

No. 664,505.

Patented Dec. 25, 1900.

H. P. RICHARDS.  
DRIVING MECHANISM.  
(Application filed Apr. 15, 1898.)

(No Model.)

2 Sheets—Sheet 1.

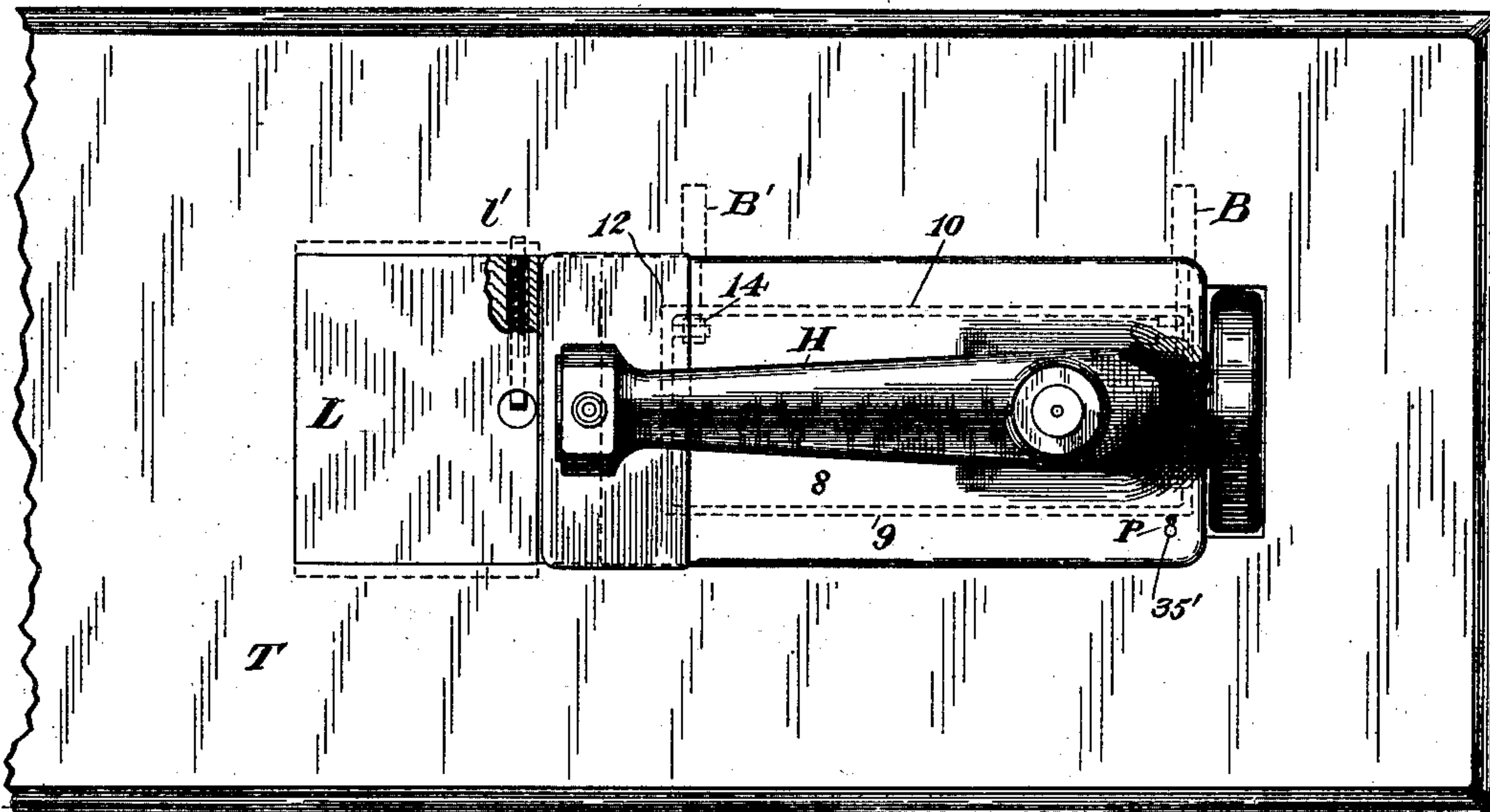
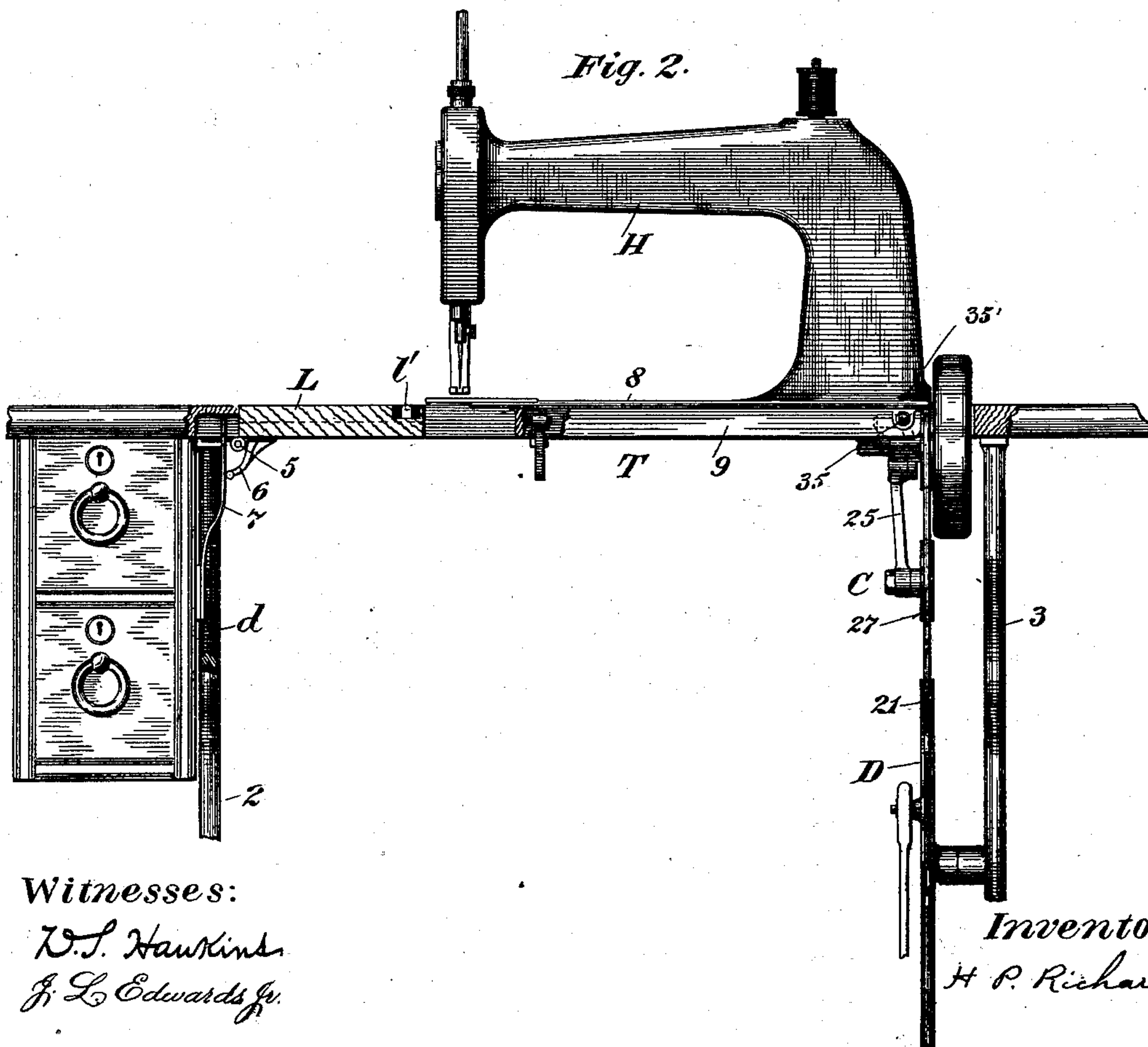


Fig. 1.



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2 Sheets—Sheet 2.

Fig. 5.

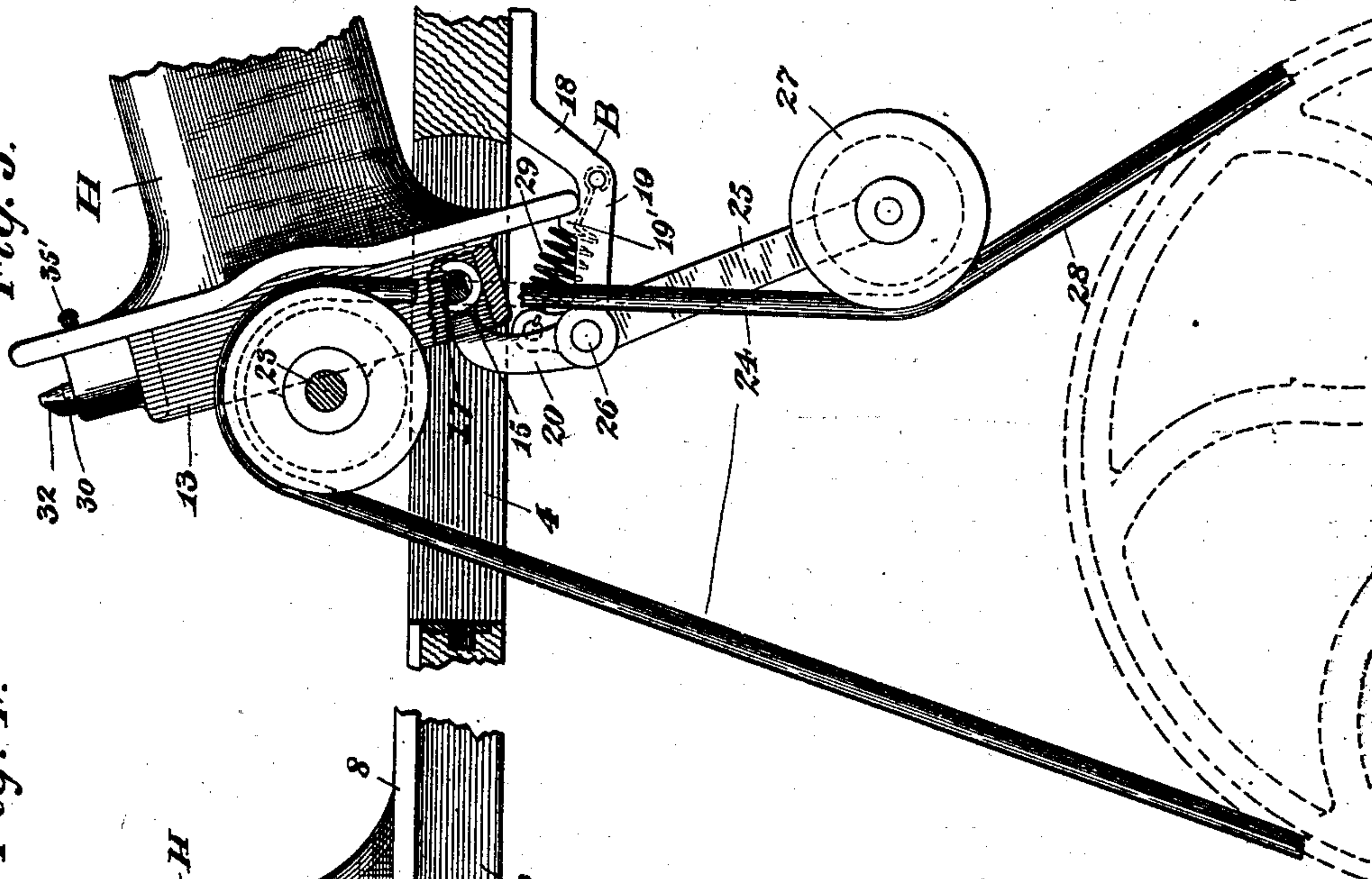


Fig. 4.

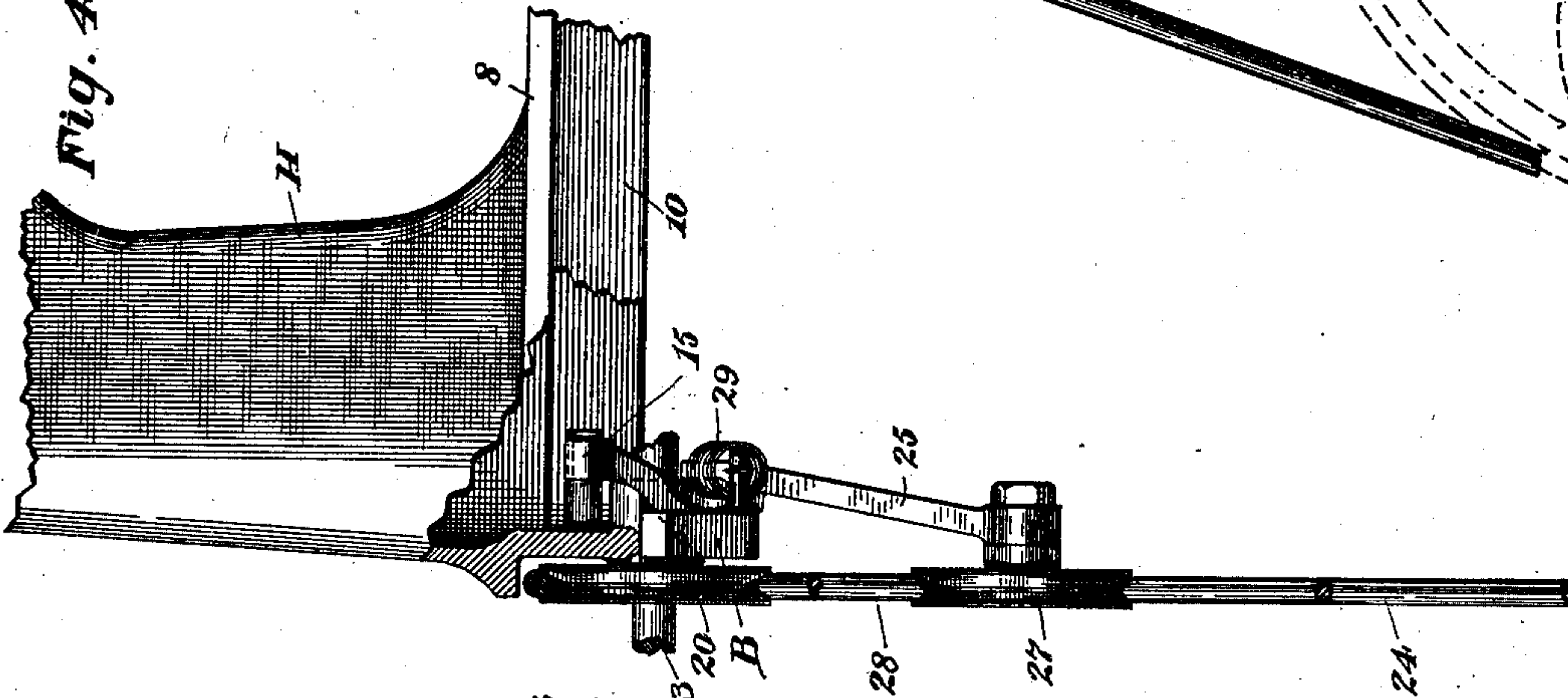
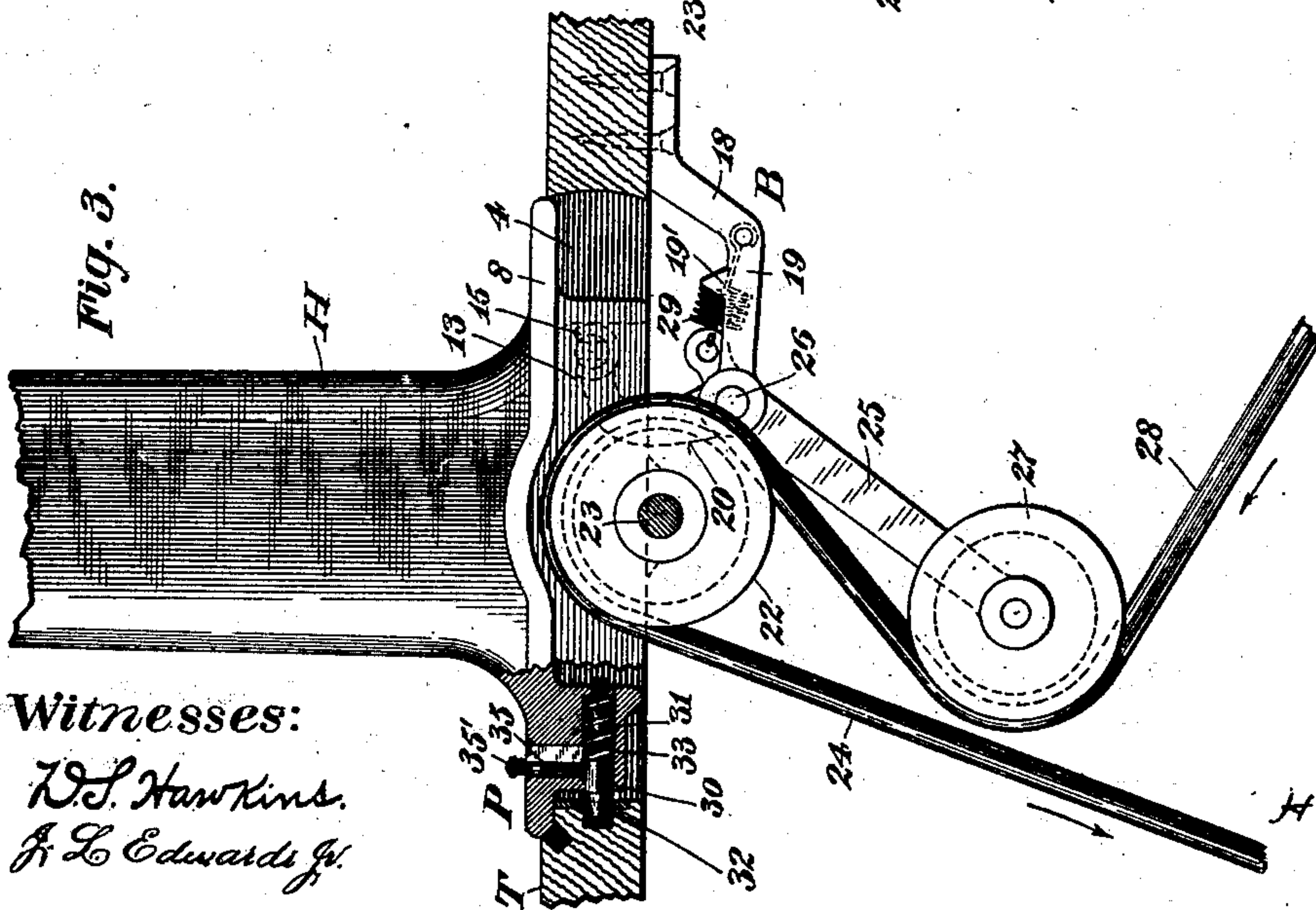


Fig. 3.



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# UNITED STATES PATENT OFFICE.

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## DRIVING MECHANISM.

SPECIFICATION forming part of Letters Patent No. 664,505, dated December 25, 1900.

Application filed April 15, 1898. Serial No. 677,728. (No model.)

*To all whom it may concern:*

Be it known that I, HUBERT P. RICHARDS, a citizen of the United States, residing in New Britain, in the county of Hartford and State of Connecticut, have invented certain new and useful Improvements in Driving Mechanism, of which the following is a specification.

This invention relates to sewing-machines, and more particularly to sewing-machine-driving mechanism.

One object of my present invention is to provide in a sewing-machine improved driving mechanism of a construction and organization whereby the belt or band constituting one element of said driving mechanism will be constantly maintained under predetermined tension in all positions of the sewing-machine head, as when the same is tilted from its working position to a position for inspection, thus facilitating such tilting of the sewing-machine head without necessitating the displacement of the driving-belt.

Another object of my invention is the provision in connection with such a driving-band running around the rotary driving and driven members of the machine of a suitable belt-controller or belt-tightener so disposed as to coact with the idle run of the belt, this belt-controller having its band-engaging face or point in position to be shifted by the idle run whenever an abnormal tension is put upon the latter, either when one of the rotary members just described is shifted or tilted relatively to the other (in a manner which will be hereinafter described) or when the idle-run is operated directly when the direction of movement of the belt is reversed. Usually this band-engaging face of the belt-controller will be disposed normally within that common tangent to the two rotary members which corresponds to the idle run of the driving-band, and hence the idle run will at all times have two portions thereof traveling in two paths which intersect each other at quite a sharp angle. Hence whenever the driving member or wheel is turned backward accidentally a greater stress or tension than the normal is immediately put upon the idle run of the band, and the belt-controller or tension device being movable the latter is shifted di-

rectly by the pull of the normally idle run, and the tension upon the belt is thereby released and the belt loosened to such an extent as to make it impossible for it to turn the driven rotary member and run the machine backward. It will be apparent, therefore, that by means of a single simple organization of mechanism two important results are obtained—to wit, the maintenance of a suitable tension upon the driving band or belt for running the machine forward in whatever position the mechanism may be and the prevention of any running backward of the machine.

A further object of the invention is to provide, in connection with a sewing-machine frame having a driving-wheel mounted thereon and with a tiltably-supported sewing-machine head having a driven wheel, a band extending around and of a length to permit a change in the relation of said driving and driven wheels and a shiftably-supported device engaging one run of said band and holding the same under tension irrespective of the position of one wheel relatively to the other.

In the drawings accompanying and forming part of this specification, Figure 1 is a plan view of a portion of a sewing-machine embodying my present improvements. Fig. 2 is a front elevation, partially in section, of a portion of a sewing-machine such as illustrated in Fig. 1. Fig. 3 is an end view, partially in section and on a relatively large scale, of a portion of the sewing-machine head and driving mechanism as seen from the right in Fig. 2, the head of the machine being shown locked in its normal working position. Fig. 4 is a rear elevation, partially in section, of the parts of the sewing-machine illustrated in Fig. 3, as seen from the right in said figure; and Fig. 5 is an end view similar to Fig. 3 of the same parts, showing the head of the machine tilted back to an inspecting position and the belt-controller in the position it occupies when the head is so tilted.

Similar characters designate like parts in all the figures of the drawings.

The sewing-machine proper comprises a main frame which includes a table T, supported on standards, a sewing-machine head (designated in a general way by H) which will



in practice include any suitable stitch-forming mechanism, and a driving mechanism (designated in a general way by D) including a shiftable belt-controller, hereinafter described.

The main frame of the sewing-machine comprises in the preferred form thereof shown in part in the accompanying drawings two table-supporting uprights 2 and 3, which may be of any suitable general construction, and a work-table T, having an elongated opening 4 for the head of the machine.

The head H of the sewing-machine, which head may be of any suitable general construction, is shown embodying a bed-plate 8, having depending front and rear flanges 9 and 10 and end flanges 12 and 13, which meet at their ends and form a hollow and bottomless casing for that portion of the stitch-forming mechanism disposed below the bed-plate 8. The sewing-machine head will in practice be provided with stitch-forming mechanism, which may be of any suitable construction and organization. Only a portion of this mechanism is shown in the accompanying drawings, for the reason that it is inessential to the present invention. In the present instance, since one of the features of the present improvement resides in the cooperation of this improved driving mechanism with a tilting sewing-machine head, one means for tiltably or pivotally supporting such head is shown herein, which means, however, more particularly forms the subject-matter of my contemporaneously-pending application filed January 5, 1900, Serial No. 431 of series of 1900, and therefore I do not claim the same independently of the combination above set forth in the present application.

As a means for tiltably or pivotally supporting the sewing-machine head at a point remote from the rear edge of the bed-plate thereof in such manner as to permit the ready removal and replacement of said head I have provided in connection with the table T, preferably, two head-supporting brackets (designated in a general way by B and B') provided at the forward ends thereof with parti-circular or transversely-slotted hinge members or bearings 14 and 15, respectively, and I have provided in connection with the end flanges 12 and 13 of the sewing-machine head two inwardly-projecting slatted or parti-circular pintles 16 and 17, adapted to be slipped into operative position within the hinge members or bearings 14 and 15, the construction and organization of said pintles and bearings being such that when the head of the machine is in the position shown in Fig. 3 it may be readily disengaged from its supports by lifting the same upward, which will draw the pintles out of the bearings through the slots thereof, as will be readily understood by reference to Figs. 3 and 5 of the drawings.

It will be seen by reference to Figs. 3 and 5 that the pintles are cut away or slatted on

their front and rear faces, that the hinge member or bearing of each of the brackets, as B, has a portion of its upper wall cut away to form a slot to permit the entrance of said pintles, that when the sewing-machine head is in the position shown in Fig. 3 the lower circular face of each pindle has a cooperative bearing engagement with the inner circular wall of the bearing, and, further, that when the sewing-machine head is tilted backward to a position shown in Fig. 5 both curved faces of the pindle cooperate with opposing interior portions of the bearing and lock the head against removal when in this position. Each bracket in the preferred form thereof (shown in the accompanying drawings) has downwardly, forwardly, and upwardly extending portions, (designated by 18, 19, and 20, respectively,) the latter of which terminates within the opening 4 in the table considerably in advance of the rearward edge thereof and the former of which has a rearwardly-extended bar whereby the same may be secured to the table, preferably by screws, (shown in dotted lines.)

By reference to Figs. 3 and 5 it will be seen that the sewing-machine head is hinged or pivotally supported somewhat remote from the rear edge of the bed-plate, so that when the said head is tilted to an inspecting position in said Fig. 5 the rear edge of said bed-plate will extend considerably below the pivotal point of said head, and as a means for limiting the tilting movement of said head and for holding the same when in a tilted position out of contact with the rear portion of the table I have provided, in connection with each head-supporting bracket, a stop-abutment 19', which is shown formed on the intermediate or forwardly-extended portion 19 of said bracket at a point substantially midway between, but considerably below and in the rear of the pivotal point of said head, said abutment being disposed in the path of movement of the rear portion of the bed-plate 8.

The driving mechanism for the machine comprises in the preferred form thereof shown in the accompanying drawings a driving-wheel 21, pivotally supported on the upright 3 of the sewing-machine frame, a driven wheel 22, fixed to the main shaft 23 of the sewing-machine head, only a portion of which is shown, and which will be journaled in suitable bearings, a belt or band 24, extending around the driving and driven pulleys, and a shiftable-supported belt-controller (designated in a general way by C) in operative engagement with one run of said belt and holding the same under tension irrespective of the relative positions of the two wheels 21 and 22, which wheels have their relations changed by the tilting of the sewing-machine head from the position shown in Fig. 3 to that shown in Fig. 5, or vice versa.

The belt-controller C in the preferred form thereof shown in the accompanying draw-



ings comprises a belt-controlling lever 25, pivotally supported at 26 intermediate its ends on one of the head-supporting brackets, as B, preferably at the junction of the two portions 19 and 20 thereof, a friction-roller 27, pivotally supported at the lower end of said lever and bearing against the return run 28 of the belt, and a tension device, shown as a spring 29, fixed at one end to the upper end of said lever and fixed at its opposite end to a portion of said bracket. The band or belt will be of sufficient length to permit the necessary change in the relative positions of the two wheels 21 and 22 as required by the tilting of the sewing-machine head, and the belt-controller will be of such a disposition as to take up any slack in said belt when the head is in either of its two extreme positions. It will be obvious, however, that while the belt-controller or belt-tightener normally serves to maintain the belt or driving-band in proper driving engagement with the driving member and the driven wheel, yet as said belt-tightener is shiftable in one direction for tightening the belt it is also retractable to loosen the belt and prevent the transmission of the movement of the driving member to said driven wheel. In the construction shown the belt-tightener is spring-tracted to force the idle run of the belt toward the driving-run, and thereby take up any slack which may be present; but owing to the fact that the idle run does not travel in a single straight path defining the shortest distance between the working faces of the driving member and the driven member, at which points the idle member coöperates with said members, but that instead the band-engaging face of the belt-tightener is within the common tangent to the two rotary members which defines the shortest or straight path along which the idle run might travel, it will be seen that there is a relatively sharp turn in such idle-run at the point where the latter passes around the band-engaging face or wheel of the belt-tightener, and hence that any excessive or abnormal increase of the tension on such idle run will result in retracting the belt-tightener in opposition to the force of the spring 29, this tightener therefore being a belt-operated one controlled as to one of its movements by the idle run of the driving-band. Such an abnormal tension may be put upon said idle run in either of two different ways: first, by tilting back the sewing-machine head in the manner and to the position illustrated in Fig. 5, or, second, by reversing the direction of travel of the rotary driving member or wheel, as sometimes occurs in manipulating the treadles of sewing-machines. In the latter case, as will be evident, if the direction of rotation of the driving member were reversed and no provision were made to prevent it the movements of the sewing mechanism would also be reversed, which, obviously, would result in spoiling the work. When, however, the

parts are combined in the manner hereinbefore described and the band-engaging face of the belt-tightener is within the common tangent corresponding to the idle run, any reversal of the movement of the driving member will result in a pull upon the portion 28 of the idle run and a consequent shifting of the wheel 57 and the other parts of the belt-tightener in opposition to the force of the spring 29. This of course results in releasing the tension on the belt and loosening the latter to such an extent as to render it impossible for such belt to maintain an operative driving connection between the driving member and the driven wheel 20, and hence as the belt is loosened it slips over the face of the wheel 20 without turning the latter, and thus a reversal of the movements of the sewing mechanism is prevented. It will be noticed also that as the driving-band usually passes around a driving-wheel of relatively large size said band engages a very large portion of the periphery of such driving-wheel, and an excellent coaction of the parts is thereby assured so long as said parts are in the position shown in Fig. 3; but when the direction of movement of the driving-band is reversed, as just described, the idle run is shifted quickly, so as to withdraw from a considerable portion of the periphery of each of the two rotary members, and this partial unwrapping of the idle run from the driving and driven wheels assures a very sensitive action of the parts and results in a quick stoppage of the mechanism whenever the driving-wheel is accidentally reversed during the manipulation of the treadles.

As a means for locking the sewing-machine head in its working or normal position I have provided a locking device, (designated in a general way by P,) which locking device in the preferred form thereof shown in the accompanying drawings comprises a spring-actuated bolt 30, supported for reciprocatory movements in a bearing 31, formed in a boss on the front flange of the bed-plate and having a conical locking portion or head 32, adapted to closely fit a socket formed in the face of the table T, as will be readily understood by reference to Fig. 3 of the drawings, a spiral spring 33, bearing at one end against the headed end of the bolt and at its opposite end against the rear wall of the bearing, forcing the conical portion of the head into said socket and holding the sewing-machine head against any accidental vibratory movement, and as a means for shifting the bolt to an inoperative position and for locking the same in this position I have provided a bolt-actuator, which is herein shown as a vertically-disposed pin 35, fixed at its lower end to the headed end of the bolt and extending through a vertical slot in the bed-plate, the outer end of said pin being furnished with a head or thumb-piece 35', whereby said pin and bolt may be manipulated. The slot through which this pin extends will preferably be of such



form that the pin may be turned to a position whereby the wall of said slot will hold the same in either of its adjusted positions, so that the bolt may be locked in an advanced  
5 or retracted position.

Having described my invention, I claim—

1. The combination, with a frame having a driving-wheel mounted thereon, of a tiltably-supported sewing-machine head having  
10 a driven wheel; a band extending around the driving and driven wheels and of a length sufficient to permit a change in relation between the driving and driven wheel; and a shiftably-supported device engaging one run  
15 of said band on its outer side and holding the same under tension irrespective of the position of one wheel relatively to the other.

2. The combination, with a driving and a driven wheel one of which is supported for  
20 movement toward and away from the other, of a band extending around said wheels and of a length sufficient to permit the movement of one wheel relatively to the other, and a shiftably-mounted spring-actuated belt-controller in bearing engagement with one run  
25 of said band and holding the same under tension irrespective of the relative positions of said wheels.

3. The combination, with two wheels supported with their axes in parallelism, of a fixed support for one of said wheels; a head or carrier for the other of said wheels, pivotally supported at one side the axis of the wheel carried thereby; a driving-belt extending  
30 around both the wheels and of a length sufficient to permit a movement of one wheel bodily with relation to the other wheel; and a shiftable belt-controller supported for movement independently of the tilting of  
35 the head and having an idle-wheel in engagement with one run of said belt and holding the same constantly under tension irrespective of the relative positions of said wheels.

4. The combination, with a driving-wheel  
45 of large diameter and with a fixed support therefor, of a driven wheel of small diameter located above, and having its axis in parallelism with, the axis of the driving-wheel; a pivotally-supported head or carrier for the driven  
50 wheel, the pivot of which support is disposed at one side the axis of said driven wheel; a belt extending around both wheels and of a length to permit a movement of one wheel bodily with relation to the other; and a re-  
55 actionary belt-actuated controller supported free of said driven-wheel carrier having an idle wheel in tensional engagement with one run of the belt irrespective of alterations in the relative positions of said wheels, whereby  
60 on the shifting of said carrier in one direction the belt acts to shift said controller.

5. The combination, with a driving-wheel of large diameter and with a fixed support therefor, of a driven wheel of small diameter  
65 located above, and having its axis in parallelism with, the axis of the driving-wheel; a piv-

otally-supported head or carrier for the driven wheel, the pivot of which support is disposed at one side the axis of said driven wheel; a belt extending around both wheels and of a  
70 length to permit a movement of one wheel bodily with relation to the other; a bracket mounted on the driving-wheel support; a belt-controlling lever pivotally supported intermediate its ends on said bracket; an idle  
75 wheel supported at one end of the belt-controlling lever in position to engage one run of the belt; and a spring in connection with the opposite end of said lever and holding the idle wheel in tensional engagement with one  
80 run of said belt.

6. The combination, with rotary driving and driven members one bodily shiftable relatively to the other, of a driving-band extending around said members and normally mov-  
85 able in a predetermined direction, and a belt-operated shiftable belt-controller cooperative with the idle run of the band, and normally having its band-engaging face within that common tangent to the two rotary members  
90 which corresponds to such run, and shiftable by said idle run to permit the loosening of the band on the reversal of the movement of the latter.

7. The combination, with a rotary driving  
95 member and a rotary driven member one of which is shiftable bodily relatively to the other, of a driving-band extending around said members and normally movable in a predetermined direction and of a length sufficient  
100 to permit the shifting of one of said members bodily relatively to the other, and a belt-operated shiftable belt-controller cooperative with the idle run of the band, and normally having its band-engaging face within that  
105 common tangent to the two rotary members which corresponds to such run, and shiftable by said idle run to permit the loosening of the band on the reversal of the movement of the latter.

8. The combination, with a rotary driving member and a bodily-shiftable driven member, of a driving-band extending around said members and normally movable in a pre-  
110 determined direction, and a belt-retracted spring-protracted shiftable belt-controller cooperative with the idle run of the band and normally having its band-engaging face within that common tangent to the two rotary  
115 members which corresponds to such run, and shiftable by said idle run on an abnormal increase of the tension on the latter.

9. In a sewing-machine, the combination of a tilting head; a driving and a driven member; a belt extending around said members;  
125 a lever fulcrumed to the frame of the machine, its free end carrying a pulley engaging one run of said belt in such manner as to automatically maintain a uniform stress on said belt when the machine is running in a pre-  
130 determined direction and when the head of said machine is in its normal position, said belt be-



ing of sufficient length to allow the head to be tilted without removing the belt from the driving or driven member.

10. In a sewing-machine, the combination 5 of a tilting head; a driving and a driven member; a belt extending around said members; a lever pivoted to the frame of the machine, its free end carrying a pulley engaging one run of said belt in such manner that when 10 said head is in its normal position and its driving member is running in a predetermined direction the stress on said belt is automatically held normal, but when said head is tilted or the running direction of the driving mem- 15 ber is reversed the stress is automatically relaxed.

11. In a belt-operated machine, the combination of a driven and a driving member, a belt extending around said members, and 20 means for permitting the bodily shifting of one of said members relatively to the other without the removal of the belt from either member, and automatically operative to effect the stoppage of the machine upon the re- 25 versal thereof.

12. In a belt-operated machine, the combination of a driven and a driving member normally rotating in a predetermined direction, a belt extending around said members, and 30 means for permitting the bodily shifting of one of said members relatively to the other without the removal of the belt from either member, and automatically operative to effect the stoppage of the machine upon a change 35 in the rotation of said members.

13. In a belt-operated sewing-machine, the combination of a tiltable head carrying a driven member; a driving member normally rotating in a predetermined direction; a belt

extending around said members; means for 40 permitting the shifting of the driven member without the removal of the belt from either member, and automatically operative to effect the stoppage of the machine upon a change 45 in the rotation of said members.

14. In a belt-operated sewing-machine, the combination with the frame thereof, of a driven and a driving member, one supported for movement relatively to the other; a belt 50 extending around said members; means pivoted to the frame of said machine; a device carried by said means in position to engage said belt; and means for yieldingly holding said device in engagement with the belt so as 55 to permit the shifting of one of said members relatively to the other and also permit said device to be automatically shifted by the belt on the reversal of the driving member to prevent the rotation of the driven member in any 60 but its normal direction.

15. In a belt-operated sewing-machine, the combination of a driven and a driving member normally rotating in a predetermined direction; a belt extending around said mem- 65 bers; a spring-controlled idle wheel located in the path of one run of the belt, and engaging said belt in such a manner as to permit the shifting bodily of one of the members relatively to the other without the removal of the 70 belt from either member, and so organized as to prevent the rotating of the driven member in a direction opposite to the said predetermined direction.

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