

No. 617,634.

Patented Jan. 10, 1899.

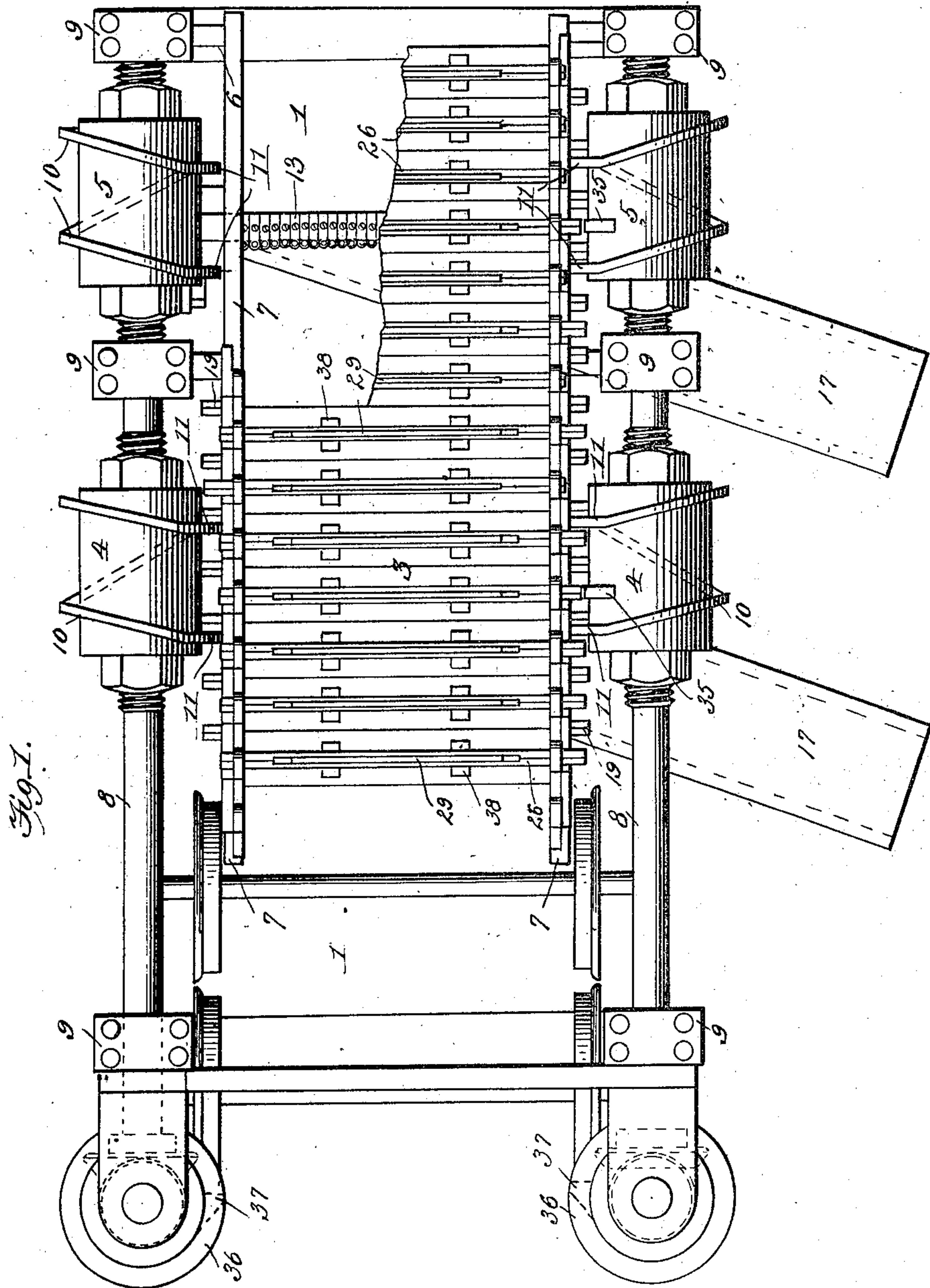
E. H. & W. G. BRONSON.

MATCH MACHINE.

(Application filed Aug. 24, 1898.)

(No Model.)

4 Sheets—Sheet 1.



WITNESSES

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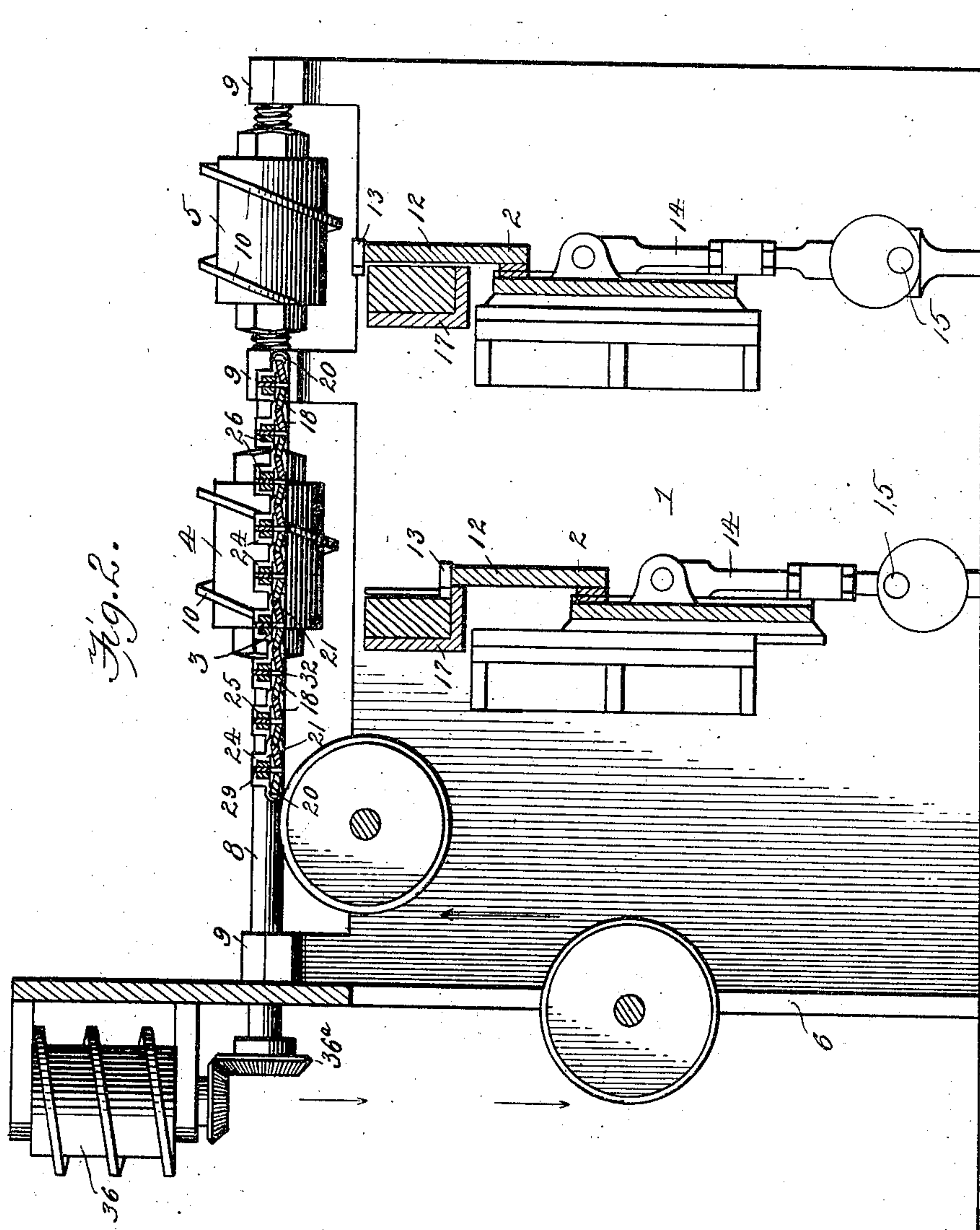
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4 Sheets—Sheet 2.



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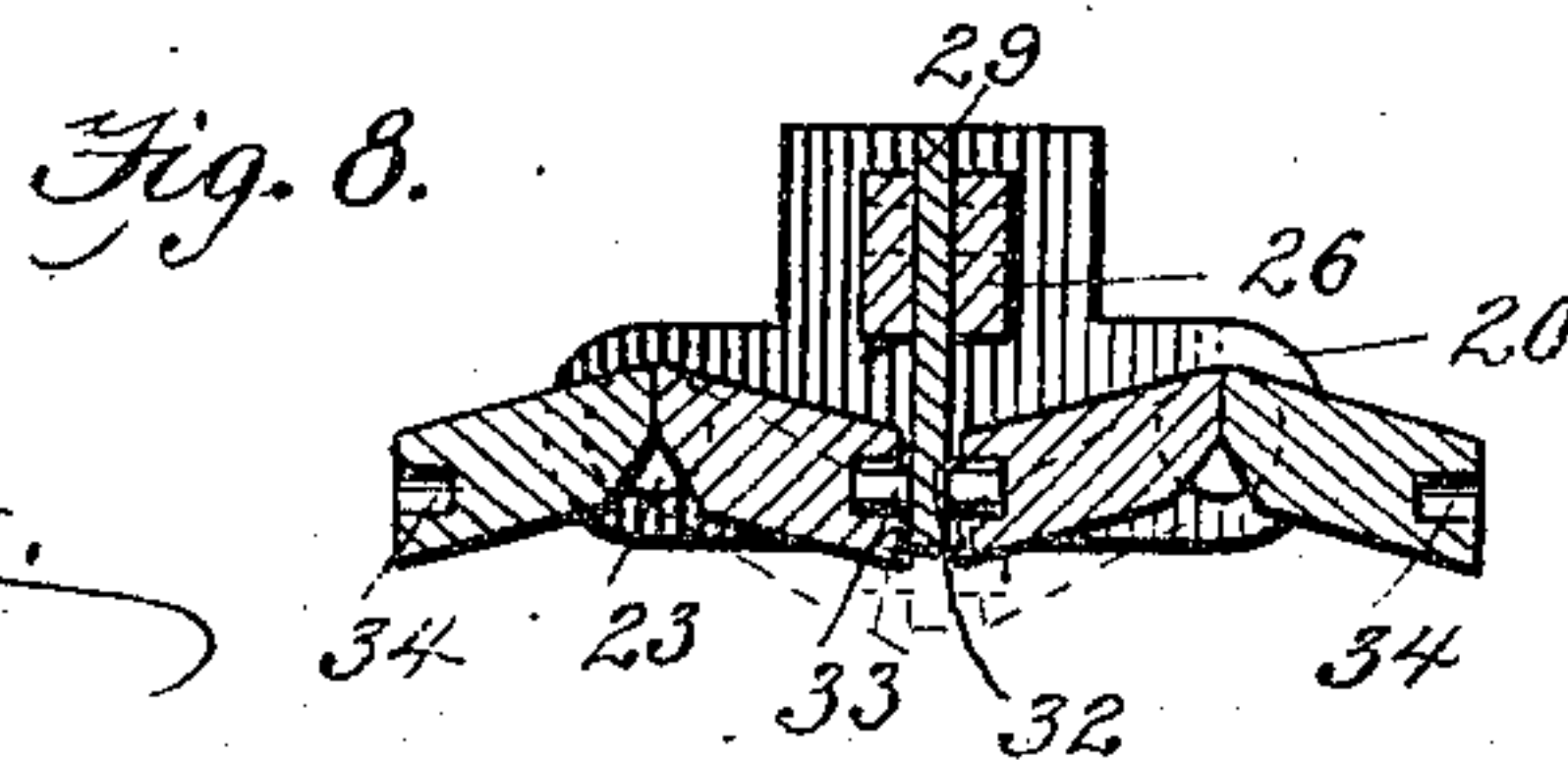
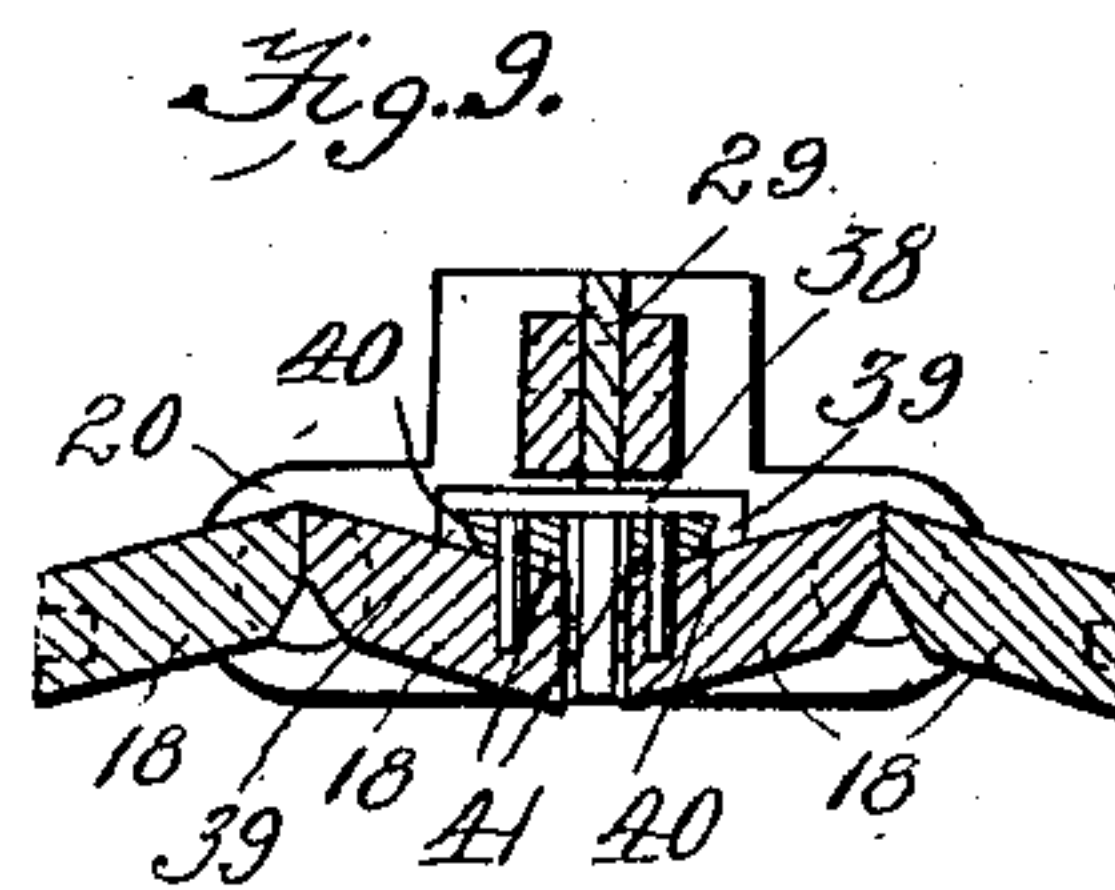
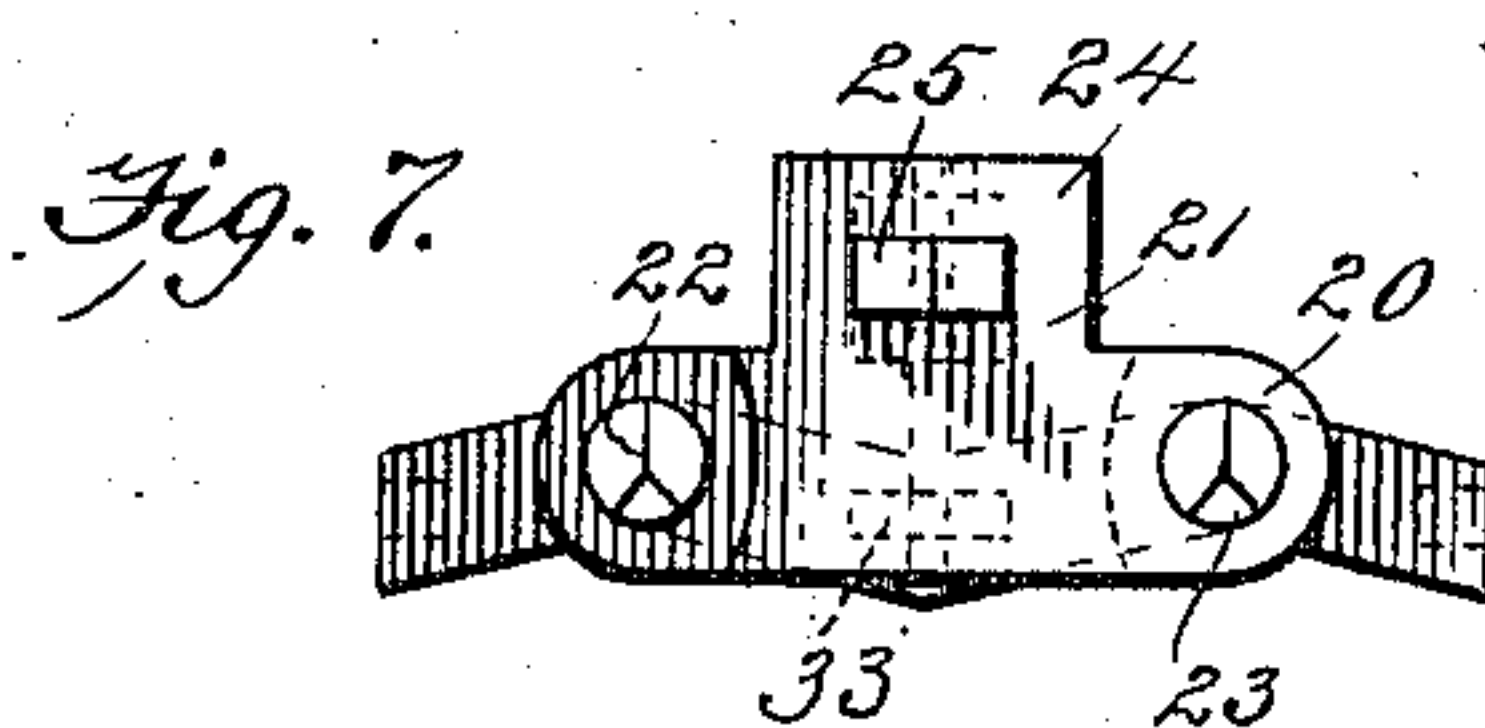
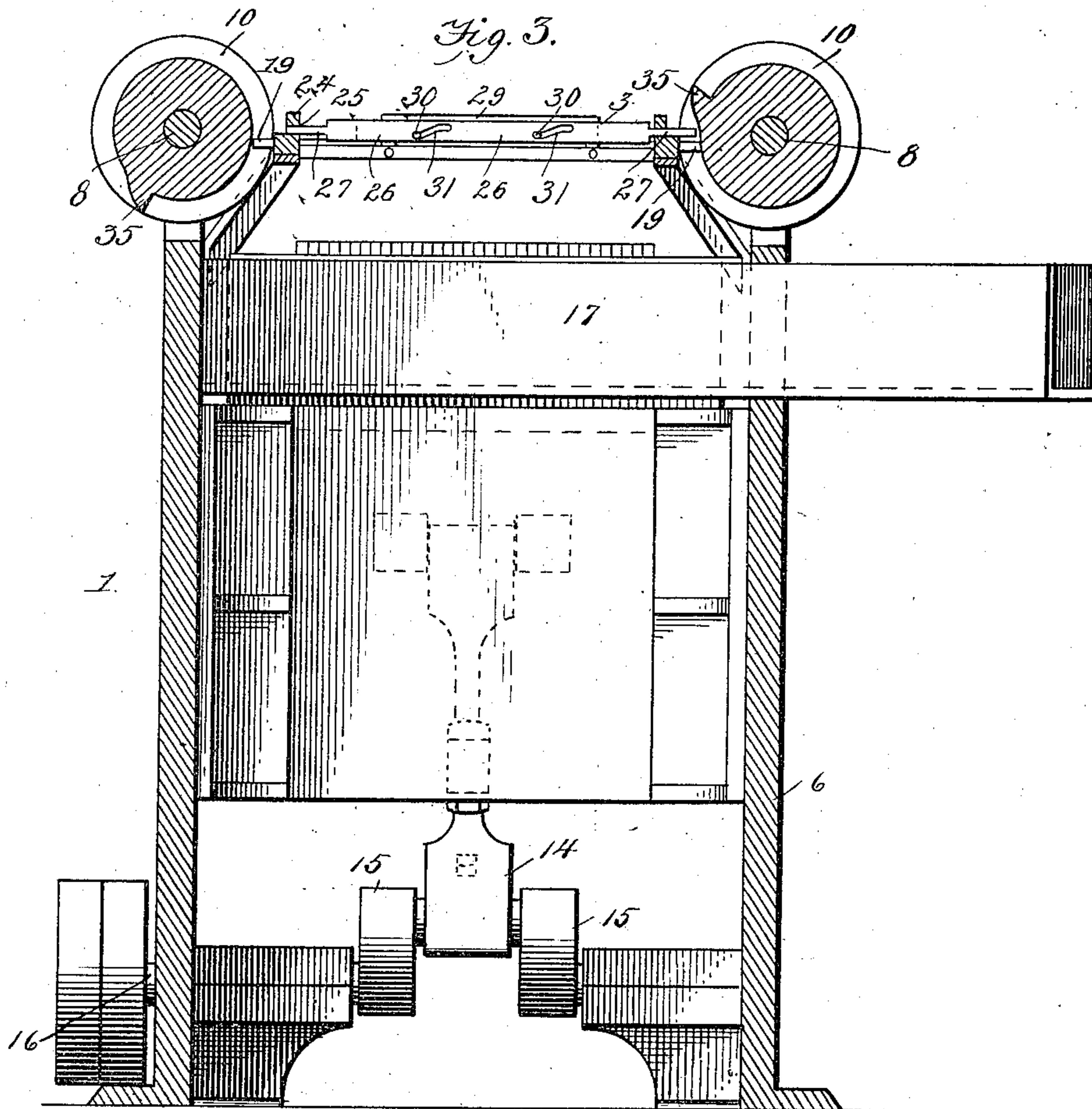
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4 Sheets—Sheet 3.



WITNESSES

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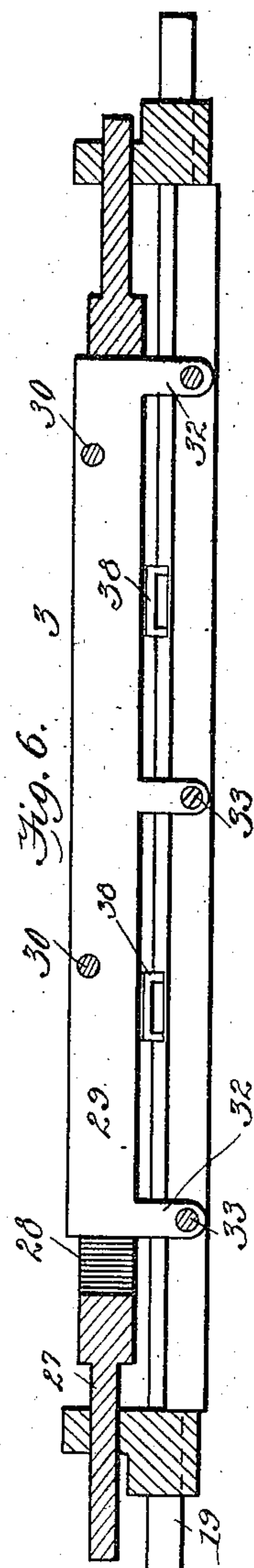
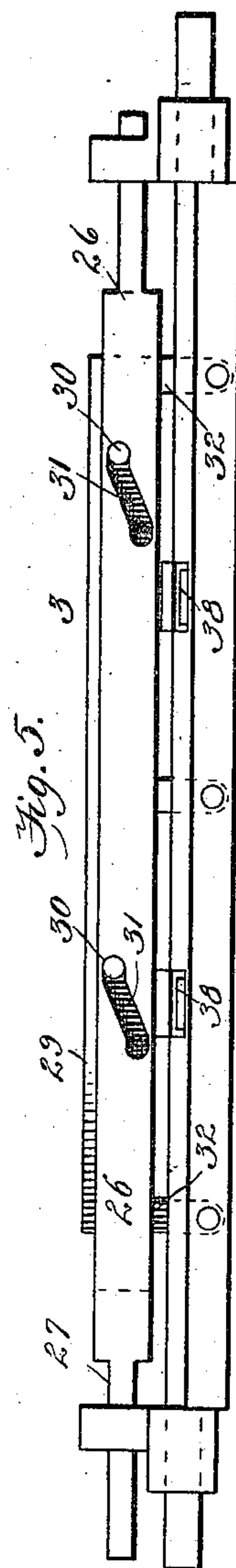
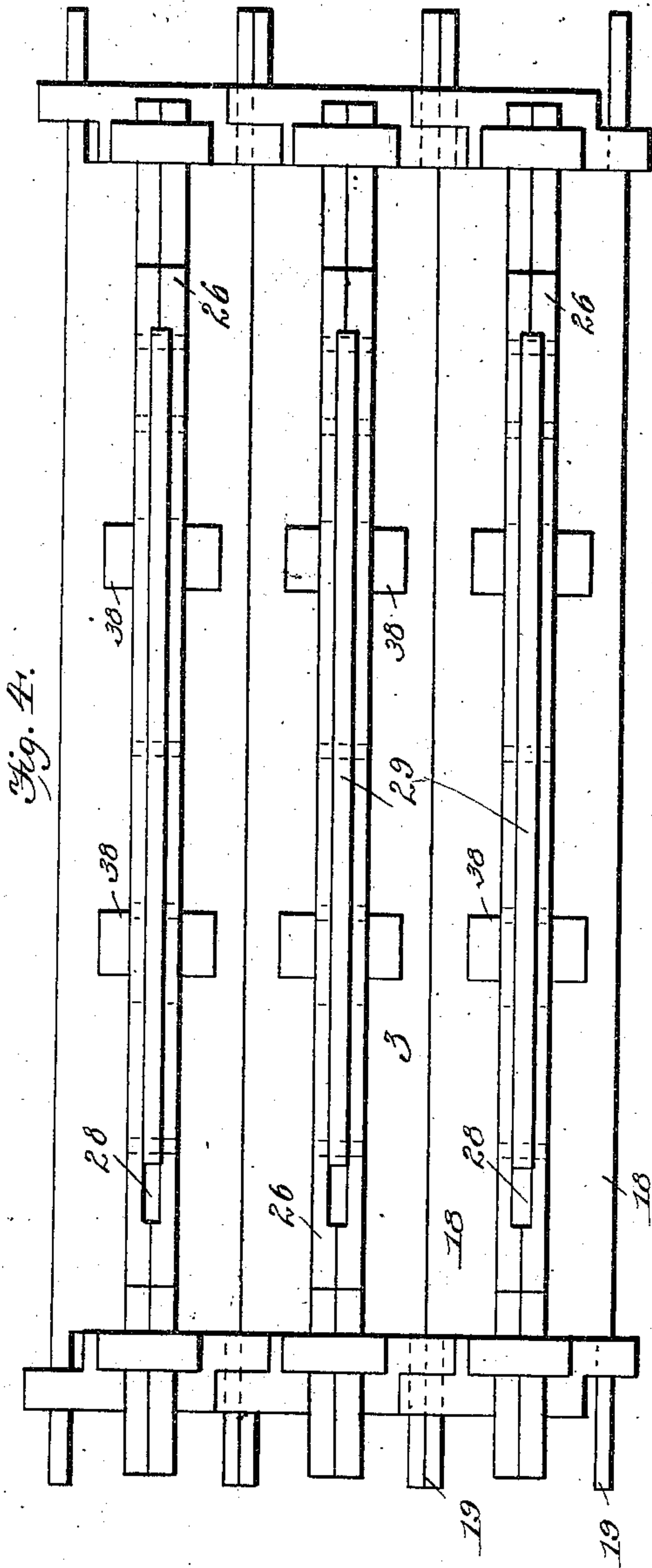
E. H. & W. G. BRONSON.

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(No Model.)

4 Sheets—Sheet 4.



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UNITED STATES PATENT OFFICE.

ERSKINE H. BRONSON AND WALTER G. BRONSON, OF OTTAWA, CANADA.

MATCH-MACHINE.

SPECIFICATION forming part of Letters Patent No. 617,634, dated January 10, 1899.

Application filed August 24, 1898. Serial No. 689,411. (No model.)

To all whom it may concern:

Be it known that we, ERSKINE H. BRONSON, a subject of the Queen of Great Britain, and WALTER G. BRONSON, a citizen of the United States, both residing at Ottawa, in the Province of Ontario and Dominion of Canada, have invented certain new and useful Improvements in Match-Machines; and we do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

Our invention relates to improvements in match-machines, and particularly to that class of machines which are provided with reciprocating cutters adapted to cut splints and to deposit them into a traveling belt composed of slats adapted to receive and hold them.

It consists in providing such a machine with two or more reciprocating cutters, an endless chain for receiving the splints from the said cutters, and worms for feeding said chain in such a manner that each cutter will deposit match-splints in alternate holders or sections of the said chain.

It also consists in certain other novel constructions, combinations, and arrangement of parts, as will be hereinafter described and claimed.

In the accompanying drawings, Figure 1 represents a top plan view of a machine constructed in accordance with our invention. Fig. 2 represents a side elevation of the machine, portions of the same being shown in section to better reveal the construction of the parts. Fig. 3 represents a transverse vertical section through the match-machine and a pair of cams or worms mounted therein. Fig. 4 represents a top plan view of a portion of a carrier-chain. Fig. 5 represents a side elevation of a section of said chain. Fig. 6 represents a longitudinal vertical section through one of said chain-sections. Fig. 7 represents an end elevation of one of the chain-sections. Fig. 8 represents a vertical transverse section through the same; and Fig. 9 represents a vertical transverse section through the said chain, showing strengthening bands or cleats.

1 in the drawings represents a match-machine; 22, reciprocating cutters; 3, a carrier-

chain; 4 4 and 5 5, feeding worms or cams for operating the said chain.

In match-machines of this character it is desirable to be able to cut a large number of matches at a time and have a chain which is capable of receiving and holding the splints thus cut. In this way it is desirable to make the match-machine capable of more work without a greater expense in building the machine.

In carrying out the objects of our invention we employ a machine provided with a suitable frame, as 6, upon the top of which suitable guideways, as 7, are formed for supporting and guiding a splint-carrier chain. Upon the top of the frame we mount longitudinal shafts, as 8 8, in suitable bearings, as 9 9, the said shafts being revolved by any suitable or well-known means. Near one end of the machine the feeding worms or cams, as 4 and 5, are rigidly secured to the said shafts 8 8. The worm 4 upon one side of the machine is arranged directly opposite the worm 4 upon the opposite side of the machine, and one worm 5 is arranged opposite the other worm 5 upon the opposite side of the machine. The pairs of worms 4 and 5 are arranged at a point in the machine opposite the places where the cutters 2 2 reciprocate and are provided with threads or spiral projections, as 10 10, which engage the carrier-chain and move the same forward in the machine. The worms are preferably constructed upon such pitch with respect to the pitch of the chain that the chain will be moved forward two sections at each revolution of the worms—as, for example, a chain having a one-inch pitch would be engaged by worms having a two-inch pitch. By this construction the worms, as seen in the drawings, will only engage alternate sections of the chain. Certain portions of the ribs 10 10 are made straight, as at 11 11—that is, upon a plane at right angles to the axis of the shafts 8 8—so as to hold the carrier-chain stationary for the time required to receive the splints from the cutters. The cutters 22 are constructed in any well-known manner, each preferably having a cutter-head, as 12, carrying a cutter, as 13. The cutters 13 are provided with a series of cylindrical cutting edges adapted to cut splints of

the desired shape from blocks of wood presented to the said cutters. Any suitable and well-known means for reciprocating the said cutters may be employed, that shown in the drawings comprising a pitman, as 14, operated by a crank, as 15, formed upon a power-shaft 16. The cutters may be reciprocated simultaneously for cutting and carrying up the splints, or they may be arranged to reciprocate alternately, so that one is carrying up the splints, to the chain while the other is descending to cut the splints from the blocks of wood. In either case the cutters are so spaced apart in the machine as to deposit splints in alternate sections of the carrier-chain, whereby the cutters cooperating with the action of the worms which feed the chain forward two sections at a time may completely fill the said chain. The blocks of wood are fed to the cutters preferably in two troughs 17 17, arranged at an angle to the cutters entering at the side of the machine. While these boxes might be arranged upon opposite sides of the machine, yet we prefer to arrange them so as to enter the machine upon the same side thereof. This brings the two feeding-boxes comparatively close together and makes it possible for one attendant to supply blocks of wood to both of the boxes.

In constructing a machine with double cutters operated in the manner described we find it necessary to construct a chain suitable to receive the splints from the said cutters. The construction of our improved chain forms an important feature of our invention. It comprises sections made up of two hinged portions, as 18 18, each of said portions being provided with half-journals, as 19 19, which enter and engage bearings, as 20, formed in suitable connecting-links, as 21. The meeting faces of adjacent half-bearings 19 are preferably flattened, as at 22, while the lower edges of the said half-bearings are beveled or cut away, as at 23, to permit of a slight oscillation of the half-sections 18 in the bearings 20. The links 21 of the chain are provided with upwardly-extending projections, as 24, which have recesses or apertures formed in them, as at 25. Sliding bars, as 26, are arranged above each section and are formed with reduced end portions, as at 27, which are adapted to extend through the apertures 25 in the links 21. The reduced portions 27 of the said bars are made of sufficient length to permit of a reciprocating movement of the said bars. The bars 26 are each cut away upon their inner faces, as at 28, so as to form an elongated slot between the two bars when they are applied together, as clearly seen in Fig. 4 of the drawings. The bars 26 are preferably rigidly secured together. Interposed between the bars 26 and working in a slot 28 is a slat-operating plate 29, the said plate 29 being provided with laterally-extending studs or lugs 30, which engage inclined ways or slots, as 31, formed in each of the bars 26 26. The greater

part of the slots 31 are arranged upon a diagonal line, as seen in Fig. 5 of the drawings, while each end of each of the said slots is provided with a horizontal portion, as seen in the said Fig. 5. The said slat-operating plate 29 is also provided with downwardly-extending projections, as 32 32, which project between the slats 18 of the chain-sections, sufficient room being left between the slats for this purpose. The lower ends of the projections 32 32 carry studs or pins 33, which project into and engage corresponding recesses 34, formed in the edges of the slats 18 18. This construction can be clearly seen by reference to Fig. 8 of the drawings. It will be apparent from this description that upon depressing the plate 29 the studs 33 will carry the edges of the slats 18 downwardly, the said slats turning upon their half-journals 19 and occupying a position as indicated in dotted lines in Fig. 8. This movement of course operates to spread the edges of the said slats with respect to each other, so that they are ready to receive a row of match-splints between them. When the said plate 29 is raised again, it will raise the adjoining edges of the slats 18 and clamp the upper ends of the match-splints between them. It will also be apparent from the above description that upon moving the bars 26 longitudinally with respect to the sections of the chain the slots 31 therein, engaging the pins 30, will raise and lower the said plate 29 to operate the slats. In order to bind the sections of the chain together more perfectly, we may also employ spanning bands or cleats, as 38. (Illustrated in Figs. 4 and 9 of the drawings.) The bands 38 are preferably formed of flat pieces of metal having depending end portions, as 39, engaging the outer beveled edges 40 of metal pieces, as 41, secured to adjacent slats 18. The engaging end portions 39 are beveled to fit the beveled portions of the pieces 41, so as to permit the spanning-cleats 38 to accommodate themselves to the movement of the swinging sections 18. As the carrier-chain 3 approaches the cutters the slats should be lowered, and thus opened to receive the match-splints, and to accomplish this we form lugs, as 35, at suitable points upon the peripheries of the worms 4 and 5 to engage the ends of the sliding bars 26, whereby the said slats will be opened at the proper time to receive the discharged splints from each of the cutters and will immediately be closed to grip the said splints and prevent their descent with the cutters. As seen in Fig. 3 of the drawings, the sliding bars 26 will first be moved in one direction to open the slats by the lug 35 upon one side of the machine, and when the splints have been received the lug 35 on the opposite side of the machine will move the bars 26 back again to close the sections. The match-engaging edges of the slats 18 are preferably corrugated or grooved to better engage and hold the splints. After the carrier receives its charges of

matches from the cutters it passes to suitable paraffining, heading, heating, and drying mechanisms, as in other match-machines of ordinary construction. After being suitably dried the endless chain passes back to the splint-cutting machine, reaching the same at the opposite end of the machine from the cutters. Here the chain, descending to the machine, engages the feeding-worms, as 36, which are provided with projections 37, similar to the projections 35, which operate the rods 26 and open the sections of the chain, whereby the matches are dropped out, thus leaving the chain free to receive matches again. The worms 36 are arranged upon vertical shafts mounted in suitable bearings upon the rear end of the machine, which receive their motion through bevel-gearing, as 36^a, from the shafts 8. The gearing 36^a is preferably of such a character as to impart twice the speed of the shafts 8 to the said worms 36. This enables us to use only one pair of worms at the discharge end of the machine, the said worms having a pitch half that of the worms 4 and 5, so as to engage and open every section of the chain.

While we have described and shown worms at the discharge end of the machine of a different pitch from those at the cutters and therefore adapted to be revolved twice as fast, yet we do not wish to be understood as limiting ourselves to this construction, as we may, if desired, use worms at the discharge end of the same pitch as the worms 4 and 5 and therefore capable of feeding forward two sections of the chain at one revolution. In this instance it will only be necessary to provide the said worms with two lugs instead of one in order to open all the chain-sections. This will reduce the speed of the worms at the rear to the same velocity as the one at the front.

Of course, as illustrated in the drawings, it will be understood that the links 21 connect all the sections of the chain, so as to form an endless belt or carrier.

When the cutters are arranged to reciprocate simultaneously, the carrier-chain can be held taut between the worms 4 and 5; but when the cutters are reciprocated alternately it is necessary to arrange the worms 4 and 5 so as to leave a slight slack in the chain between the said worms. This is rendered necessary on account of the intermittent feed of the chain at the points where it receives the splints from the cutters.

It will be apparent that a machine constructed in accordance with our invention is adapted to do twice as much work as a machine employing a single cutter and that a machine constructed in this manner, and thus able to do double quantity of work, can be constructed about as cheaply and with as great strength as a machine having only a single cutter. When the cutters are reciprocated alternately, also, the strain upon the machine would be less than when the cutters are reciprocated together. Feed-troughs also, being

placed near together, require only one operator to feed the blocks to both cutter-heads. Special advantages also accrue from the construction of our improved chain, particularly in that no abutment-block is needed to sustain the lower end of the match-splints, as the matches do not have to be thrust into the chain. The chain opens and closes to grip them. The thrust which is usually employed for placing the splints in the carrier is thus done away with, and relieves the machine of the excessive strain accompanying such thrusts. It will also be noted that a knocker-block or ejector is not necessary to empty the chain of its load of splints.

While we have described our special character of conveyer-chain as adapted to be operated in a machine which we prefer—namely, one operating two cross-heads or sets of cutters—yet we do not wish to be understood as limiting ourselves in this matter, as a chain of our construction can be used advantageously in a machine operating only one cross-head or cutter, as in this case it would only be necessary to feed the chain forward one section at each revolution of the cutters.

Having now described our invention, what we claim as new, and desire to secure by Letters Patent, is—

1. In a match-machine, the combination of independent cutter-heads, a carrier-chain made up of a series of sections connected together and traveling from one cutter-head to the other, the said cutter-heads being timed so that one inserts splints in separate sections of the carrier-chain and the other inserts splints into the intervening sections, substantially as described.

2. In a match-machine, the combination with a carrier-chain having a series of sections, of a plurality of independent cutter-heads carrying splint-cutters, the said chain passing across the paths of the said independent cutter-heads and means for reciprocating the cutter-heads alternately, some of the heads placing the splints in separate sections of the chain while the others place splints in the intervening sections, substantially as described.

3. In a match-machine, the combination of independent cutter-heads, a carrier-chain having sections for receiving splints and traveling from one cutter-head to the other, worms for feeding the chain forward so that one cutter-head will place splints in separate sections of the chain, while the other inserts splints into the intervening sections of the said chain, substantially as described.

4. In a match-machine, the combination of independent cutter-heads, a carrier-chain having a series of sections and traveling across the paths of the cutter-heads from one to the other, worms having inclined portions and straight portions for feeding the carrier-chain with an intermittent movement, the cutter-heads being so timed that one inserts splints in separate sections of the carrier,

while the other inserts splints in the remaining sections, substantially as described.

5. In a match-machine, the combination of independent cutter-heads, a carrier-chain having a series of sections and traveling from one cutter-head to the other, worms for feeding the carrier-chain forward and means upon the said worms for opening the sections of the chain at the proper time to receive splints from the cutters, the said cutters being timed so that one inserts splints in separate sections of the chain, while the other inserts splints in the remaining sections, substantially as described.

15 6. In a match-machine, a carrier comprising two parallel sets of links and cross-slats having end pivots at one edge which connect the links, the opposite edge of each slat co-acting with that of the next slat to form splint-gripping faces, substantially as described.

20 7. In a match-machine, the combination with reciprocating cutters, of an endless carrier-chain comprising sections formed of hinged slats, a reciprocating bar mounted above the said slats, means connected with the said bars for opening and closing the said slats, worms for feeding the said carrier-chain, and means upon the said worms for operating the slat-opening bars, substantially as described.

30 8. In a match-machine, the combination with reciprocating cutters, of an endless carrier-chain comprising slats having segmental journals, links connecting the said slats and inclosing the said segmental journals, means for moving the slats up and down upon the said journals, whereby their meeting edges will be spread apart to receive the splints from the cutters, substantially as described.

40 9. In a match-machine, the combination with reciprocating cutters, of a carrier-chain comprising hinged slats, links connecting the same, longitudinal bars mounted in the said links above the said slats and having slots formed in them, a vertically-moving plate mounted in the said slot and engaging the said slats for opening and closing the same

to receive and discharge the splints, substantially as described.

10. In a match-machine, the combination 50 with reciprocating cutters, of an endless carrier-chain comprising hinged slats, links connecting the said slats, longitudinally-moving bars having reduced end portions engaging apertures formed in the said links, the said 55 bars being provided with elongated slots, vertically-moving slides moving in the said slots and provided with pins engaging angular slots formed in the said bars, and depending portions formed upon the said slide and provided 60 with pins engaging recesses in the slats, the construction being such that when the bars are moved in one direction, they will depress the slide and thus open the slats and when the bars are moved in the opposite direction, 65 they will raise the slide and close the slats, substantially as described.

11. In a match-machine, the combination with reciprocating cutters, of a carrier-chain mounted therein, said chain comprising 70 hinged slats, longitudinally-moving bars arranged above the said slats and connected therewith, worms for feeding the chain forward, and lugs formed upon the said worms and adapted to move the said bars longitudinally for operating the slats, substantially as described.

12. In a match-machine, the combination with a cutting mechanism, of a carrier-chain comprising sets of links and cross-slats hav- 80 ing adjacent edges pivoted upon common centers in the said links, their opposite edges co-acting with the edges of the adjacent slats in the chain to form splint-gripping surfaces.

In testimony whereof we hereunto affix our 85 signatures in presence of witnesses.

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WALTER G. BRONSON.

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Witnesses to signature of W. G. Bronson:

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