

A new or improved soap cutting machine / [Jacob Adrian Jacobson].

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COMPLETE SPECIFICATION.

A New or Improved Soap Cutting Machine.

We, JACOB ADRIAN JACOBSEN, Carpenter of 32 Bethune Street, in the City County and State of New York, and ALFRED MORTIMER MILES, Printer, of West Hoboken, in the County of Hudson and State of New Jersey, United States of America, do hereby declare the nature of this invention and in what manner the same is to be performed to be particularly described and ascertained in and by the following statement :—

This invention has reference to a machine for cutting a block of soap successively first into slabs then into bars and lastly into cakes of the required size so that a considerable saving in time and labour is obtained and the cutting up of a block of soap into cakes greatly facilitated and expedited and the invention consists in its general features of a soap cutting machine which comprises an elevator for receiving the block of soap means for intermittently lifting the elevator a horizontal reciprocating frame provided with two pivoted pushers and a horizontal cutting wire at one end of the frame for cutting off a slab from the block which slab is then moved by the first pusher with the frame and by the next motion of the frame taken up by the second pusher and pushed through stationary vertical cutting wires so as to be cut into bars. The bars thus obtained are next placed in front of a laterally reciprocating pusher which forces the bars through a second series of vertical cutting-wires arranged in a stationary frame at right angles to the first set of vertical cutting-wires so as to cut the bars into cakes the laterally reciprocating pusher being hinged to its frame so as to pass over the bars that are fed forward by the next motion of the horizontally reciprocating frame. The invention consists further of means for intermittently lifting the elevator so that the block of soap is successively subjected to the action of the cutting-wire for being cut into slabs said transmitting mechanism being operated when the reciprocating frame has cleared entirely the block of soap. The invention consists lastly of certain mechanisms by which motion is imparted at the proper time to the different operative parts of our soap-cutting machine as will be fully described hereinafter and finally pointed out in the claims.

And in order that our invention may be easily understood and readily carried into practice we will proceed to fully describe same with reference to the accompanying drawings in which :—

Fig. 1 represents a side-elevation of our soap-cutting machine.

Fig. 2 is a plan view of the same.

Fig. 2^A is a vertical longitudinal section of one form of reversing mechanism employed in our soap-cutting machine.

Fig. 3 is a plan view drawn on a larger scale and showing the mechanism for transmitting motion from the driving shaft to the different operative parts of the machine.

Fig. 4 is an end elevation of the left hand end of the machine.

Fig. 5 is a vertical transverse section on line 5—5 Fig. 2.

Fig. 5^A is a detail vertical transverse section on line 5^A 5^A Fig. 2 seen in the direction of the arrow Fig. 2, and

Figs. 6, 7 and 8 are detail vertical longitudinal sections drawn on a larger scale of the longitudinally reciprocating frame by which the soap-block is cut into slabs and the slabs then moved forward and passed through the first set of vertical cutting-wires.

Similar letters of reference indicate corresponding parts throughout.

[Price 8d.]

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Referring to the drawings:—

A represents the supporting frame of our soap-cutting machine which is provided at one end with upright and transversely braced standards A¹ on which the elevator E by which the block of soap is intermittently lifted is placed. At the other end of the frame A is arranged at right angles thereto an auxiliary frame A² 5 on which are supported the bearings for the driving shaft S to which rotary motion is imparted by suitable pulleys a straight belt and a cross belt from a suitable counter shaft. On the main frame A is guided on suitable ways a horizontal longitudinally reciprocating frame B which is provided with longitudinal side rails b^x and at its extreme right hand end with a stationary horizontal cutting-wire b and above the same with a pusher B¹ pivoted to lugs b¹ on the side rails of frame B. Near the middle portion of the frame B is arranged a second 10 pusher B² which is pivoted to lugs b² attached to the top of the side rails of the frame B and which is provided with a hinged block B³ having slits b³ in the body of same. The distance between the pushers B¹ B² is of such length that a slab 15 which is cut off from the block of soap by the horizontal cutting-wire b of the frame B can be readily placed in the space between the pushers. The standards A¹ of the elevator frame support also rails B⁴ on which the frame B is guided so that the latter can be moved from one pair of standards to the other pair and entirely over the block of soap supported on the elevator E. 20

About mid-way to the length of the main frame A is arranged a transverse frame C which is provided with a number of vertical cutting-wires d said frame being attached to a horizontal platform P which is supported on the main frame directly below the frame B and which extends from a point near the supporting-frame of the elevator to a point near the opposite end of the main-frame B as 25 shown clearly in Fig. 2. From the transverse frame C extends along one side rail of the main frame A a narrow rail C¹ which is bevelled at its opposite end said rail serving as a guide rail for the slab of soap that is cut off from the block by the horizontal wire b.

To the side of the platform P opposite to the rail C¹ are attached flat springs C² 30 which serve to press the slab towards the stationary guide-rail C¹ when the same is moved forward by the pusher B¹ and pressed through the vertical cutting-wires of the transverse frame C.

To the elevator E is imparted an intermittent motion so that the block of soap which is placed on the same is raised for the required height above the horizontal 35 platform P of the main frame and thereby subjected to the action of the horizontal cutting-wire b when the frame B is moved over the block of soap so that a horizontal slab is cut off from the block. The required intermittent motion is imparted to the elevator-platform E by means of rack bars e that are attached to each corner of the elevator E and guided in ways e^x of the standards A¹. With 40 each rack-bar e meshes a pinion e¹ which are applied in pairs to two transverse shafts e² which turn in bearings of the supporting frame A¹ as shown in Figs. 2 and 5 said shafts being turned simultaneously so that all the rack bars are raised at the same time.

To the end of one of the shafts e² is applied a ratchet wheel e³ which is engaged 45 by a spring pawl e⁴ the teeth of the ratchet wheel e³ being proportioned in such a manner that by the engagement of the pawl with the teeth of the ratchet-wheel the exact height to which the elevator is to be lifted is controlled so that the slabs of uniform thickness are cut from the block. Rotary motion is intermittently transmitted to the transverse pinion-shafts e² by means of an endless sprocket 50 chain e⁵ which passes over a sprocket wheel e⁶ of the same size of each shaft e². One of the shafts e² is further provided with a sprocket wheel e⁷ to which rotary motion is transmitted by a sprocket chain e⁸ and several intermediate sprocket wheels and chains e⁹ e¹⁰ e¹¹ e¹² e¹³ and e¹⁴ from a sprocket wheel e¹⁵ on the driving shaft S. The driving shaft S also transmits motion by a pinion f to a gear 55 wheel f¹ which is applied to an intermediate shaft f² that is supported in suitable bearings below the platform P said auxiliary shaft f² transmitting motion by

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means of a pinion f^3 to a gear wheel f^5 on a second intermediate shaft f^4 and from said shaft f^4 by means of a pinion f^6 and gear wheel f^7 to a third intermediate shaft f^8 which is likewise supported in bearings of the supporting frame A to a longitudinal rack bar f^9 at the underside of the frame B as shown in Figs. 3 and 4.

The frame B is provided with a transverse piece B^5 below the platform P which piece is attached by bolts to the side rails of the frame B and to which piece B^5 is applied a longitudinal piece B^6 that carries the rack bar f^9 as shown in Fig. 3. When the driving shaft S is rotated in one direction motion is imparted by the intermediate transmitting gears to the rack bars f^9 and the frame B in one direction while when the motion of the driving shaft S is reversed the rack bar f^9 and frame B is moved in an opposite direction. The reversing of the driving shaft S is accomplished at the proper time by any approved reversing device one form of frictional reversing mechanism being shown in plan in Fig. 2 and in detail vertical longitudinal section in Fig. 2^A.

To one end of the transverse piece B^5 of the frame B is attached a block B^7 which carries a horizontal tongue B^8 which is tapered off at the ends and provided at its underside with heel pieces b^8 and a curved channel b^7 between the same as shown in Figs. 1 and 3 said heel pieces serving to engage an anti-friction roller b^9 at the end of a fulcrumed lever B^9 that engages by its opposite end the movable member of a clutch B^{10} . The stationary member of the clutch B^{10} is attached to the sprocket wheel e^{16} so that the sprocket wheel is at rest when the movable member is out of gear with the stationary member of the clutch but which is turned by the driving shaft as soon as the movable member is thrown into gear with the stationary member of the clutch. This is accomplished by the heel pieces b^8 of the tongue B^8 when the frame B is moved forward over the platform as the roller b^9 of the lever B^9 passes first along the inner edge of the first heel-piece then outwardly on the channel b^7 and then along the outer edge of the second or longer heel piece b^8 . When the tongue B^8 is not in engagement with the lever B^9 the latter is pressed inwardly by the action of a helical spring b^{11} which is interposed between the outer end of the lever B^9 and the upper end of a spring arm B^{11} that is pivoted to one of the horizontal side-pieces of the frame A² as shown in Figures 1, 2 and 4. By the pressure of the spring b^{11} the opposite end of the lever B^9 holds the movable member of the clutch B^{10} out of gear with the stationary member on the sprocket wheel e^{16} so that the latter is not turned by the driving-shaft. When the tapering longer heel piece b^8 of the tongue B arrives at the end of the lever B^9 it engages the roller b^9 and turns the lever on its fulcrum against the tension of the spring b^{11} so that its opposite end moves the movable member of the clutch into gear with the stationary member whereby the sprocket wheel e^{16} is turned and the elevator raised by the action of the intermediate sprocket chains and sprocket wheels on the pinion shafts and rack bars of the elevator so that the block of soap is lifted for the required thickness of the slab to be cut off. The movable member of clutch B^{10} remains in gear as long as the roller b^9 is held in engagement with the edge of the longitudinal piece b^8 of the tongue B^8 . When the roller b^9 arrives at the opposite end of the heel piece b^8 the lever B^9 is shifted again by the action of the spring b^{11} the clutch members are thrown out of gear the motion of the transmitting mechanism and elevator is interrupted and the block of soap prevented from being raised further so as to be ready for the action of the horizontal cutting-wire b . This takes place when the frame B has moved the slab of soap cut during the outward motion of the frame over the platform P and through the series of vertical cutting-wires d . During the outward motion of the frame B the cutting-wire b passes again through the raised block of soap and cuts off another slab which is engaged by the first pusher B^1 that drops into vertical position when it arrives at the end of the slab so as to take the slab along. The block B^3 of the second pusher B^2 drops at the same time into vertical position back of the slab before cut off so that on reversal of the motion of the driving shaft by the reversing mechanism the reciprocating frame B is moved in forward direction

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and its pushers B² and B¹ carry both slabs of soap forward the foremost slab being pressed by the block B³ through the vertical cutting-wires while the rear slab is moved over the block of soap onto the right hand end of the platform P as shown in Fig. 8. The edge of the platform P is beveled as shown in Figs. 6, 7 and 8 so that the slab is readily transferred to the same from the block of soap. While the foremost slab is forced by the pusher block B³ through the cutting-wires *d* it is steadied and guided by the siderail C¹ and flat springs C². The pusher block B³ moves the slab entirely beyond the cutting-wires *d* which is accomplished by the slits *b*³ in the same into which the cutting wires enter so that the slab is cut for its entire length into bars of soap. The tongue B⁸ throws the clutch B¹⁰ into gear so that the block of soap on the elevator is again raised while simultaneously the motion of the driving shaft and frame B is reversed and thereby the cutting-wire *b* moved again through the block so as to cut off another slab while the pushers B³ and B¹ pass over the slab on the platform and over the slab just being cut off from the block as shown in Fig. 6. When the frame B arrives at its outermost position the pushers B³ and B¹ drop respectively into vertical position as shown in Fig. 7. The motion of the frame B being now reversed the slab on the platform and the slab just cut off are moved forward by the pushers B³ and B¹ so that one is forced through the vertical cutting-wires *d* and the other moved onto the platform P as shown in Fig. 6.

During the forward motion of the pushers B³ B¹ they abut against stop-pins *b*^x *b*^x which are attached to the side rails of the frame B immediately back of the pushers B³ B¹ as shown in Figs. 6, 7 and 8.

At the end of the platform and located opposite to the transverse frame A² and beyond the transverse cutting frame C is arranged a transversely reciprocating pusher bar D which is hinged to a frame D¹ which is guided on ways D² of the auxiliary frame A² said frame D¹ being provided with a transverse piece D³ having a stationary screw-nut S¹ which is engaged by a screw-threaded portion of the driving shaft S as shown in Fig. 2. When the bars of soap are pushed on to the end of the platform P so as to be in front of the pusher bar D the latter is moved across the platform by the action of the threaded portion of the driving shaft S on the screw nut S¹. The bars are thereby moved through a second series of vertical cutting-wires *g* which are supported in a longitudinal frame G that is arranged parallel with the pusher bar D at the opposite side of the platform P so that the bars are cut up into a number of cakes which are moved on to a slightly inclined platform P¹ and then to a suitable conveyor or on to drying racks on which the cakes are separated and then conducted to the drying-room.

As soon as the bars are cut up into cakes by the cutting wires *g* the motion of the driving shaft S is reversed by the action of the transverse piece D³ of the frame D¹ on one of the two pins D⁵ arranged on a shifting-rod D⁴ so that the latter is shifted in the direction of the motion of the frame D¹ whereby a forked lever D⁶ which is fulcrumed to the rod D⁴ is also shifted in the same direction. Lever D⁶ moves a sliding sleeve D⁷ which is placed loosely on the shaft S and produces thereby by the connecting parts the tightening of one of the driving pulleys D⁸ on the shaft S and the loosening of the other so that the belt on the former pulley transmits motion to the driving shaft and reverses the motion of the same while simultaneously the transmitting action of the cross belt and loose pulley on the driving shaft is discontinued in the same manner as in other well-known constructions of reversing mechanisms.

During the return motion of the reciprocating frame D¹ which is produced by the reversal of the motion of the driving shaft the hinged pusher bar D passes over the rounded off end of a spring piece G¹ that is attached at its opposite end to a block G² that extends transversely across the platform P at the end of the same. During the forward motion of the pusher bar D the latter lifts by its projecting end *g*² the curved outer end of the spring piece G as shown in Fig. 5^A and sufficiently to clear the same. During the return motion of the pusher bar D over the spring rail G¹ the pusher bar is lifted so as to pass above the bars that

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are moved onto the end of the platform P by the next forward motion of the reciprocating frame B. When the frame D¹ arrives at the end of its return motion the pusher bar D clears the recessed end g^3 of the transverse block G² and drops again into vertical position so as to be in a position to push the next set of

5 bars transversely across the platform and through the vertical cutting-wires g by the next forward motion of the pusher bar D which is accomplished by the action of the transverse piece D³ on the second pin D⁵ on the shifting rod D⁴ whereby the reversing mechanism is again actuated and the motion of the driving shaft reversed.

- 10 A stop b^{12} is attached to the side rail of the frame D¹ and adapted to pass along an inclined portion b^{13} of the spring arm B¹¹ which is pivoted to the frame A² said stop raising the spring arm until it has passed the inclined portion and arrives at the straight end b^{14} of the arm B¹¹. The raising of the spring arm B¹¹ exerts a tension on the spring b^{11} so that the anti-friction roller b^9 of the fulcrumed clutch
- 15 operating lever B¹⁹ is moved along the channel b^7 between the check pieces b^8 of the tongue B⁸ on the frame B so as to secure the reliable engagement of the roller by the rear heel piece and consequently the reliable working of the clutch at the proper time so as to produce the raising of the elevator. When the motion of the driving shaft is reversed the stop b^{12} liberates during the forward motion of
- 20 the slide frame D¹ the arm B¹¹ so that the spring b^{11} is pressed on the end of the fulcrumed lever and holds the movable clutch member in ungeared position whereby during the return motion of the frame B the tongue B⁸ and its heel piece b^8 can clear the roller b^9 .

- The operation of the different parts of our soap-cutting machine was described
- 25 in connection with the description of the same so that only a brief additional description is required.

- Before starting the machine the elevator platform E is returned to its lowermost position by raising the pawls of the pinion shafts of the elevator and permitting the downward motion of the platform by gravity. When the platform has arrived
- 30 at its lowermost point the block of soap is transferred on to the same from the truck by which it is moved to the cutting machine. When the block is placed in position on the elevator E the driving shaft is started and the block raised to a sufficient height above the platform P so that by the outward motion of the reciprocating frame B the horizontal cutting-wire b passes through the block while the pusher B¹
- 35 passes over the slab cut off by the wire b . When the end of the reciprocating frame B arrives at the opposite side of the block the pivoted pusher B¹ drops into vertical position as shown in dotted lines in Fig. 6 and in full lines in Fig. 7.

- The slab is then in a position so as to be moved by the forward motion of the reciprocating frame B on to the platform P as shown in Fig. 8. During the next
- 40 outward motion of the frame B the pusher B² with its hinged pusher block B³ passes over the slab thus cut off while simultaneously the horizontal cutting-wire passes through the block which has been raised in the meantime for the thickness of a slab and cuts off the next slab the pusher B¹ passing again over the slab until it arrives at the end of the same and dropping into vertical position back of the
- 45 same. Simultaneously the pusher B² with its pusher block B³ drops likewise to the rear of the first slab so that by the forward motion of the reciprocating frame B both slabs are moved forward one towards the end of the platform P and the other from the block on to the platform P as shown in Figs. 7 and 8.

- The first slab is pressed by the forward motion of the frame B through the
- 50 vertical cutting-wires d so as to be cut into bars which are moved over the platform P into the path of the pusher bar D which moves the bars transversely over the platform and forces them through the cutting-wires g which are arranged longitudinally alongside of the platform P so as to be cut into cakes which are moved onto the platform P¹ and then conducted from the same on to a suitable
- 55 conveyor and by the same to the drying chamber. The clutch mechanism by which the elevator is intermittently raised as well as the mechanism for changing the motion of the driving shaft are operated at the proper time so as to produce the

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lifting of the block of soap before the forward motion of the reciprocating frame B commences. The motion of the reciprocating pusher bar D and its frame D¹ is so timed that it moves across the platform P when the bars are in front of the pusher bar and back again over the spring rail G¹ of the side block G² so as to pass over the next set of bars when the direction of motion of the driving shaft is changed by the reversing mechanism. When the elevator is raised sufficiently so that the block is cut up entirely into slabs the elevator is returned into its lowermost position so as to receive the next block of soap upon which the machine is again operated in the same manner as before described so that the block is cut up into horizontal slabs the slabs into longitudinal bars and the bars into cakes. 10

Having now particularly described and ascertained the nature of our said invention and in what manner the same is to be performed we declare that what we claim is:—

1. The combination with an intermittently lifted block-carrying elevator of a longitudinally reciprocating frame provided with a horizontal cutting-wire at the outer end of the same and two pivoted pushers supported at different points of the same a horizontal platform for receiving the slabs cut off from the block and a stationary frame provided with vertical cutting-wires arranged transversely to the platform substantially as set forth. 15

2. The combination with an intermittently operated block carrying elevator of a longitudinally reciprocating frame having a horizontal cutting-wire at one end a pivoted pusher above said wire and a second pusher near the opposite end of the frame a series of vertical cutting-wires arranged transversely across the platform a transversely reciprocating pusher bar arranged at one side of the end of the platform and a second series of vertical cutting-wires arranged parallel with the pusher-bar at the opposite side of the end of the platform substantially as set forth. 20 25

3. The combination of a block carrying elevator vertically guided rack-bars attached to the same pinions engaging said rack bars a series of sprocket wheels and chains for transmitting rotary motion to the pinion shafts a horizontal reciprocating frame provided with a horizontal cutting-wire at its outer end and with pivoted pushers a driving shaft a clutch on the driving shaft and means applied to the reciprocating frame and adapted to throw the clutch in or out of gear so as to transmit motion to the elevator and stop the motion of the same substantially as set forth. 30 35

4. The combination of a horizontal platform having longitudinal guide rails a reciprocating frame guided on the same means for imparting reciprocating motion to said frame a transverse frame extending across the platform and provided with vertical cutting-wires two pushers pivoted at different points of the reciprocating frame and a pusher block hinged to the pusher nearest to the transverse cutting frame said pusher block being provided with slits so as to pass over the vertical cutting wires and permit the slab to be removed entirely beyond the same substantially as set forth. 40

5. The combination of a horizontal platform guide rails at both sides of same a reciprocating frame provided with a horizontal cutting-wire and pushers for moving the slabs over the platform a transverse frame extending across the platform and provided with vertical cutting-wires a stationary guide rail extending from said transverse frame along one of the side guide rails of the reciprocating frame and flat springs attached to the opposite side of the platform and adapted to press the slab against the stationary rail while the same is forced through the vertical cutting-wires substantially as set forth. 45 50

6. The combination of a horizontal platform a transversely guided frame means for moving the frame transversely over said platform a pusher bar hinged to the end of the transverse reciprocating frame a stationary frame arranged at the opposite side of the platform and provided with a series of vertical cutting-wires a grooved transverse block rail arranged at the end of the platform and a spring rail. 55

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attached to the top of the block and having a rounded off outer end adapted to engage the pusher bar and lift the same during its return motion so as to pass over the bars of soap on the platform substantially as set forth.

7. The combination of a horizontal supporting platform having longitudinal
 5 guide rails a reciprocating frame guided on the same and provided with a horizontal cutting-wire at the end and pivoted pushers a rack bar attached to the reciprocating frame below the platform a driving shaft a reversing mechanism for said shaft and intermediate gearing between the driving shaft and the rack bar for imparting reciprocating motion to the same substantially as set forth.
- 10 8. The combination of a block carrying elevator vertical rack bars attached to said elevator pinions engaging said rack bars a pawl and ratchet wheel mechanism applied to one of the pinion shafts so as to control accurately the lifting motion of the elevator a driving shaft a clutch on said shaft and intermediate transmitting mechanism between the clutch and the pinion shaft for imparting an intermittent
 15 lifting motion to the elevator substantially as set forth.
9. The combination of a block carrying elevator a horizontal platform a reciprocating frame having a horizontal cutting-wire and pushers for moving the cut off slabs over the platform a driving shaft a clutch on said driving shaft a tongue attached to the reciprocating frame below the platform a fulcrumed and spring-
 20 pressed lever engaging the movable member of the clutch and transmitting mechanism between the clutch and the elevator for intermittently raising the same said clutch being thrown in or out of gear by said tongue so as to start or stop the raising mechanism of the elevator substantially as set forth.

Dated this 9th day of April 1895.

25

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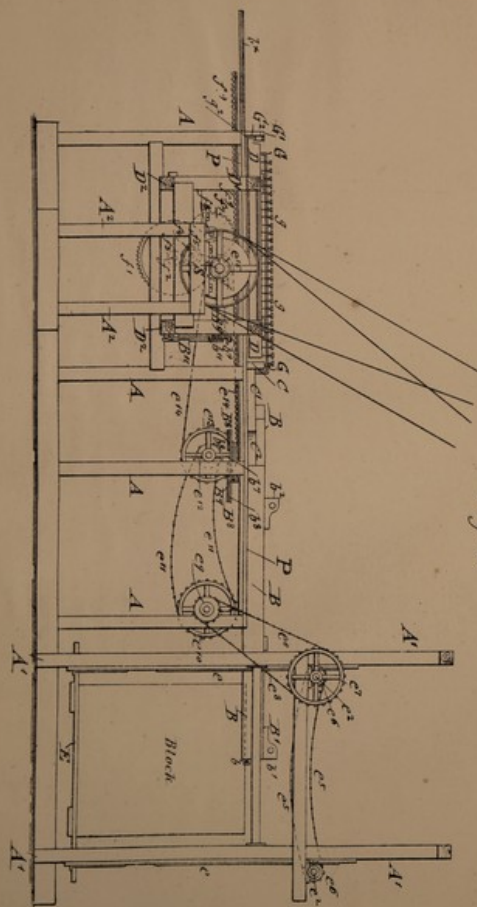


Fig. 1.

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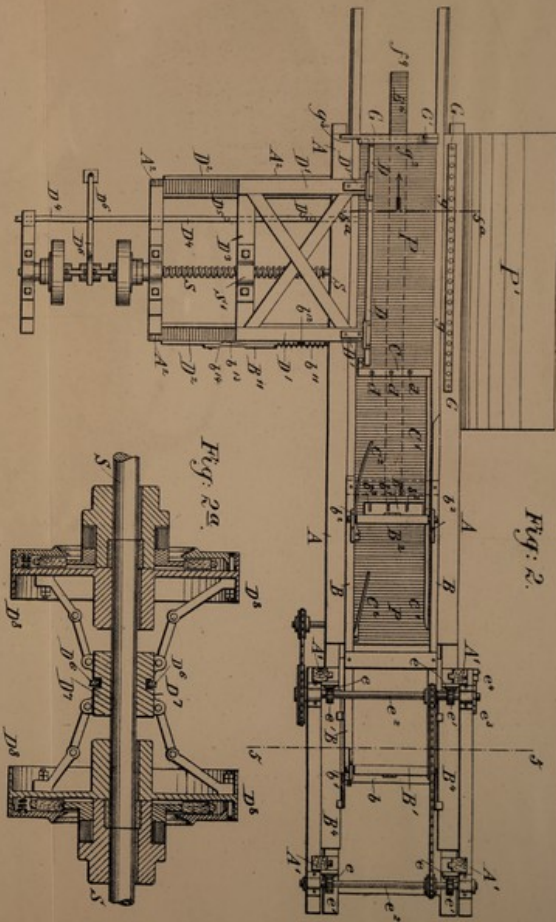


Fig. 2.

Fig. 2a.

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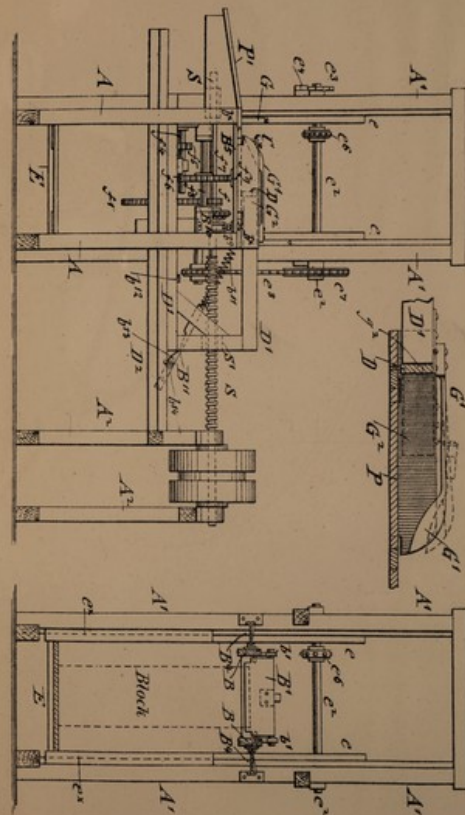


Fig. 4.

Fig. 5.

Fig. 5.

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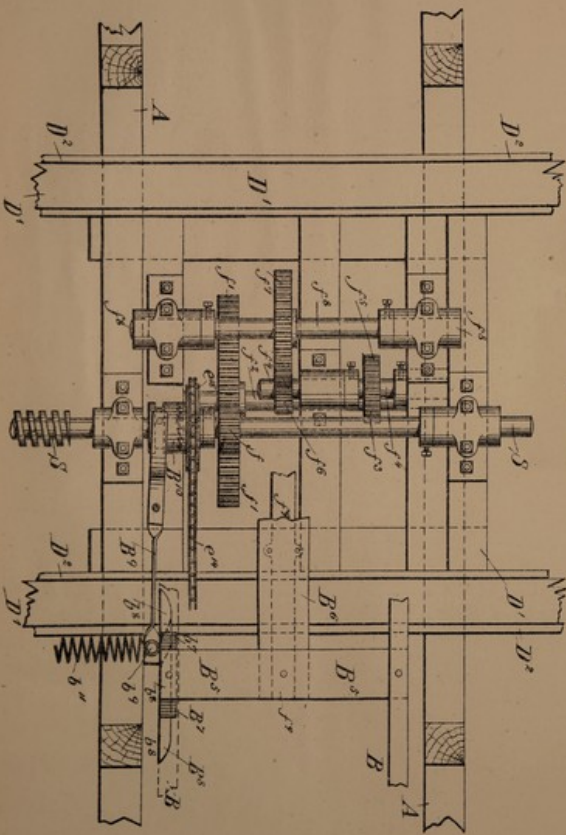
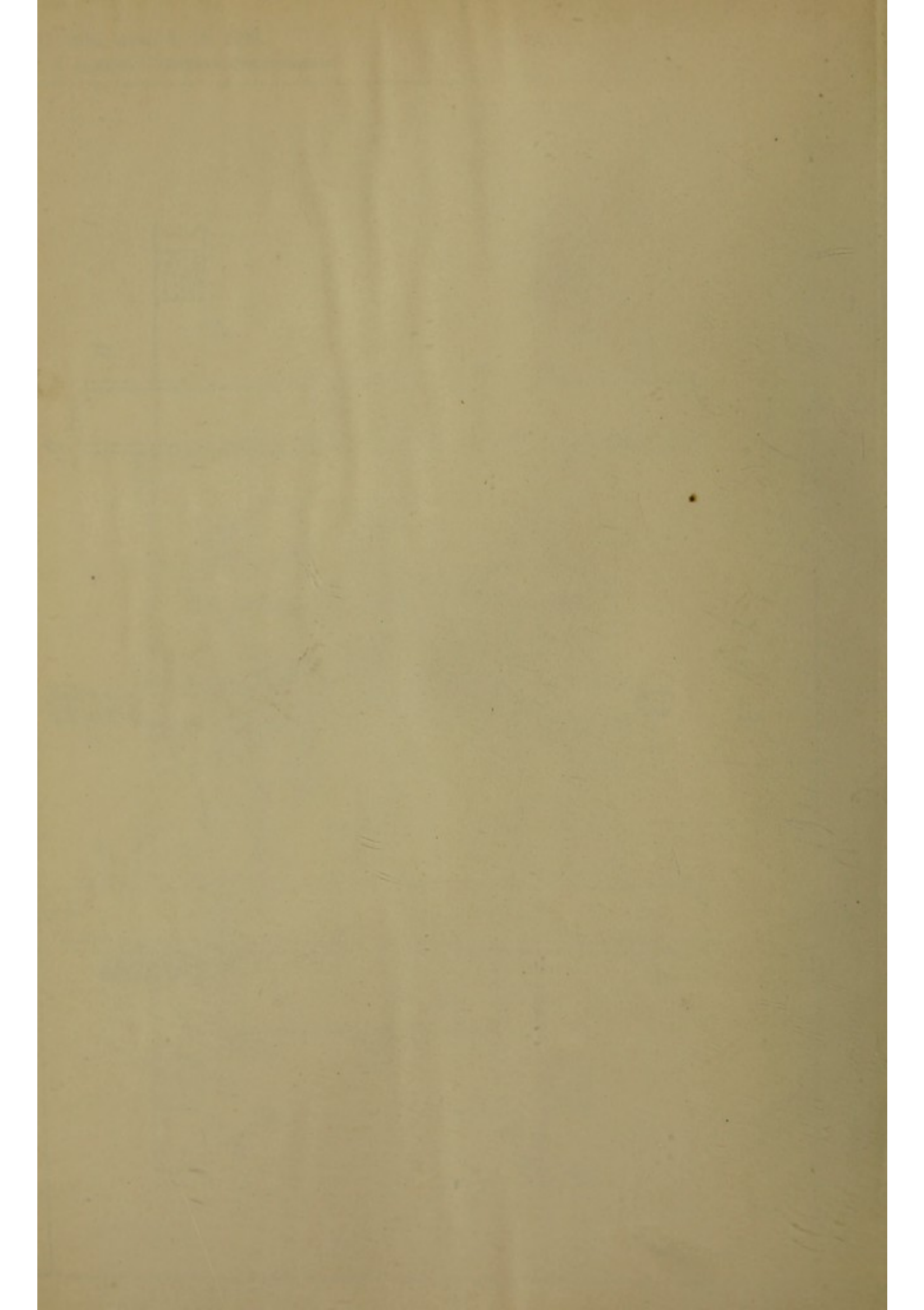


Fig. 3.



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Fig. 6

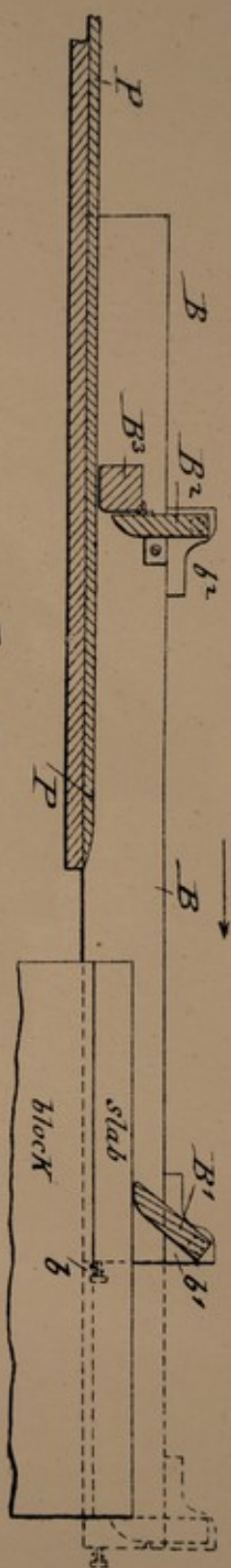


Fig. 8.

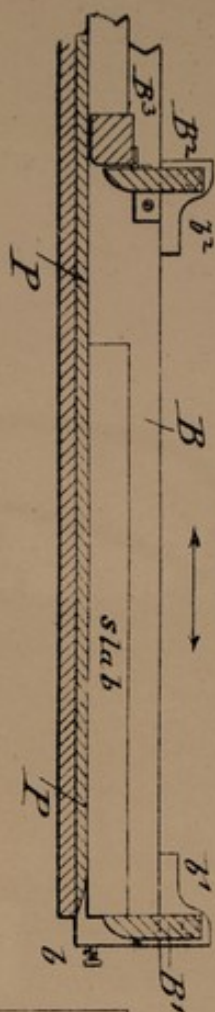


Fig. 7.

