

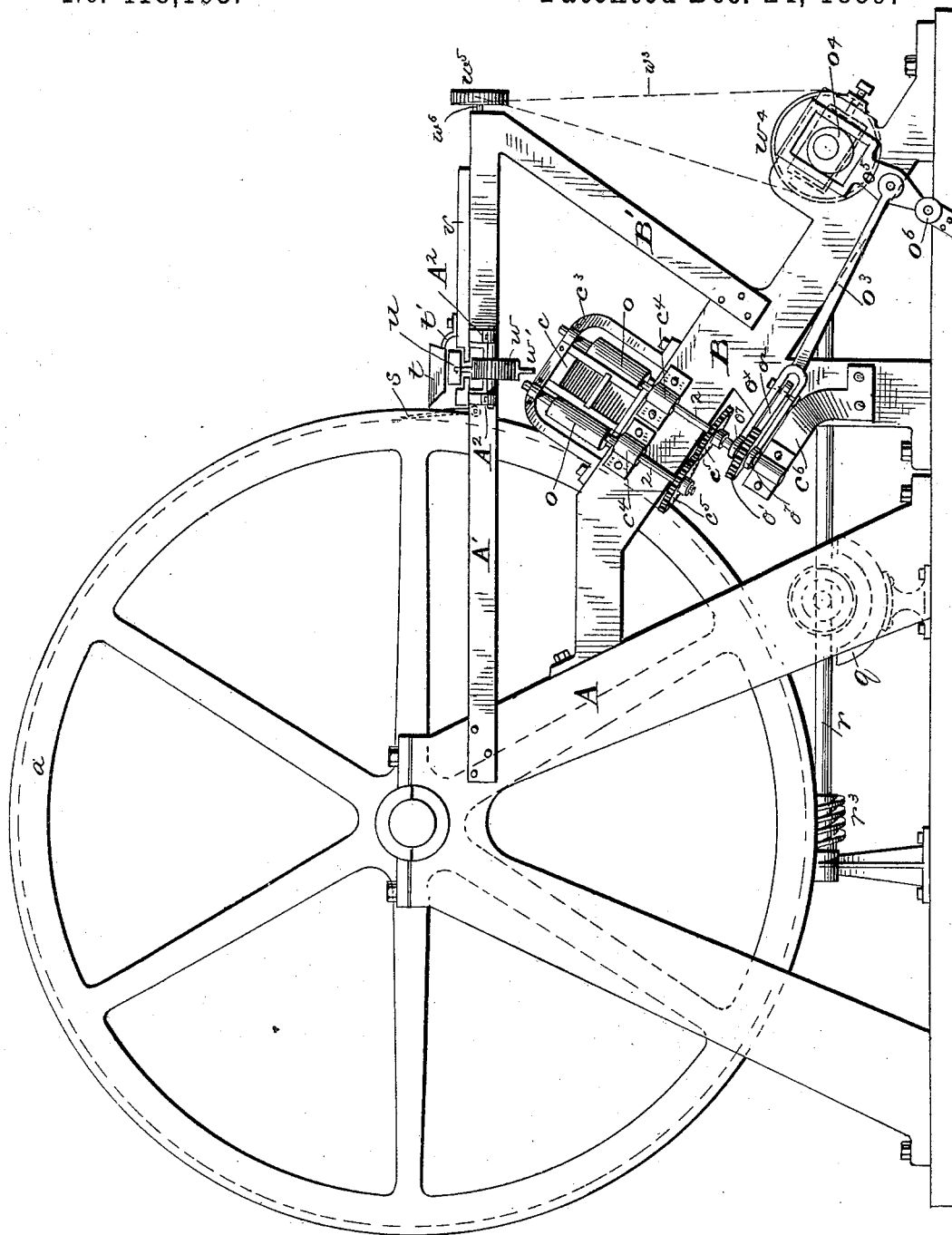
(No Model.)

4 Sheets—Sheet 1.

E. J. YOUNG.
MACHINE FOR MAKING MATCHES.

No. 418,103.

Patented Dec. 24, 1889.



WITNESSES
F. L. Ourand
E. A. Finckel.

Fig. 1.

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by Wm. H. G. Finckel
his Attorney.

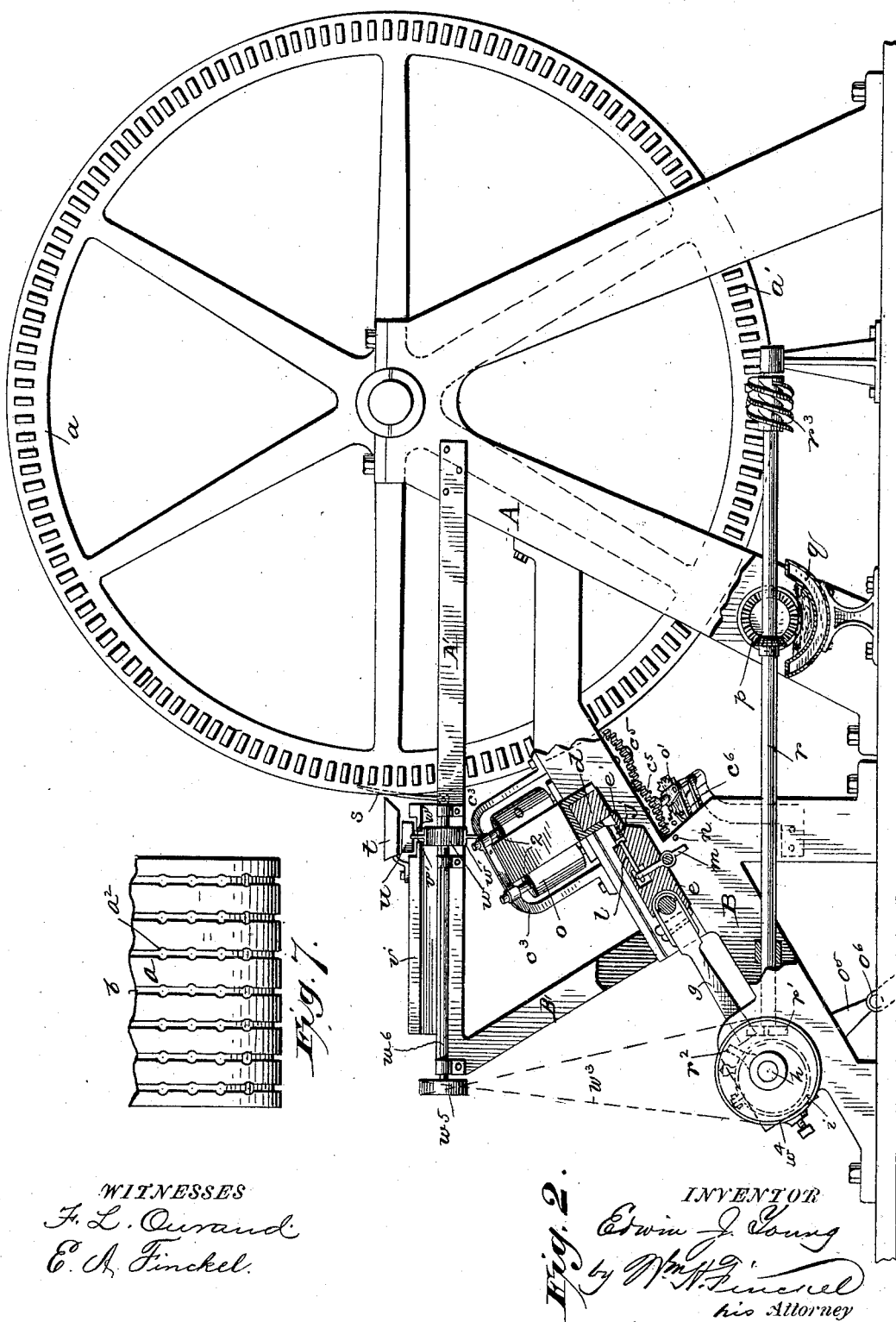
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Fig. 2.
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(No Model.)

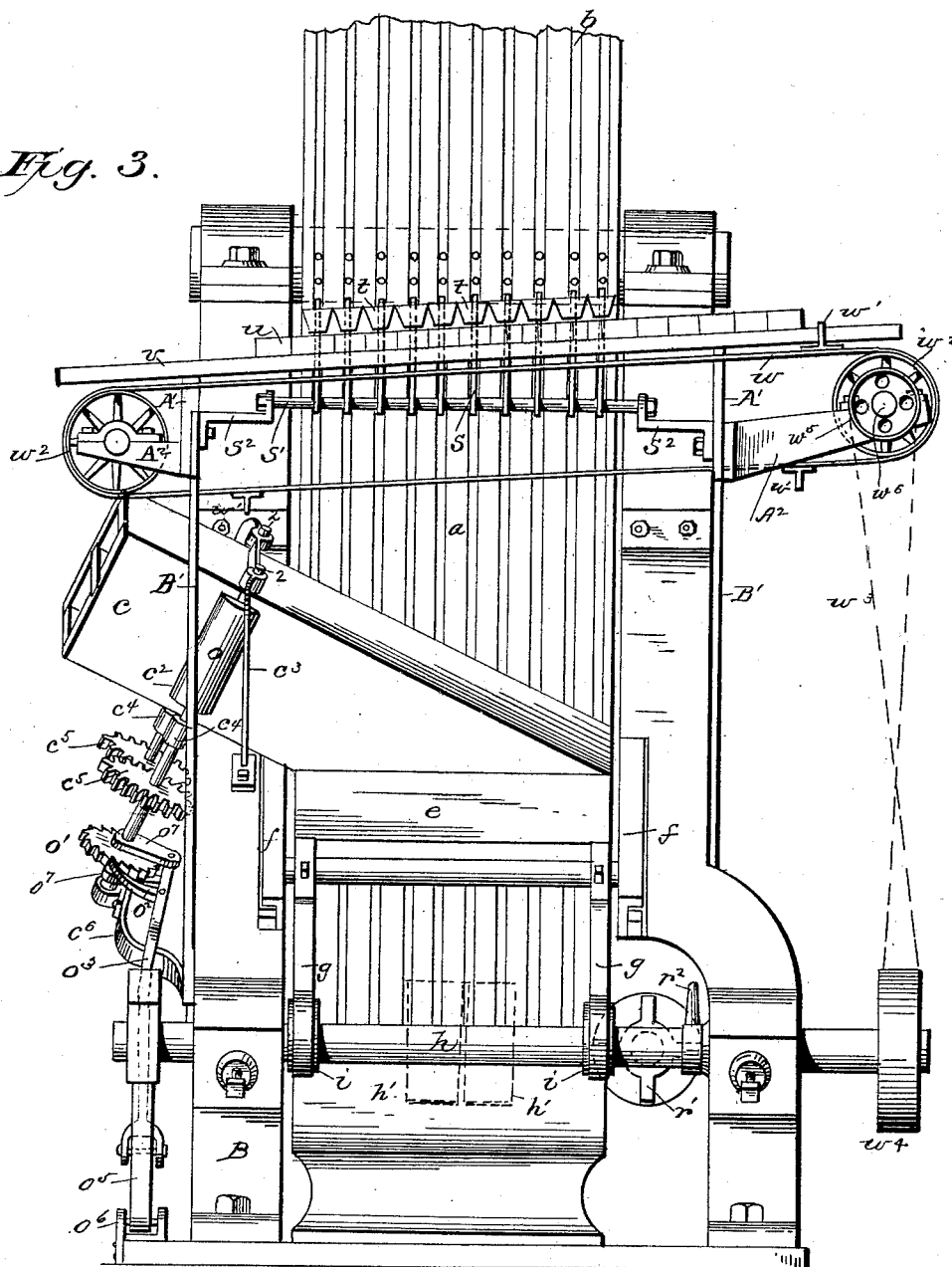
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Fig. 3.



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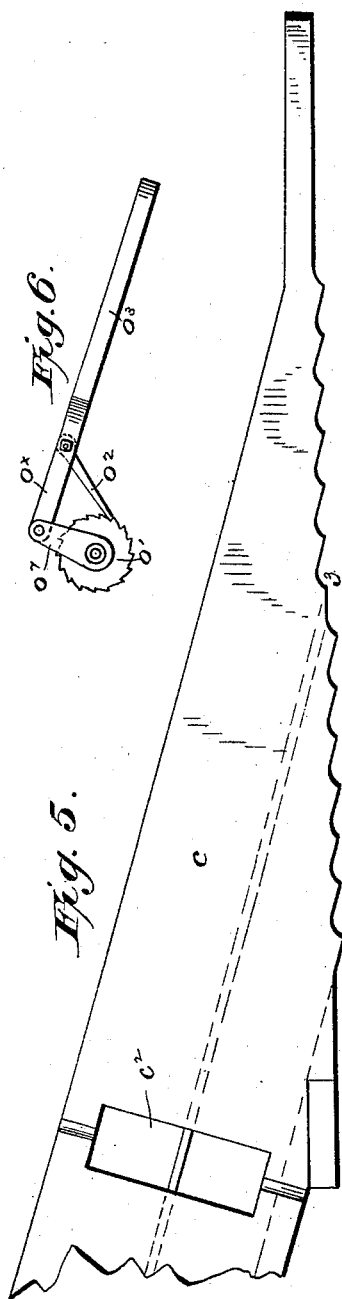


Fig. 6.

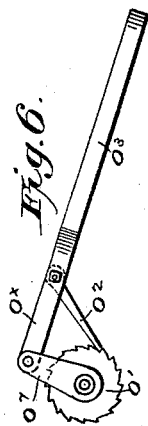


Fig. 5.

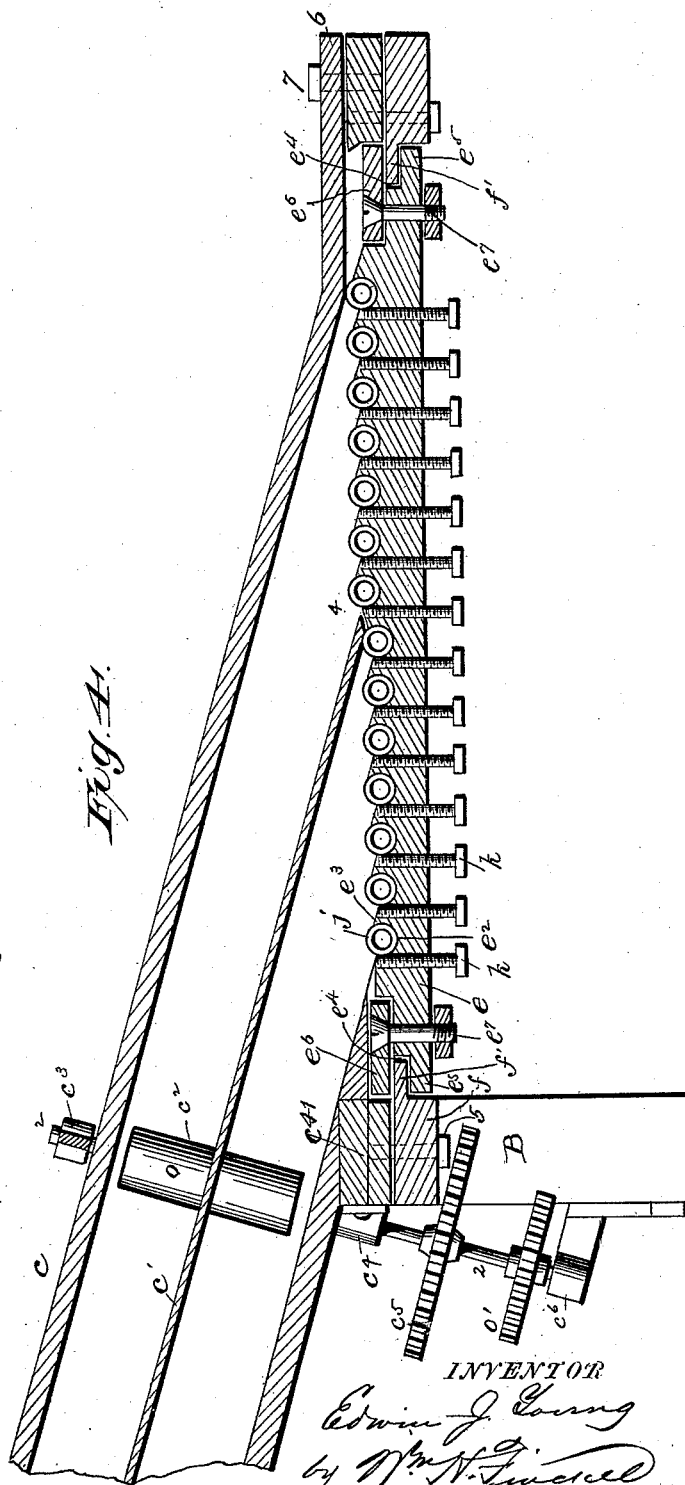


Fig. 4.

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UNITED STATES PATENT OFFICE.

EDWIN J. YOUNG, OF WADSWORTH, OHIO.

MACHINE FOR MAKING MATCHES.

SPECIFICATION forming part of Letters Patent No. 418,103, dated December 24, 1889.

Application filed February 5, 1889. Serial No. 298,728. (No model.)

To all whom it may concern:

Be it known that I, EDWIN J. YOUNG, a citizen of the United States, residing at Wadsworth, in the county of Medina and State of Ohio, have invented a certain new and useful Improvement in Machines for Making Matches, of which the following is a full, clear, and exact description.

The object of this invention is to provide a machine for making matches which shall by connected or continuous series of operations cut the splints from the wood, "stick" the splints, apply the "heads"—that is to say, the igniting composition—dry the same, and then deliver the then finished matches into boxes. In attaining this object I employ a rotary drum or cylinder having its surface grooved circumferentially, and which forms the object in which the matches are stuck and by which they are carried to the mechanism by which the igniting composition is applied and on which the matches are dried and by which said matches are thereafter carried and delivered into box-filling mechanism. In connection with this drum or cylinder I employ a splint-cutting mechanism of peculiar construction.

In the accompanying drawings, in the several figures of which like parts are similarly designated, Figure 1 is an elevation of one side. Fig. 2 is an elevation of the other side with parts of the frame removed and the cutter-head and stock-trough in section in order the more clearly to show the working parts. Fig. 3 is a front elevation, on a larger scale, with the upper half of the drum broken away and the hopper-brackets removed to show parts back of them. Fig. 4 is a cross-section of the cutter-head and stock-trough. Fig. 5 is a plan of the stock-trough. Fig. 6 is a plan of the feed-ratchet, and Fig. 7 is a plan view showing a modified form of groove for the drum or cylinder.

The drum *a* is mounted in a suitable frame *A* and given an intermittent rotary motion by means hereinafter specified. In practice this cylinder or drum may be ten feet (more or less) in diameter. The rim of this drum or cylinder is provided with circumferential grooves *b* of a little less than the width of the match stick or splint. A stock-trough *c* is arranged obliquely to the drum on the in-

clined frame *B*, bolted to frame *A* or otherwise sustained so that the mouth or delivery end of the trough will extend across the width of the rim of the drum. This trough receives the blocks of wood *d* from which the match sticks or splints are cut. *e* is a cutter-head arranged to be reciprocated in suitable ways *f*. I have shown this cutter-head as connected by pitman-rods *g* with the main shaft *h* by means of eccentrics *i*. A number of tubular cutters or knives *j* are secured to the forward end of this cutter-head in any suitable manner—as, for example, in sockets and by means of set-screws *k*—as will presently appear in the further description of Fig. 4. These cutters are provided with a slanting cutting-edge.

Referring to Fig. 2, it will be observed that the stock is fed to the cutters, and as the cutter-head is forced toward the drum the cutters excise from the wood round sticks or splints, which project into and in a measure through the said cutters. As the cutters pass through the stock "stickers" *l*, arranged in the rear of the cutters, are forced forward by means of their trip-levers *m* coming in contact with stops *n*, whereby the said stickers force the said sticks out of the said cutters and into the grooves in the said drum.

The feeding of the stock may be effected in various ways—for example, by means of a pair of geared rollers *o*, Figs. 1 and 2, the shaft of one of which rollers is extended and is provided with a ratchet-wheel *o'*, which is engaged by a pawl *o''*, pivoted in a yoke *o'''* on the leading end of a rod *o''''*, which rod is intermittently reciprocated by means of a cam *o'''''* on the main shaft, the said cam engaging a yoke-lever *o''''''*, pivoted at *o'''''''* to the frame, and the rod *o''''*, jointed to said yoke-lever between the cam and pivot. After one cut has been made by the cutters and the splints stuck into the drum the drum is moved a proper distance to receive another line of splints. As line after line of splints is stuck and the drum advances, the said lines of sticks are successively brought into contact with a roller *p*, revolving in the heated bath *q*, containing the igniting composition, the said roller applying the igniting composition or heads to the splints. Thereafter in the further rotation of the drum the matches are

carried around through a drying atmosphere until they come to the delivery apparatus, presently described.

The composition-roller p is driven from a counter-shaft r , which has a star-wheel r' on one end operated by a toe p^2 on the main shaft. This counter-shaft is extended beyond the composition-roller and provided with a worm r^3 , which meshes with a worm-wheel a' , connected with or attached to the drum. Provision is thus made for a movement of all the parts so far described in proper time, and when in such timed movement the rows of splints are successively brought adjacent to the delivery apparatus they are met by stationary wedge-shaped ejectors s , arranged upon a supporting-rod s' and projecting into the grooves and which force out the matches from below, the matches falling into hoppers t , whence they are delivered into boxes u , arranged upon a table v . This table is provided with a longitudinal slot v' and is traversed longitudinally by an endless band w , having projecting fingers w' , which pass through the slot in the table and move the boxes forward. The band w is supported on pulleys $w^2 w^3$, which may be driven from the main shaft—as, for example, by cross-belt w^3 , extending from pulley w^4 on the main shaft to pulley w^5 on the extended shaft w^6 of one of the pulleys w^2 .

The pulleys $w^2 w^3$, the table v , and the hoppers t will be supported in any suitable way. I have shown for this purpose beams A' , projecting horizontally from frame A and met by angle-pieces B' from the frame B . The pulleys $w^2 w^3$ have shaft-bearings in brackets $A^2 A^3$, fastened to beams A' . The table v is supported on beams A' and the hoppers t are supported by brackets t' , rising from the table v .

Instead of having the grooves in the drum continuous and of uniform width, I may provide them at intervals with sockets of the shape of the splints to be cut. For example, supposing round sticks are to be cut, the said sockets will be circular, as shown at a^2 , Fig. 7.

I deem a drum having circumferential grooves of uniform width to be preferable to the sockets, and also preferable to a drum grooved crosswise, for the reason that in so large a piece of machinery and one so necessarily heavy there may be more or less backlash or lost motion upon every movement. Consequently it will require very nice gearing in order to stop the wheel with its line of sockets or its transverse grooves exactly opposite the knives or the mechanism which inserts the splints or sticks in the grooves. The main shaft may have a fast and loose pulley, as shown at $h' h'$, Fig. 3, for the application of power.

Some of the details preferred are as follows: The stock-trough is made as a rectangular box divided by a central longitudinal partition c' to insure the proper delivery of the blocks of wood. Openings $c^2 c^3$ are made op-

posite each other in the back and front plates of the trough, in which the feed-rolls $o o$ are arranged so as to bear frictionally against and feed the stock. The shafts $2 2$ of the feed-rolls have bearings at one end in brackets $c^3 c^3$, supported upon the frame B , and at the other end in boxes $c^4 c^4$, similarly supported.

$c^5 c^5$ represent the gear-wheels on the shafts $2 2$. The lower end of the extended shaft 2 , carrying the ratchet o' , is further supported in a bracket c^6 , supported by the frame B .

The rod o^3 is supported at its leading end by arms o^7 , straddling the ratchet o' and loosely arranged on the shaft 2 of one of the rolls o , and these arms are jointed to the yoke o^x of the said rod.

The lower ends of the stock-trough's front and back plates are cut away, as shown in Fig. 5, in order to conform to the path of travel of the cutters, and a deflection from a right line corresponding to the thickness of the partition in the stock-trough is made at 3 in these plates to compensate for the thickness of the partition-walls. Similarly the cutter-head is cut away and also deflected at 4 for a like purpose. By this construction only enough timber is exposed at a time for one cut and no small splinters can escape.

The cutter-head has a lip e' (see Fig. 2) projecting beyond the cutters to serve as a stop to limit the descent of the stock, and also as a pressure-bar to keep the stock in place, and also as a cap to prevent the knives or cutters from tearing into cross-grained stock. The cutters are shown as tubes, and the cutter-head is made with grooves e^2 , into which the cutters are forced, and in which they are held by the lips e^3 on one side and the screws k on the other side, (see Fig. 4,) forcing the cutters against said lips.

The frame B may be made with lips f' , which enter grooves e^4 , made in the cutter-head by and between projections e^5 from below, and the upper covering-plates e^6 , secured to the cutter-head by bolts e^7 .

The stock-trough may be bolted to the frame B by brackets c^{41} and bolts 5 at one side and by the lip 6 and bolt 7 at the other end, substantially as shown in Fig. 4.

The table and belt are inclined toward the delivery end to facilitate the movement of the boxes.

The rod or bar s' , which supports the ejectors, may be connected by angle-brackets $s^2 s^2$ to the beams A' , so as to sustain said rod in a horizontal position.

What I claim is—

1. In a machine for making matches, a drum or cylinder provided with circumferential grooves in which the match-splints are stuck as cut, and means to rotate said drum or cylinder to carry the said splints to finishing mechanism, substantially as described.

2. In a machine for making matches, an intermittently-rotated drum or cylinder having its rim grooved circumferentially and pro-

vided with stick-receiving sockets to receive the sticks as they are cut, substantially as described.

3. In a machine for making matches, the 5 circumferentially-grooved drum or cylinder, a stock-feeding mechanism extending transversely across said drum, a reciprocating cutter-head provided with tubular cutters, and splint-stickers, all substantially as and for 10 the purpose described.

4. A match-making machine comprising an 15 intermittently-rotated drum or cylinder having circumferential grooves in which the splints are stuck, a stock-feeder extending transversely across the face of the drum or 20 cylinder, a reciprocating cutter-head, and stickers for forcing the cut splints out of the cutters and into the grooves of the drum or cylinder, mechanism for applying the ignit- 25 ing composition, ejectors for removing the finished matches from the cylinder, and boxing mechanism for receiving the said matches from the ejectors, substantially as set forth.

5. The reciprocating cutter-head provided 25 with cutters and a lip carried by the cutter-head and projecting therefrom below the cutters and in advance of the said cutters into the path of the descending stock to arrest the undue descent of the stock, hold it in po- 30 sition to be acted upon by the cutters, and prevent tearing of cross-grained stock, com-

bined with the stock-trough arranged in a plane substantially at right angles to the plane of the cutters and lip and means to feed the stock toward the cutters, substan- 35 tially as described.

6. The grooved drum, the cutter-head, tubular cutters therein, and stickers arranged in the cutter-head in the rear of the cutters and in alignment with their open- 40 ings, and means, substantially such as described, to project into the cutters the stickers after the splints are cut to force or stick the splints into the grooves of the drum, sub- 45 stantially as described.

7. The stock-trough provided with a number of compartments and having its front and back walls cut away to compensate for the space occupied by the partitions in the trough, combined with the cutter-head similarly 50 shaped to align the cutters with the trough, substantially as described.

8. The delivery mechanism consisting of the ejectors, hoppers, slotted table, endless belt having fingers thereon, and means to 55 move said belt, substantially as described.

In testimony whereof I have hereunto set my hand this 22d day of January, A. D. 1889.

EDWIN J. YOUNG.

Witnesses:

SCHUYLER C. DURLING,
JOHN A. CLARK.