No. 842,756. PATENTED JAN. 29, 1907.

C. W. H. BLOOD.

BELT ADJUSTING MECHANISM.

APPLICATION FILED JUNE 23, 1904.

3 SHEETS—SHEET 1.

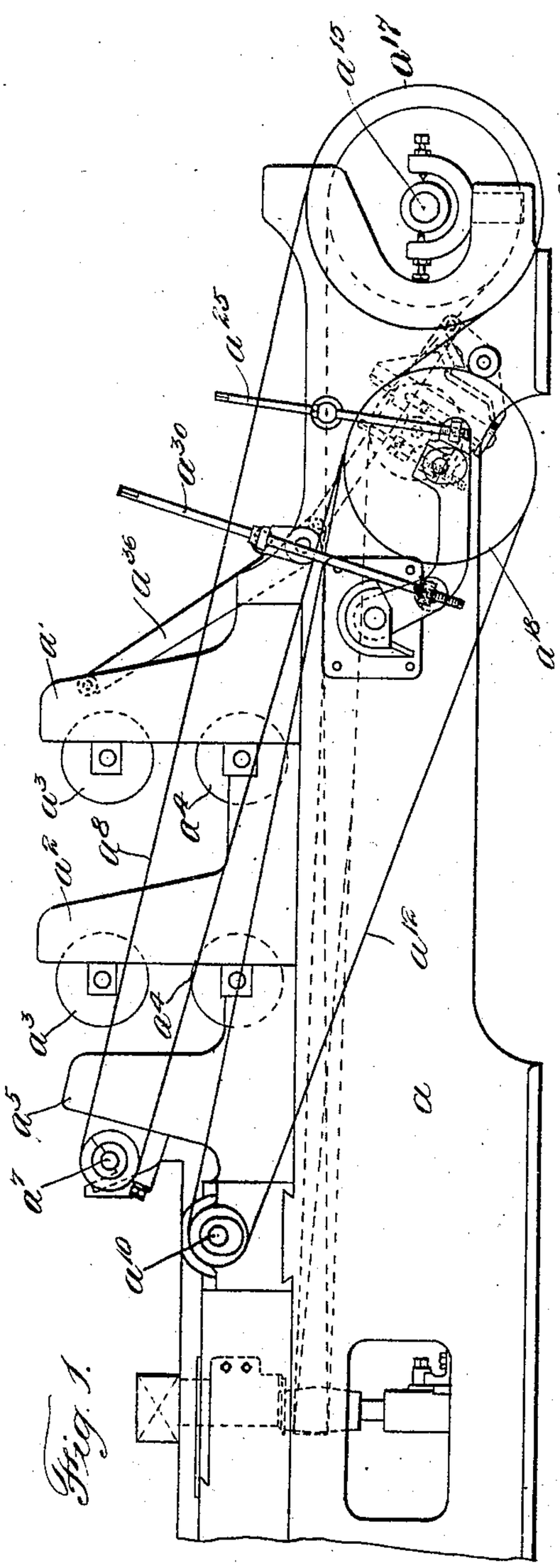

Fig. 1.

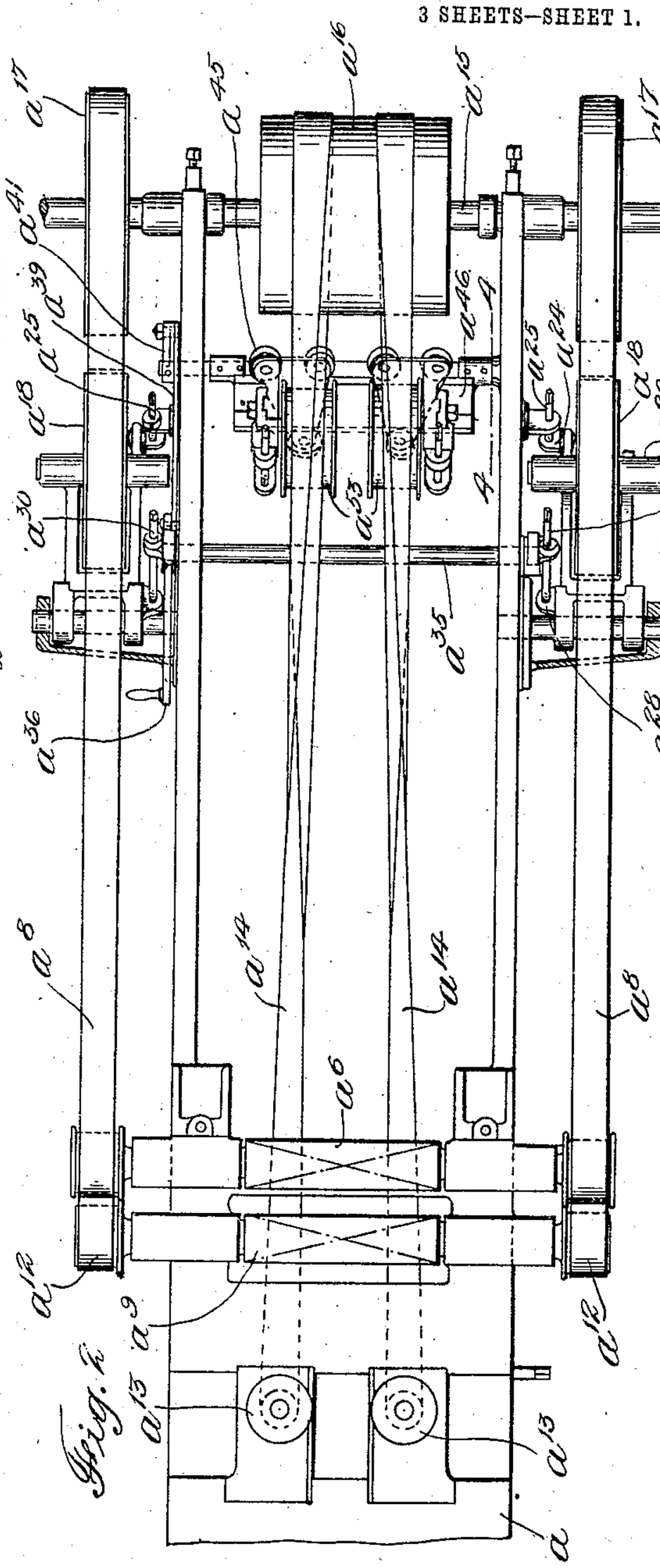

Fig. 2.

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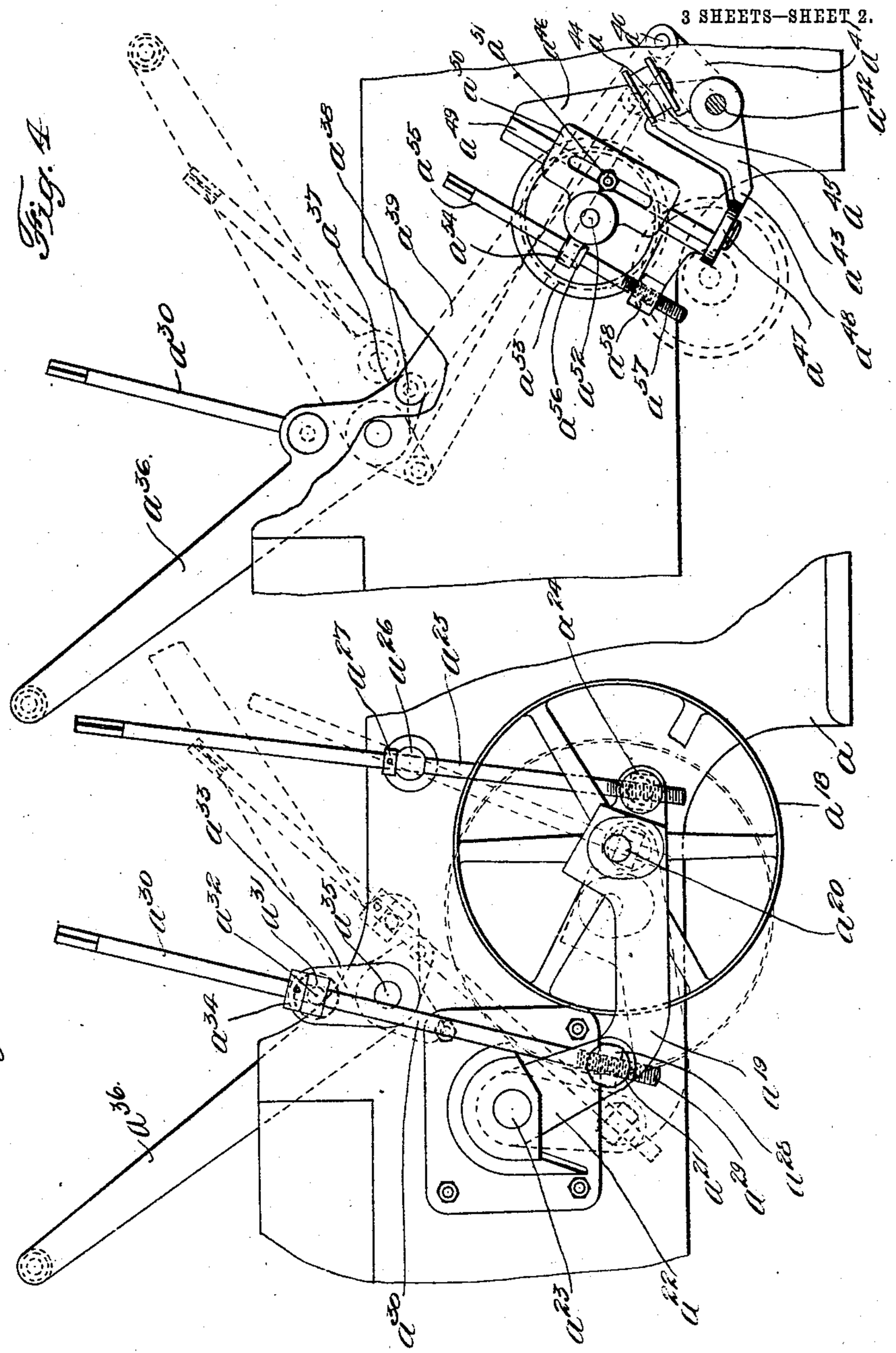

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3 SHEETS—SHEET 3.

Fig. 5.

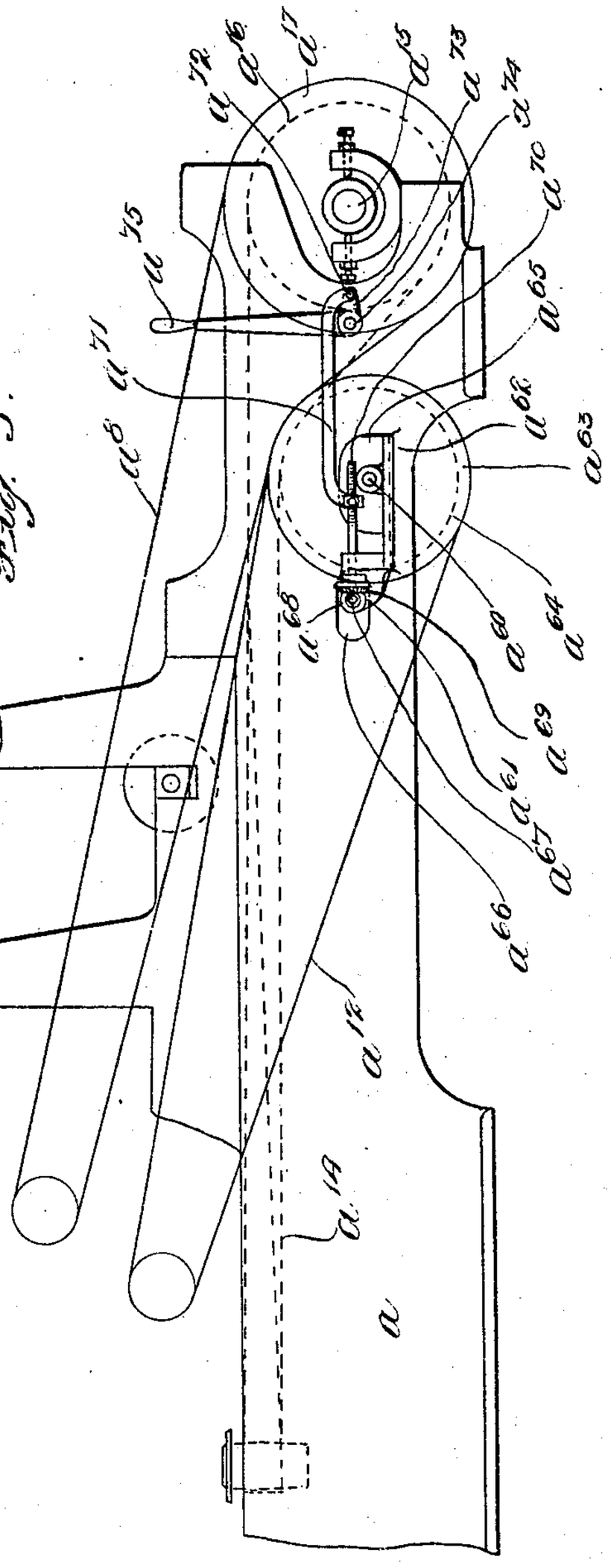
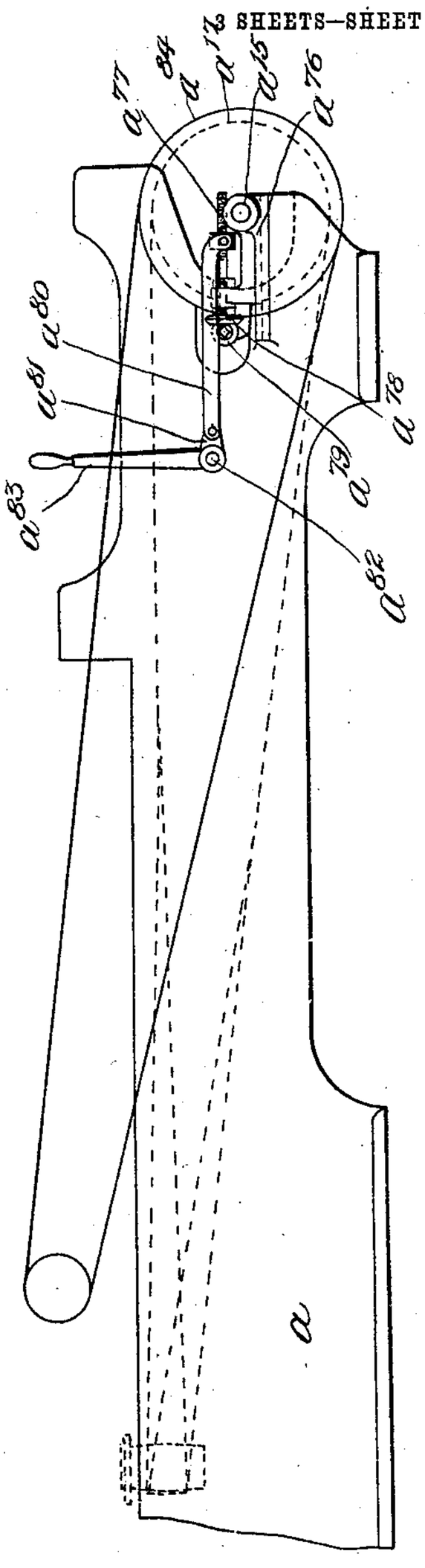


Fig. 6.



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UNITED STATES PATENT OFFICE.

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BELT-ADJUSTING MECHANISM.

No. 842,756. Specification of Letters Patent. Patented Jan. 29, 1907.

Application filed June 23, 1904. Serial No. 213,806.

To all whom it may concern:

Be it known that I, CHARLES W. H. BLOOD, a citizen of the United States, and a resident of Boston, Massachusetts, have invented an Improvement in Belt-Adjusting Mechanism, of which the following description, in connection with the accompanying drawings, is a specification, like letters on the drawings representing like parts.

My invention relates to belt-adjusting mechanism, the object thereof being to provide powerful, quick, and accurate adjustment for tightening or slackening belts for driving oppositely-moving horizontal spindles and vertical spindles capable of moving toward each other and is herein illustrated as applied to a wood-planer.

As my invention will be more readily understood by reference to a complete machine, I will hereinafter use a planer as an illustration of a practical application of my invention. I provide a toggle mechanism simultaneously operated at the opposite sides of the machine so arranged in connection with the cutter-head belts as to tighten or slacken both pairs of belts together and preferably also similarly operate the matcher-head belts. The result is that the operator by a simple movement of a single lever can instantly adjust the whole machine. Besides this simultaneous adjustment the mechanism contains means for an individual adjustment or independent movement for each belt.

The constructional details of my invention and the operation and further advantages thereof will be pointed out more at length in the course of the following description, reference being had to the accompanying drawings, in which I have illustrated a preferred embodiment of the invention.

In the drawings, Figure 1 represents in side elevation sufficient details of a usual wood-planer to enable my invention to be understood. Fig. 2 is a top plan view thereof. Fig. 3 is an enlarged view, in side elevation, of the operating mechanism, indicating the operation thereof in dotted lines. Fig. 4 is a similar view of the matcher-belt-adjusting mechanism, said view being taken on line 4 4, Fig. 2. Figs. 5 and 6 are views in side elevation showing modified constructions.

For convenience of illustration, as already explained, I have shown my invention applied to a wood-planer, having a bed a, in which are mounted stands a' a^2, carrying upper and lower feed-rolls a^3 a^4, and stands a^5, carrying an upper cutter-head a^6 on a shaft a^7, driven by belts a^8 at its opposite ends, and below the top cutter-head is a bottom cutter-head a^9, whose shaft a^{10} is driven by belts a^{12}, matcher-heads a^{13} being vertically journaled in usual manner in the bed of the machine and driven by belts a^{14}.

A driving-shaft a^{15} is conveniently mounted at the front end of the machine in any suitable manner, being provided with a driving-drum a^{16} and opposite driving-pulleys a^{17}, said drum receiving the belts a^{14} and said pulleys receiving the belts a^8, respectively. At the opposite sides of the machine are idler-pulleys a^{18}, over which the belts a^{12} pass, these pulleys being in the same vertical plane as the pulleys a^{17} and adapted to be frictionally driven thereby, the belts a^8 frictionally engaging the belts a^{12} as the latter pass around the pulleys a^{18}. This construction enables me to use open belting, which is very desirable in this class of machines.

The pulleys a^{18} are mounted in swinging hangers, herein shown as comprising links a^{19}, in the outer ends of which the pulleys are journaled at a^{20}, said links at their opposite ends being pivoted at a^{21} to links a^{22}, pivoted at a^{23} on the said frame or bed of the machine. On their inner sides the links a^{19} carry pivoted nuts a^{24}, receiving threaded rods a^{25}, loosely held in pivoted studs a^{26} and upheld by collars a^{27}, so that by properly turning said rods the pulleys a^{18} may be raised or lowered. The links a^{19} a^{22} constitute a toggle and at their pivot a^{21} are provided on the inner side with threaded nuts or ears a^{28} (shown in top plan in Fig. 2) to receive the lower threaded ends a^{29} (see Fig. 3) of rods a^{30}, loosely mounted in eyes a^{31}, pivoted at a^{32} in the free ends of cranks a^{33}, said rods having fixed collars a^{34}, maintaining them against downward movement in said eyes a^{31}.

The cranks a^{33} extend up rigidly from the opposite outer ends of a rock-shaft a^{35}, journaled in the frame of the machine, and at one end, herein shown as the farther side, Figs. 1, 2, and 3, the crank a^{31} or shaft is provided with

a hand-lever a^{36} for rocking said shaft and operating said cranks and connected mechanism. Also projecting from the hand-lever a^{36} and the adjacent crank a^{31} is an arm or crank a^{37}, pivotally connected at a^{38} to a link a^{39}, pivoted at a^{40} to a crank a^{41}, projecting rigidly from a rock-shaft a^{42}, on which is fixed a frame a^{43}, carrying the mechanism for tightening the matcher-head belts a^{14} a^{14}, said mechanism not being herein claimed *per se*, but claimed in a divisional application, Serial No. 304,210, filed March 5, 1906. The frame a^{43} is approximately triangular in cross-section, as shown best in Fig. 4, and its upper outer side is shaped to provide a track a^{44}, against which rest rollers a^{45}, whose flanges embrace said track. The rollers a^{45} depend from a bracket a^{46}, there being two wheels a^{45} to engage the track a^{44}, said bracket having a third wheel a^{47} at its lower end to engage the lower edge a^{48} to said frame. Said bracket has a guide a^{49}, on which slides a plate a^{50}, adapted to be clamped in position by a nut a^{51}. Said plate a^{50} has journaled at a^{52} a pulley a^{53}, said plate having a projecting ear a^{54} for receiving an adjusting-screw a^{55}, shouldered at a^{56} to bear against the under side of said ear a^{54} and having threaded engagement at its lower end a^{57} with an arm a^{58}, projecting from the lower end of said bracket a^{46}. Two of these brackets a^{46} and pulleys a^{53} are provided, movable toward and from each other on the frame a^{43}, one pulley for each belt a^{14}, the parts a^{46} a^{50} a^{55} constituting carriers for said pulleys. This construction permits the frame and supported pulleys a^{53} to be swung up and down with the frame a^{43} and rock-shaft a^{42} by the hand-lever a^{36} simultaneously with the similar movement of the side belt-adjusters previously explained, and yet the roller arrangement permits these matcher-belt tighteners to move freely toward or from each other automatically as the matcher-belts may be adjusted.

If it is desired to remove the lower cutter, for example, it is no longer difficult to take off the belts, as has heretofore been the case, but the lever a^{36} is simply moved to the right, Figs. 1 and 2, from its full-line position to its dotted-line position, Fig. 3, the result being that instantly the belts a^{12} a^{12} are slackened, thereby permitting the lower cutter to be slid out from the machine without any waste of time or unnecessary labor. If, on the other hand, it is desired to adjust the upper cutter-head for the purpose of putting on or removing knives or otherwise attending thereto, all that is necessary is simply to move the lever a^{36} the same as before to the right, Fig. 1, thereby instantly slackening the belts a^{8}, so as to permit any attention desired to the upper cutter a^{6}. So likewise, if either of the matcher-heads is to be attended to the same movement of the lever a^{36} instantly turns downwardly the pulleys a^{53}, so as to slacken the belts a^{14}, leaving the matcher-heads a^{13} free to be adjusted or attended to in any way desired. Also this instantaneous adjustability is of importance in permitting convenient loosening or throwing off of the belts at night or upon stopping the machine. Releasing the belts materially lengthens the life thereof; but ordinarily, on account of the difficulty and time required in releasing the belts, they are left under continuous strain, and hence quickly give out, and all this is prevented by my invention.

My mechanism permits the tension of either belt a^{8} a^{12} to be adjusted independently. For instance, if the belt a^{8} is too tight the rod a^{25} is simply screwed down, so as to lower the pulley a^{8} without, however, changing the tension of the belt a^{12} thereby. If the tension of the belt a^{12} is to be changed, the rod a^{30} is rotated, thereby automatically swinging the pulley a^{18} to the right or left of Fig. 1 and adjusting the belt a^{12} without appreciably changing the tension of the belt a^{8}. If it is desired to change the tension of either of the belts a^{14}, it is accomplished simply by turning up or down the corresponding rod a^{55}.

By having the various belt-tightening pulleys mounted to swing in connection with the toggle action and cranks shown they are locked rigidly in tightening position, and yet are capable of being instantly slackened without requiring much exertion on the part of the operator. The toggles are so arranged that they provide a powerful leverage just when the belt is getting to its tightest position, and when the belt has been fully tightened the cranks at that moment have just passed the dead-center. In other words, I obtain at one and the same time a powerful leverage and a simple and certain locking of the parts, the leverage being the most powerful at the point most desired and just prior to the moment the locking action becomes effective.

In certain classes of work it is not necessary to provide for the nicety of adjustment and other movements just described, and accordingly I include in certain of my claims as hereinafter contained a sliding arrangement which is of special value in a timber-machine, said arrangement being shown in Figs. 5 and 6, in which I have shown the same largely diagrammatically, inasmuch as the duplication of parts at the opposite sides of the machine and the general operation and arrangement are the same as already shown and described in detail.

In Fig. 5 I have shown the driving-shaft a^{15} as provided with pulleys a^{17} and a drum a^{16}, the same as before; but instead of having the belt-tighteners arranged to swing as in Figs. 1–4 I arrange a transverse shaft a^{60} in end frames a^{61}, sliding on ways a^{62}, said shaft carrying pulleys a^{63} and a drum a^{64}, the former for receiving the belts a^{12} and the lat-

ter for tightening the belts a^{14}. The frame of the machine is cut away, as indicated at a^{65}, to permit the shaft a^{60} to slide as required and is also cut away at a^{66} to permit a gear-shaft a^{67} to pass therethrough for adjusting the tension, said shaft being provided with miter-gears a^{68}, meshing with gears a^{69} on screw-shafts a^{70}, journaled in the frame a^{61} and engaging a link a^{71}, pivoted at a^{72} to a crank a^{73} on a rock-shaft a^{74}, operated by a hand-lever a^{75}, the result of this construction being that movement of the lever a^{75} to its position, Fig. 5, serves simultaneously to tighten all of the belts by causing the shaft a^{60} and its pulleys and drum to slide to the right, whereas by turning the lever a^{75} over to the left all of the belts are simultaneously slackened.

In Fig. 6 I have shown a further modification in which the adjustment is secured directly from the main shaft a^{15}, which is journaled in sliding end frames a^{76}, carrying adjusting-screws a^{77}, operated by beveled gears a^{78} a^{79}, the same as already described, and connected by links a^{80} to cranks a^{81} on a rock-shaft a^{82}, operated by a lever a^{83}. By turning the lever a^{83} to the left the driving-shaft and its pulleys a^{84} and drum a^{17} are simultaneously shifted to slack position, and upon swinging the lever a^{83} back again to the right the parts are moved to belt-tightening position.

It will be understood that my invention when considered in its broader aspects is capable of various other embodiments, and accordingly I wish it understood that many changes in arrangement and combination of parts may be resorted to without departing from the spirit and scope of my invention as further defined in the appended claims.

Having described my invention, what I claim as new, and desire to secure by Letters Patent of the United States, is—

1. A machine, containing oppositely-moving horizontal spindles, oppositely-moving vertical spindles, and their driving-belts, combined with belt-tightening mechanism for simultaneously tightening the belts of said horizontal spindles and the belts of said vertical spindles, and a single hand-lever for operating said tightening mechanism.

2. A machine, having a horizontal spindle, and its driving-belt and pulleys, a vertical spindle and its driving-belt and drum, and hand-operated means for simultaneously tightening said belts.

3. A machine, having an upper horizontal spindle, a lower horizontal spindle rotating in the opposite direction to said upper spindle, coöperating vertical spindles rotating in opposite directions, driving-belts for all of said spindles, and hand-operated mechanism for simultaneously tightening all of said belts.

4. A machine, having an upper horizontal spindle, a lower horizontal spindle, driving-belts for oppositely rotating said spindles, one set of belts being frictionally driven by the other, means for simultaneously tightening said two sets of driving-belts, and means for independently tightening the same.

5. A machine, having a horizontal spindle, driving-belts for its opposite ends, adjustable driving-pulleys for said belts, opposite toggles for adjusting said pulleys, and a hand-lever for simultaneously operating said toggles.

6. A machine, having a horizontal spindle, driving-belts for its opposite ends, swinging driving-pulleys for said belts, opposite toggles for swinging said pulleys, and a hand-lever for simultaneously operating said toggles.

7. A machine, having upper and lower horizontal spindles and their driving-belts and pulleys, the pulleys and belts of one thereof being frictionally driven by the others thereof, said frictionally-driven pulleys being adjustably mounted, means for simultaneously adjusting the same toward and from the driving-belts, and adjusting means for adjusting said pulleys toward or from their spindles.

8. A machine, having upper and lower horizontal spindles and their driving-belts and pulleys, the pulleys and belts of one thereof being frictionally driven by the others thereof, said frictionally-driven pulleys being swingingly mounted, means for simultaneously swinging the same toward and from the driving-belts, and adjusting means for adjusting said pulleys independently of said swinging movement.

9. A machine, having a horizontal spindle, a driving-belt therefor, an adjustable pulley for said belt, means for adjusting said pulley, a toggle for moving said pulley to tighten the belt, and means for adjusting the operative movement of said toggle.

10. A machine, comprising a horizontal spindle, a driving-belt therefor, a swinging pulley for said belt, a toggle for said swinging pulley, and means for adjusting the operative movement of said toggle.

11. A machine, comprising a horizontal spindle, a driving-belt therefor, a swinging driving-pulley, about which said belt passes for driving said belt, a toggle arranged to move toward lengthened position to swing said swinging pulley into belt-tightening position, and means for adjusting said pulley toward and from its swinging center.

12. A machine, having a rotary spindle, driving-belts for its opposite ends, independently-adjustable driving-pulleys therefor movable into belt-tightening position and belt-releasing position, said belts passing around said pulleys in driven engagement therewith, a lever for simultaneously swinging said driving-pulleys, and automatic

means coöperating therewith for locking said parts in belt-tightened position, said means being automatically locked and unlocked by movement of said lever.

13. A machine, having a horizontal spindle, a driving-belt therefor, an adjustable pulley for said belt, means for adjusting said pulley, a toggle for moving said pulley to tighten the belt, means for adjusting the operative movement of said toggle, and an operating-crank movable past a dead-center for locking said parts in belt-tightened position.

14. A machine, having a horizontal spindle, a driving-belt therefor, a swinging pulley for said belt, a toggle for swinging said pulley, means for adjusting said pulley toward and from its swinging center, means for adjusting the operative movement of said toggle, and an operating-crank movable past a dead-center for locking said parts in belt-tightened position.

15. A machine, comprising a horizontal spindle, belts at its opposite ends, tightening-pulleys for said belts, toggles for moving said pulleys, a rock-shaft, cranks and rods therefrom connected to said respective toggles, and an operating-lever for rocking said shaft.

16. A machine, having a horizontal spindle, belts at its opposite ends, tightening-pulleys for said belts, toggles for moving said pulleys, a rock-shaft, cranks and rods therefrom connected to said respective toggles, and an operating-lever for rocking said shaft, said rods being adjustable in length for changing the normal angles of said toggles.

17. A machine, having a rotary spindle, a driving-belt therefor, a tightening driving-pulley mounted to swing for tightening said belt, said belt passing around said pulley in driven engagement therewith, a toggle movable toward lengthened position to tighten the belt, and operating connections for swinging said toggle, belt and pulley.

18. A machine, having a rotary spindle, a driving-belt therefor, a tightening-pulley for tightening said belt, an adjustable swinging support for said pulley, and a toggle and adjustable operating connections for swinging said support and pulley.

19. A machine, having horizontal rotary spindles and vertical rotary spindles, belts and driving-pulleys for all of said spindles, belt-tightening mechanism, including swinging pulleys and toggles for all of said belts, and a single hand-lever for simultaneously operating all of said pulleys and toggles.

20. A machine, having an upper horizontal spindle and its driving-belts and pulleys, a lower horizontal spindle and its driving-belts and pulleys, opposite vertical spindles and their driving-belts and driving means, belt-tightening pulleys for the belts of said vertical spindles, a swinging support for said belt-tightening pulleys, swinging supports for the pulleys of said lower spindle, and means for simultaneously swinging all of said swinging supports and their pulleys.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

CHARLES W. H BLOOD.

Witnesses:

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