No. 814,027. PATENTED MAR. 6, 1906.

P. DIEHL & A. GRIEB.

FEEDING MECHANISM FOR SEWING MACHINES.

APPLICATION FILED MAR. 11, 1905.

2 SHEETS—SHEET 1.

Fig. 3.

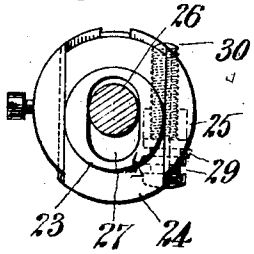


Fig. 4.

Fig. 5.

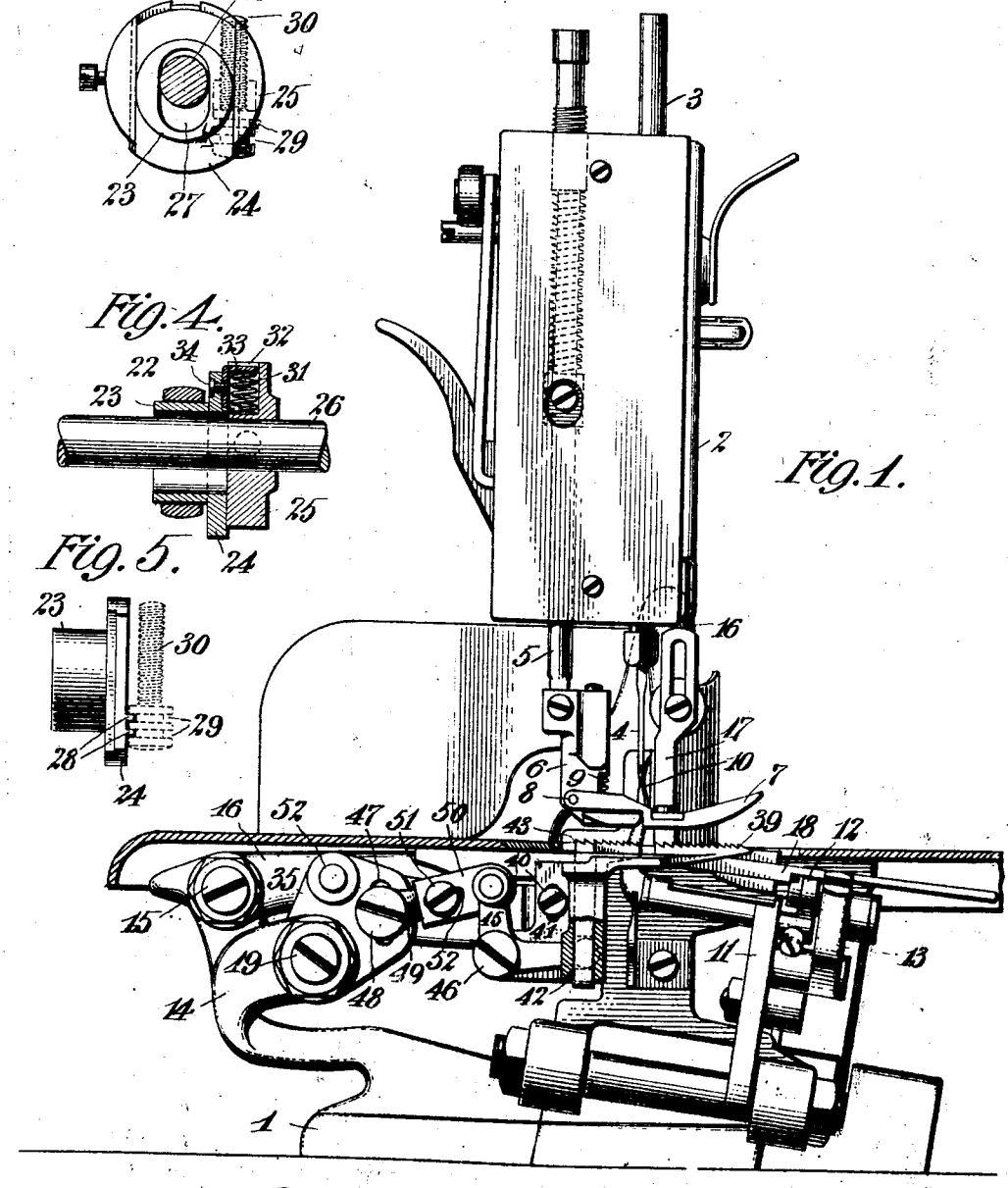


Fig. 1.

Fig. 6

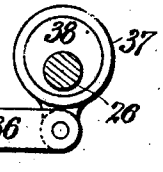
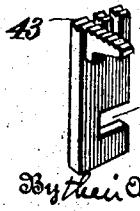


Fig. 7.



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2 SHEETS—SHEET 2.

Fig. 2.

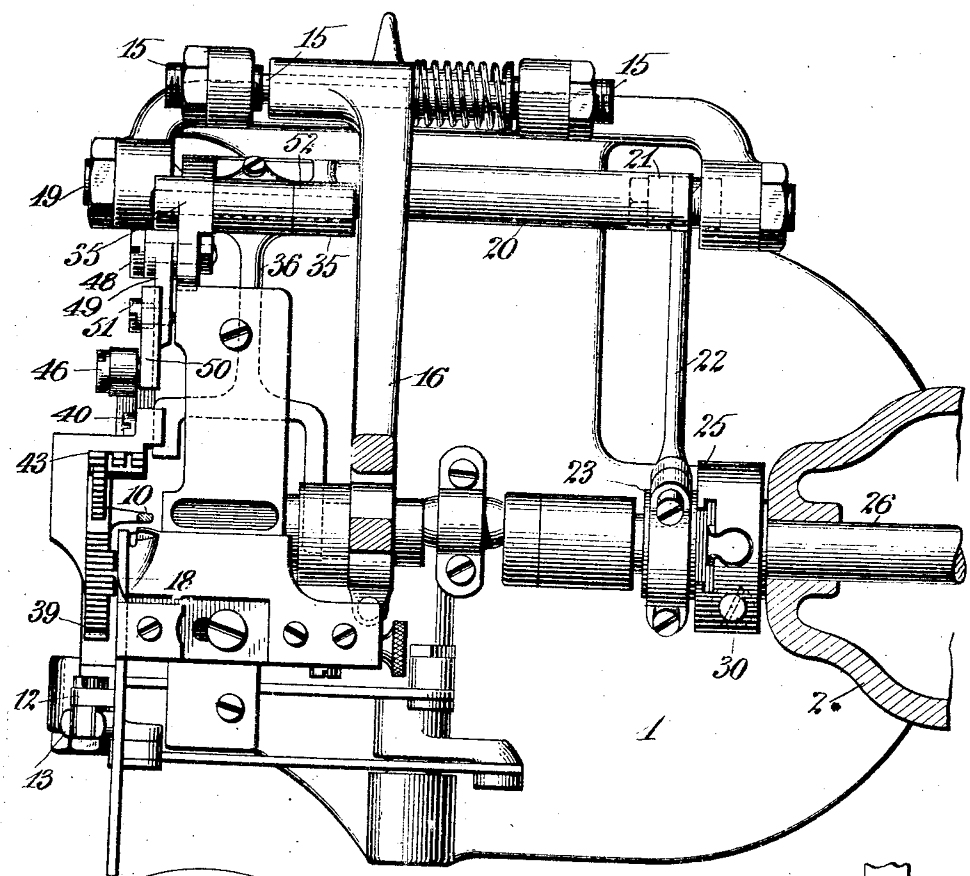
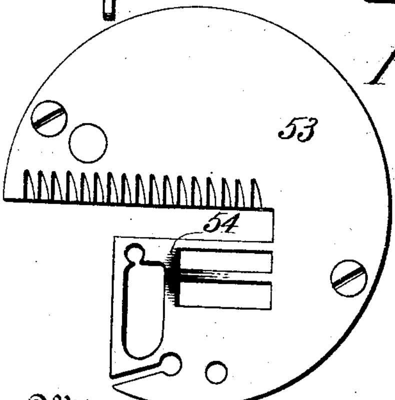


Fig. 8.



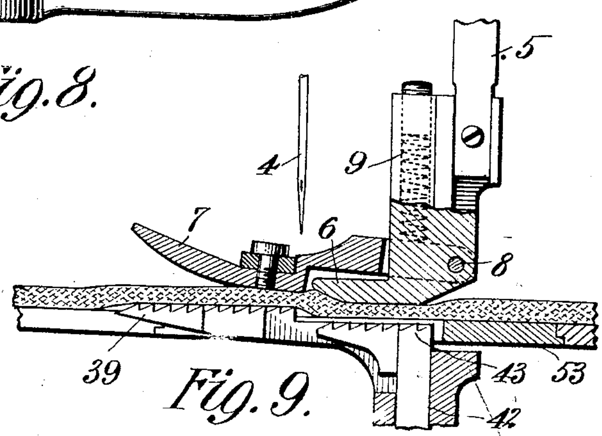


Fig. 9.

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UNITED STATES PATENT OFFICE.

PHILIP DIEHL AND ALFRED GRIEB, OF ELIZABETH, NEW JERSEY, ASSIGNORS TO THE SINGER MANUFACTURING COMPANY, OF ELIZABETH, NEW JERSEY, A CORPORATION OF NEW JERSEY.

FEEDING MECHANISM FOR SEWING-MACHINES.

No. 814,027. Specification of Letters Patent. Patented March 6, 1906.

Application filed March 11, 1905. Serial No. 249,524.

To all whom it may concern:

Be it known that we, PHILIP DIEHL and ALFRED GRIEB, citizens of the United States, residing at Elizabeth, in the county of Union and State of New Jersey, have invented certain new and useful Improvements in Feeding Mechanism for Sewing-Machines, of which the following is a specification, reference being had therein to the accompanying drawings.

This invention relates to an improvement in differential feeding devices for puckering or crowding together the goods beneath the needle of a sewing-machine, and especially to such devices as employed for overseaming the raw trimmed edges of knit goods; and it has for its object to provide a simple and effective device of this nature and to provide a greater scope of adjustment of mechanism of the class described than that afforded by constructions heretofore in use.

The invention consists, primarily, in a feeding device comprising a common feed-bar, to which are attached two relatively movable feed-dogs, having their roughened feeding-surfaces similarly disposed to engage the lower surface of the work, the one in advance and the other in the rear of the needle, deriving their feeding movements from said bar and provided with means for lifting the same independently into engagement with the work, whereby while both feed-dogs rise to engage the work at the same time the rearward feed-dog is retracted from engagement with the work before the forward feed-dog, so that the latter serves to feed the goods after the former has ceased its effective operation.

The invention also includes means for adjusting independently the effective action of the two feed-dogs and mechanism whereby a single cam upon the main shaft of the machine communicates to the rearward feed-dog both its feeding and lifting movements.

In the annexed drawings, Figure 1 is a front end view of an overseaming sewing-machine similar to that forming the subject of United States patent to Philip Diehl, No. 733,170, dated July 7, 1903, and embodying the present invention, the work-plate and a portion of the feed-bar being shown in section; and Fig. 2 is a plan of the same with the work-plate removed and certain other parts in horizontal section. Fig. 3 is a transverse section of the main shaft with the main feed-eccentric, and Fig. 4 is a partial longitudinal sectional elevation of the same. Fig. 5 is a side view of the main feed-eccentric with the sliding block by which it is carried. Fig. 6 is a transverse section of the main shaft, representing in elevation the main feed-lifting eccentric and its connection with the feed-bar. Fig. 7 is a perspective view of the rearward or auxiliary feed-dog. Fig. 8 is a plan view, upon an enlarged scale, of the throat-plate of the machine; and Fig. 9 is a sectional elevation representing the two-part presser-foot, feed-dogs, and a portion of the goods interposed between the same.

As herein represented, the machine is provided with the base 1 and bracket-arm 2, in the forward end of which are mounted the needle-bar 3, carrying the needle 4, and the presser-bar 5, carrying the presser-foot, comprising the rigid heel portion 6 and offset toe portion 7, connected therewith by the pivotal pin 8 and maintained in normal relation therewith by means of the spring 9, housed in a suitable socket in the heel portion.

As in the patent before referred to, the looper 10 is mounted upon a rock-shaft journaled in the swinging carrier 11 and provided with a crank-arm 12, by means of which it receives its rocking movements from the forked vibrating arm 13, having connections with a crank upon the main shaft of the machine.

The base 1 is provided at the rear with a bracket 14, having a pair of arms carrying the shaft 15 for the vibrating knife-arm 16, carrying the trimming-knife blade 17, which operates in conjunction with the stationary lower knife-blade 18. The bracket 14 has a second pair of rigid arms carrying center-screws 19 for the feed rock-shaft or rocker 20, having a depending arm 21, connected with one end of an eccentric-rod 22, embracing at the opposite end the feed-actuating eccentric 23, which is mounted upon a sliding block 24, mounted in a lateral transverse slideway in the collar 25, fixed upon the main shaft 26. The feed cam or eccentric 23 is formed with an elongated clearance-slot 27, embracing the main shaft, and the sliding block 24 has upon its rear face a pair of lugs 28, entering the annular grooves 29 in the head of an ad-

justing-screw 30, fitted to a suitably-threaded transverse aperture in the collar. The turning of the screw 30 evidently serves to move its head within the countersink therefor formed in the collar 25 and to thereby similarly shift the block 24 to vary the eccentricity of the cam or eccentric 23, carried thereby. As shown in Fig. 4, lost motion is prevented between the relatively movable parts by means of a spring 31 interposed between the bottom of a radial socket 32 in the collar 25 and the flange 33 of an angle-piece secured to the block 24 by means of a screw 34, the spring tending to maintain a continuous engagement between the lugs 28 and the grooved head of the screw 30.

The feed rock-shaft or rocker is provided at its forward end with the usual upwardly-projecting lugs 35, to which is pivoted one end of the feed-bar 36, which is forked at its opposite end, one branch being pivoted to the rod of an eccentric-strap 37, embracing the primary feed-lifting eccentric 38 upon the main shaft, and the other branch being extended toward the stitch-forming members, where it is provided with the forward or primary feed-dog 39, secured adjustably thereon by means of the fastening-screw 40, passing through a slot 41 in the shank of the same and with a slideway 42, fitted to the shank of the rearward or auxiliary feed-dog 43, having a lateral notch 44, entered by the lateral arm of a two-armed angular lever 45, pivoted upon the fulcrum-stud 46, carried by the shank of the primary feed-dog 39. The forward lug 35 of the feed-rocker is provided with a lateral projection having a substantially vertical slot 47, entered by the adjustable pivotal screw 48, embraced by the part 49 of a two-part pitman whose other portion 50 is pivotally connected with the upright arm of the angular lever 45, the parts 49 and 50 of the pitman being adjustably connected together by means of the screw 51, passing through a slot 52 in the one and entering the other.

In the use of the machine the primary feed-dog 39 is first set in its desired elevation upon the feed-bar 36 and the feed-eccentric 23 adjusted to give the desired feeding movement to such primary feed-dog. The pivotal screw 48 is then adjusted in its slot 47 in the rocker to or from alinement with the axis of motion of the rocker and the upper end of the upright arm of the angle-lever 45 to determine the point at which the auxiliary feed-dog 43 shall drop in the forward feeding movement of the feed-bar, and the main shaft having been turned to elevate the primary feed-dog 39 to its highest position the length of the two-part link 49 50 is adjusted by temporarily loosening the clamp-screw 51 to bring the auxiliary feed-dog to the same level as the primary feed-dog, when the feeding mechanism is adjusted for operation.

In the normal operation of the machine as the point of the needle rises above the throat-plate the feed-dogs rise simultaneously and begin their feeding movements. As the pivotal pin 52 of the feed-bar 36 and the fulcrum-screw 46 of the angle-lever 45 have equal movements derived from the feed-rocker, while the pin 48 has a slower resultant horizontal movement due to its angular relation with the pivotal members 19 and 52, it is evident that the auxiliary feed-dog 43 will begin to descend as soon as the feed of the material commences with a speed which is determined directly by the distance of the screw 48 from the lower end of the slot 47. Both members of the presser-foot having been simultaneously lifted by the rise of the corresponding feeding members, the heel member 6 of the presser-foot falls with the auxiliary feed-dog in its descent, and thereby presents a shoulder offering a partial obstruction to the fabric which is still being fed forward by the primary feed-dog, as represented in Fig. 9, which results in the crowding of the fabric beneath the needle, thereby affording compensation for the distending action normally due to the compression of the fabric between the presser-foot and the feed-dog, as in ordinary work-feeding operation, the result being the production of an overseamed edge upon the fabric which may be made perfectly flat.

In practice it has been found desirable to form a slight depression in the throat-plate 53 slightly behind the needle-hole and in the direct line of the overseam, as at 54 in Fig. 8, whereby the pressure of the heel portion of the presser-foot upon the overseamed edge of the fabric is somewhat relieved, thereby providing for a substantially uniform pressure upon the fabric both in front and in rear of the needle, notwithstanding the increased thickness of the edge resulting from the addition of the overseam.

As in ordinary feeding operations the feeding-surfaces of the feed-dogs rise materially above the top of the throat-plate, it will be observed that the extent of effective action of the auxiliary feed-dog is determined by the distance traversed by the same in making its forward or feeding movement before it descends beneath the upper face of the throat-plate, the heel portion 6 of the presser-foot following the same downwardly until arrested by contact of the same or the material beneath it with the throat-plate at the edges of the feed-apertures when the further drop of the auxiliary feed-dog evidently becomes ineffective as regards the feeding operation.

From the foregoing description it will be observed that the present improvement is susceptible of considerable modification in constructive features and arrangement of parts without departing from the spirit of the invention, and it is therefore to be understood

that the invention is not limited to the specific embodiment disclosed herein.

Having thus set forth the nature of the invention, what we claim herein is—

1. In a sewing-machine, the combination with a feed-bar, a primary feed-dog carried thereby, and means connected with said feed-bar for communicating to said primary feed-dog feeding and lifting movements, of an auxiliary feed-dog operatively connected with said feed-bar to receive feeding movements therefrom, said auxiliary feed-dog having its feeding-surface presented to and adapted to act upon the same side of the work as that of the primary feed-dog, and means for communicating to said secondary feed-dog differentially-timed lifting movements in respect of those of the primary feed-dog.

2. In a sewing-machine, the combination with a feed-bar, a primary feed-dog fixed upon said feed-bar, and an auxiliary feed-dog operatively connected with said feed-bar to receive feeding movements therefrom and movable thereon crosswise of the direction of feed, of actuating means for communicating to said feed-bar its feeding movements, means for communicating to said feed-bar its lifting movements, and a connection between said actuating means and the auxiliary feed-dog for communicating lifting movements thereto.

3. In a sewing-machine, the combination with a feed-bar having a slideway disposed transversely of the direction of feed, of a primary feed-dog carried by and an auxiliary feed-dog mounted within the slideway of said feed-bar, means for communicating to said feed-bar feeding and lifting movements, and means connected with said auxiliary feed-dog for communicating thereto lifting movements independent of those of the feed-bar.

4. In a sewing-machine, the combination with a feed-bar, a primary feed-dog carried thereby, a feed-rocker to which said feed-bar is connected, and means for communicating lifting movements to said feed-bar, of an auxiliary feed-dog movably connected with and deriving feeding movements from said feed-bar, and an independent connection between said auxiliary feed-dog and the feed-rocker whereby the feeding movements of said feed-rocker serve to impart the lifting movements to said auxiliary feed-dog.

5. In a sewing-machine, the combination with a feed-bar, means for communicating feeding movements thereto, and two relatively movable feed-dogs disposed the one in advance of the other with their feeding-surfaces presented to and adapted to act upon the same side of the work and operatively connected with said feed-bar to receive equal feeding movements therefrom, of independent means for lifting said feed-dogs.

6. In a sewing-machine, the combination with a feed-rocker pivotally mounted in fixed bearings, means for actuating it, a feed-bar, and a feed-dog movably mounted upon the latter and adapted to be moved therewith in the direction of feed, of independent connections from said feed-rocker to said feed-bar and feed-dog for imparting thereto respectively feeding and lifting movements.

7. In a sewing-machine, the combination with a feed-rocker mounted to oscillate in fixed bearings, a feed-bar pivotally connected with and supported at one end by said feed-rocker, and means for actuating said feed-rocker, of a feed-dog movably connected with said feed-bar to receive feeding movements therefrom, and an adjustable positive connection between said rocker and feed-dog for communicating to the latter lifting movements in respect of said feed-bar.

8. In a sewing-machine, the combination with a feed-bar, a feed-rocker mounted to oscillate in fixed bearings and connected with said feed-bar for which it affords a support, and means for actuating said feed-rocker, of a feed-dog movably connected with and deriving feeding movements from said feed-bar, and a two-armed lever fulcrumed upon said feed-bar and having one arm connected with said feed-dog and the other arm connected with said feed-rocker, whereby lifting movements are communicated to said feed-dog.

9. In a sewing-machine, the combination with feeding mechanism comprising two independently-movable feed-dogs, and means for communicating thereto feeding movements and differential rising and falling movements, of a two-part presser-foot having relatively yielding members operating each in conjunction with one of said feed-dogs and adapted to rise and fall with the same under the action of said feeding mechanism.

In testimony whereof we have signed our names to this specification in the presence of two subscribing witnesses.

PHILIP DIEHL.
ALFRED GRIEB.

Witnesses:
HENRY J. MILLER,
HENRY A. KORNEMANN.