines, and particularly to the work-feeding mechanism of such machines having what is commonly known as a four-motion feed-dog. The invention is particularly applicable to machines for the closing of filled bags but may also be applied to machines for the production of the bags themselves.

One of the objects of the invention is to provide a feeding mechanism of the aforementioned type in which the feed-dog is adapted to be readily adjusted horizontally along the line of feed with respect to the position of the needle and may be locked in the adjusted position.

A further object of the invention is the provision of readily adjustable means whereby the feed-dog may be tilted and set either in a position in which the feeding surface of the dog is in a horizontal plane as it engages and advances the work or one in which said surface is at a slight angle to the horizontal, depending upon the requirements of the work being performed.

Through the combination of features employed in attaining the foregoing objects the necessity for extreme accuracy in the construction of the parts and the location of various centers is eliminated since slight inaccuracies may be compensated by the adjustments.

Another object of the invention is to provide effective lubrication for the work feeding mechanism and other operating parts in a machine positioned for the closing of filled bags, in which the main drive shaft is vertically disposed. A feature of this phase of the invention is the provision of lubricant control means which permits the free flow of oil to the bearings of the machine when it is operating and which automatically stops such flow when the operation of the machine ceases.

Other objects, features, and advantages of the invention will appear from the detailed description of an illustrative embodiment of the same which will now be given in conjunction with the accompanying drawings, in which:

Fig. 1 is a horizontal sectional view through the machine taken just below the work-supporting surface, certain parts of the frame below that plane being broken away for clearer illustration of other parts;

Fig. 2 is an end elevational view of the machine, with the cover of the needle-head removed, as seen from the left-hand end of Fig. 1;

Fig. 3 is an elevational rear view of the machine in which the longitudinal axis of the main drive shaft is disposed vertically instead of horizontally as in Figs. 1 and 2, the position being that used in the sewing of filled bags;

Fig. 4 shows, in exploded perspective form, the various parts of the feed-dog and feed-bar assembly; Fig. 4*a* shows in fragmentary form the upper portion of the feed-bar bracket as viewed from the right in Fig. 4;

Fig. 5 is a fragmentary view, in vertical section, of the oil reservoir embodying the means for checking the flow of oil when the machine is not in use; Fig. 5*a* is a horizontal sectional view through the reservoir, taken along the line 5*a* of Fig. 5;

Figs. 6 and 6*a* show, in elevation and plan, respectively,

an alternative arrangement of the check valve when only one lubricating tube is employed; and

Fig. 7 is an axial sectional view through a portion of the drive shaft showing the manner in which the oil from the reservoir is distributed to various bearings.

In Figs. 1 and 2 of the drawings, the machine has been illustrated in the conventional position assumed for the seaming of flat work, for example, the production of bags as distinguished from the sewing of filled bags. It will be understood that when the machine is used for the closing of filled bags its position will be such that the work-supporting surface will be disposed in a vertical plane, i. e., the base and the overhanging arm will have their longitudinal axes disposed vertically rather than horizontally and the driving pulley will be at the top as shown in Fig. 3. The machine will be supported by a pedestal or the like in substantially the same position as that shown in the patent to Kucera et al., No. 1,577,472, granted March 23, 1926.

The frame of the machine comprises a base **1** having a work-supporting surface (not shown) from one end of which rises a standard **2** (Figs. 2 and 3). An overhanging arm **3** projects laterally from the upper end of the standard and terminates in a needle-head **4**. A main drive shaft extends longitudinally through the base and is journaled in suitable bearings therein. To facilitate assembly the shaft is formed in two sections **5** and **5***a* (Fig. 1) which are joined by a coupling **5***b* so as to provide in effect a single continuous shaft. At its right end the shaft extends through the frame and projects therefrom, the projecting end carrying a combined hand wheel and pulley **6** through which power for operating the machine may be applied from any suitable source. The shaft has a crank **7** formed thereon which carries a strap member **8**. A pitman is connected to the strap member, the mode of connection being shown clearly in the copending application of Oscar Quist, Serial No. 211,457, filed February 17, 1951, now Patent No. 2,636,463, issued April 28, 1953. As also shown in that application, the upper end of the pitman is connected with one end of a needle-lever which is pivoted at or near its mid-point, as shown in said application. The other end of the needle-lever is connected by a link **9** (Fig. 2) to a block **10** secured to a needle-bar **11** which is mounted for vertical reciprocating movement in bearing sleeves **12** and **13** carried by the needle-head. As will be apparent, the needle-lever will be oscillated by the rotation of the drive shaft **5**, the motion being transmitted through the connections between the crank **7** and the needle-lever to the needle-bar. The needle-bar **11** carries a needle at its lower end which is reciprocated through the work between successive feeding movements of the latter along the work-supporting surface **15** (Fig. 2). At the lower end of the work-supporting surface, as shown in Fig. 3, there is a throat-plate **16** provided with slots through which the feed-dog **17** (Fig. 2) operates to feed the work that is being sewn. The material being sewn, whether flat or in the form of a filled bag, is held against the throat-plate by means of a presser-foot **18** (Fig. 2) which is pivoted at **20** to a supporting shank **21** fastened to a presser-bar **19** mounted in suitable bearings in the needle-head **4**. The presser-foot **18** is normally maintained in contact with the work by a spring **22** surrounding the presser-bar **19**. Suitable means of conventional character (not shown) are provided for lifting the presser-bar for the introduction or removal of work.

The work-feeding mechanism, a portion of which is shown in Fig. 4, includes the feed-dog **17** which is supported and given four movements, that is, it is raised into engagement with the material, then moved forwardly for feeding the material, then moved downwardly away from the material and then returned to its initial position.

Feed and return movements are imparted to the feed-dog by a feed-bar **23** in a manner to be presently described. As shown, the feed-bar is of the offset type adapted to support the feed-dog to act along a line to the left of the feed-rocker to be described. This enables formation of the frame in a way to facilitate movement of filled bags. The feed-bar is provided at the left end of the offset portion with a vertical flange **23***a* having a flat surface in which is formed a groove **61** which is proportioned to fit lugs **25** (Fig. 4*a*) projecting from the cooperating face of a C-shaped feed-bar bracket **24** when these parts are assembled. The vertical flange **23***a* has a threaded opening therein adapted to receive a screw **26** by which the bracket arm **24** is secured to the feed-bar **23**. An opening **60** in the upper portion of the bracket arm **24** through which the screw **26** passes is elongated in a direction parallel with the groove **61** so as to permit lateral adjustment of the bracket arm with respect to the bar **23** and also lateral adjustment of the feed-dog, which, as will presently be explained, is adjustably supported by the bracket arm **24**; turning of the bracket-arm in relation to bar **23** is prevented by the engagement of the lugs **25** with the groove **61** in the vertical face **23***a* of the bar. In order to permit adjustment of the feed-dog relative to the bracket-arm **24**, it is not attached directly to the bracket-arm but is supported, with capability of vertical adjustment, by a feed-dog holder **27**, which, as will be explained, is capable of angular adjustment with respect to the bracket-arm. The holder **27** has an arcuate-shaped opening **29**, through which a set screw **30** may be inserted for engagement with a threaded opening **31** in the bracket-arm. Holder **27** also has therein an opening **28** through which access may be had to the screw **26** when adjustment of the bracket-arm is desired. The holder is provided with a channel **32** arranged to receive an arm **33** of feed-dog **17**. An opening **62** in the channelled portion of the holder **27** permits passage therethrough of a screw **37** which extends through an opening in the shank **33** of the feed-dog and is engaged with threads in an opening **38** in the bracket-arm. Screw **37** provides a pivot for the angular adjustment of the holder **27** as permitted by the opening **29**. A threaded opening **63** is provided in the holder **27** to receive a set-screw **64** which engages the under surface of one of the longitudinally extending portions of the feed-dog. This guards against relative turning of the feed-dog in relation to the holder as the feed-dog actively engages the work. A needle-guard holder **34** is provided for retaining a needle-guard **36**, the holder having a channel **35** in the back thereof, which engages the shank **33** of the feed-dog and also having a channel **65** in the opposite face thereof into which the shank of the needle-guard **36** is fitted. The needle-guard and its holder, and also the feed-dog **17** and the feed-dog holder **27** are secured to the bracket-arm **24** by the screw **37** which passes through the alined openings in the several parts and is engaged by the threaded opening **38** in the bracket-arm **24**. The screw **37**, as mentioned, constitutes a pivot upon which the feed-dog holder **27** may be turned, the extent of angular movement being determined by the length of the arcuate-shaped opening **29**. Since the shank **33** of the feed-dog is closely fitted within the channel **32** in the holder **27**, its angular position is determined by that of the holder which is held in a desired position of adjustment by tightening the screw **30**. The mode of mounting the feed-dog makes it possible to adjust it in three different ways. It may be adjusted longitudinally of the toothed extensions by the shifting of the bracket-arm **24** with respect to the feed-bar **23**, as permitted by the elongated opening **60**; vertical adjustment is permitted by the elongated opening in the shank **33** of the feed-dog, while angular adjustment is effected by the angular movement of the holder **27** around the screw **37** as a pivot.

The feed-bar **23** is fastened to a shaft **39** (Fig. 1) which is rockably supported by a feed-rocker **42** (Fig. 2). This feed-rocker is given rocking movements by a feed-stroke eccentric **40**, the motion being transmitted through a pitman **41** to the feed-rocker. Pitman **41** is connected to the rocker by a bolt **44** which may be secured in any desired position along an arcuate-shaped slot **43** in an arm of the rocker. The rocker is fastened to a shaft **45** (Fig. 2) which is supported by suitable bearings at the rear of the base of the frame. It will be understood that rocking movements thus imparted to the rocker **42** serve to reciprocate the feed-bar **23** and through it the feed-dog **17**. The extent of rocking movement of the rocker **42** and hence the longitudinal movement of the feed-bar, may be regulated by adjusting the position of the bolt **44** in the slot **43**, the slot being of sufficient length to provide the desired range of movement of the feed-bar.

Bracket-arm **24** is connected by a pitman **66** (Fig. 2) with an eccentric **67** which is carried by the main shaft, thereby serving to rock the feed-bar about its pivot **39** to carry the feed-dog **17** into and out of engagement with the work. Thus the feed-dog is given the desired four-motion movement to engage the work and advance it and then return to its initial position.

Beneath the work-support is a four-motion looper **46** (Fig. 2) which coacts with the needle in the formation of stitches. The looper is mounted on the upper end of a looper-carrier **47** which is pivotally supported by a bolt **48** carried by an arm **48***a* secured to a shaft **48***b* rockably mounted in the base of the machine. Attached to the carrier **47** is a ball-pin which is encircled by a strap at one end of a link **49**, the opposite end of which also has a strap that encircles a ball-pin carried by an arm **50** (Fig. 1). This arm extends from a member **50***a* which is rocked about a fixed shaft **51** extending laterally of the base of the machine. As more fully explained in the copending Quist application hereinabove mentioned, the member **50***a* is rocked by connections from a looper stroke eccentric **52** carried by the main shaft **5**. These connections include a sleeve **51***a* mounted on the shaft **51** and having an arm **51***b* connected by a spring-urged pin **51***c* with an arm of member **50***a*. Sleeve **51***a* has an arm **51***d* carrying a ball-pin connected with the lower end of a pitman having a strap at its upper end cooperating with the eccentric **52**. Means are also provided to impart needle avoid movements to the looper in properly timed relation to the loop-seizing-and-shedding movements imparted by the mechanism above described. Such means includes an arm **48***c* secured to the shaft **48***b* pivotally connected with the lower end of a pitman having a strap **48***d* surrounding an eccentric on the main shaft **5***a*.

As hereinabove indicated, means are provided for controlling the flow of lubricating oil to the work-feeding mechanism and other parts when the machine is in the position shown in Fig. 3, i. e., in which the machine is used for closing filled bags. When so positioned the oil for lubricating the work-feeding devices and other parts of the machine is fed from a reservoir **53** through various tubes **53***a* (Fig. 3). One of the tubes **53***a* may, for example, extend to a pocket **53***b* (Fig. 3) from which the lubricant may be supplied through wicking **68** in a bore **68***a*, Figs. 3 and 7, to a bearing **69***a* in a wall **69** (Figs. 1 and 7) in the machine base. The left-hand section **5***a* of the main shaft is hollow and is preferably filled with wicking, the oil being conducted to the wicking in the shaft through a hole **70** drilled therein which communicates with the bore **68***a*. The lubricant is then delivered from the bore of the shaft through radial openings alined with the various bearings and eccentrics, such as the feed eccentric **40** and a trimmer operating eccentric **72** (Fig. 7). The lubricant delivered to the bearing has a tendency to flow downwardly by gravity along the surface of the main shaft when it is in the vertical operating position assumed for bag closing purposes and is apt to be dis-

charged onto points where it is not desired. To prevent such flow of oil, a helical groove **54** is provided in the bearing **69***a* adjacent to its lower end, the direction of the spiral being such that any oil flowing along the shaft will be forced upwardly by the pumping action of the groove. When the machine is stopped, the oil remaining in the reservoir would naturally continue to feed to the various parts until the reservoir is empty. In order to avoid that result, a check valve is provided in the reservoir, this valve consisting of a ball **55** positioned within a cage **56** which is fastened to the bottom wall of the reservoir, the cage consisting of two U-shaped wires the planes of which are preferably disposed at 90° in relation to each other. The cage is so positioned that when the machine is not in operation the ball will rest in the opening of a passageway **57** extending from the reservoir to a manifold **58** from which the several tubes **53***a* lead to various parts of the machine and will thus block the passageway from the reservoir. When the machine is running, its vibration keeps the ball from seating and in consequence the oil will readily flow from the reservoir through the passageway **57** to the manifold and thence through the tubes to various parts of the machine. When the machine stops operating, the ball will seat itself again in the opening to the passageway and thereby the flow of oil from the reservoir will be automatically stopped. The ball is preferably formed of steel or other metal and in any event is substantially heavier than or of greater mass than the oil which it displaces.

The ball check-valve of the lubricating system may, if desired, be located directly at the upper end of the lubricant delivery tube **53***a*, as shown in Figs. 6 and 6*a*, instead of being located as shown in Fig. 5. U-shaped wires **56***a* are then mounted on a small fitting at the top of the tube and serve to retain a ball **55***a* over the upper end of a small passage through the fitting. The latter may be screwed into the lower end of the reservoir. This arrangement is desirable when only a single delivery tube **53***a* is provided. It will be understood that the ball will seat itself in the orifice at the top of the fitting upon the cessation of vibration of the machine when its operation is stopped. The oil reservoir may be filled through a Gits oil cup **73** at its top.

The machine may be used for the seaming of flatwork, as in the production of bags, and when so used the work-supporting surface and the overhanging arm will be disposed horizontally. However, the machine is particularly suited for the closing of filled bags and for that purpose the work-supporting surface and the overhanging arm will be vertically disposed. It will be understood that whenever reference is made herein to the vertical or horizontal disposition or movement of any of the parts of the machine, this is with reference to the arrangement of the machine with the work-supporting surface and the overhanging arm disposed horizontally. While the invention has been disclosed in a particular form of embodiment, it will be understood that the construction and the arrangement of the parts may be varied without departing from the spirit and scope of the invention as defined by the appended claims.

What is claimed is:

1. In a sewing machine having a main drive shaft, a work-feeding mechanism comprising a rockable member, connections from said shaft for rocking said member, a feed-bar pivotally connected to said member and arranged for longitudinal reciprocation thereby, an arm rigidly connected with the feed-bar and extending lengthwise in a general direction transverse to the direction of reciprocation of the feed-bar, said feed-bar and said arm having tongue and groove formations extending in the direction of said longitudinal reciprocation to enable adjustment of said arm longitudinally of said feed-bar, means for securing said arm in adjusted position on said feed-bar, connections from said shaft to said arm for causing pivotal movement of the bar in relation to said member, and a feed-dog connected with said arm, the connection between said feed-dog and said arm being arranged to enable tilting of the feed-dog in a plane perpendicular to the axis of the main shaft.

2. In a sewing machine having a main drive shaft and a frame supporting said shaft, the combination of a rockable member, means connecting said member to said shaft, said connecting means being arranged to impart a rocking motion to said member, a feed-bar connected to said member and arranged to receive longitudinal reciprocatory motion therefrom, a bracket detachably and adjustably connected to said feed-bar, said bracket and said feed bar having cooperating faces in a plane perpendicular to the axis of said shaft, means for confining relative adjustment of said bracket and feed bar to a direction parallel with the longitudinal reciprocatory motion of said bar and for retaining said faces in adjusted relation to each other, said bracket extending lengthwise in a direction generally transverse to said feed-bar, means connecting said bracket to said drive shaft arranged to impart movement to said bracket in a direction transverse to said longitudinal reciprocatory motion, and a feed-dog connected to said bracket and receiving four-motion movements therefrom, the feed-dog being pivotally connected with said bracket and being so arranged as to enable tilting of the feed-dog in a plane perpendicular to the axis of the main drive shaft.

3. In a sewing machine, in combination, a drive shaft, a feed-bar, means connecting said shaft with said feed-bar to impart forward and backward motion to said feed-bar, the feed-bar having a vertical flange at one end thereof, the flange being perpendicular to the axis of the drive shaft, a bracket fastened to said bar, said flange and said bracket having faces provided with interengaging groove and lug means thereon whereby the bracket may be adjusted longitudinally of the feed-bar, means to secure the bracket to the feed-bar in adjusted position, a feed-dog holder fastened to said bracket, a feed-dog positioned in said holder and fastened thereto, means affording a pivot and serving to secure said feed dog to said holder, said holder being pivotally mounted on said last mentioned means and being capable of angular adjustment about said means, and means for retaining said holder in adjusted position.

4. In a sewing machine, in combination, a drive shaft, a rock member, connections from said shaft for rocking said member forward and backward upon rotation of said shaft, a feed-bar connected with said rock member for longitudinal reciprocation thereby, a C-shaped bracket connected to said feed-bar, the bracket being adjustable longitudinally of said feed-bar and confined to such adjustment in relation to said feed-bar, means accessible from the side of said bracket for securing the same to said feed bar in any adjusted position, connections from said drive shaft to said bracket for imparting up-and-down motion to said bracket, a feed-dog holder having a channel therein, a feed-dog having an arm fitted within said channel, and a screw fastening said feed-dog and said holder to said bracket, said holder being arranged for angular adjustment about said screw.

5. In a sewing machine having a frame and a main drive shaft mounted therein, the combination of a rock member carried by said frame, connections from said drive shaft for rocking said member, a feed-bar pivotally connected with said rock member, said feed-bar having at its forward end a laterally projecting part which extends longitudinally toward the free end of said drive shaft and overlies the latter, a bracket arm connected with said feed-bar adjacent the end of said part, the connection between said arm and feed-bar being such as to enable relative adjustment thereof only in a direction longitudinally of the main axis of said bar, means accessible from the side of said bracket arm for securing the same to said feed bar, and a feed-dog secured to said bracket arm.

6. In a sewing machine having a main drive shaft and a frame to support said shaft, a feed-bar driven forwardly

and backwardly by said drive shaft, a bracket adjustably connected to said feed-bar and confined for adjustment longitudinally thereof, means extending through said bracket for securing said bracket to said feed bar, connections from said drive shaft to said bracket arranged to impart up-and-down motion to said bracket and through the latter to said feed-bar, a feed-dog, and means connected to said bracket to support said feed-dog, said feed-dog supporting means being angularly adjustable on said bracket and arranged to tilt said feed-dog in a plane perpendicular to the axis of the main drive shaft, and said

feed dog supporting means having an enlarged opening therethrough for access to said means for securing said bracket to said feed-bar.

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