No. 808,841. PATENTED JAN. 2, 1906.

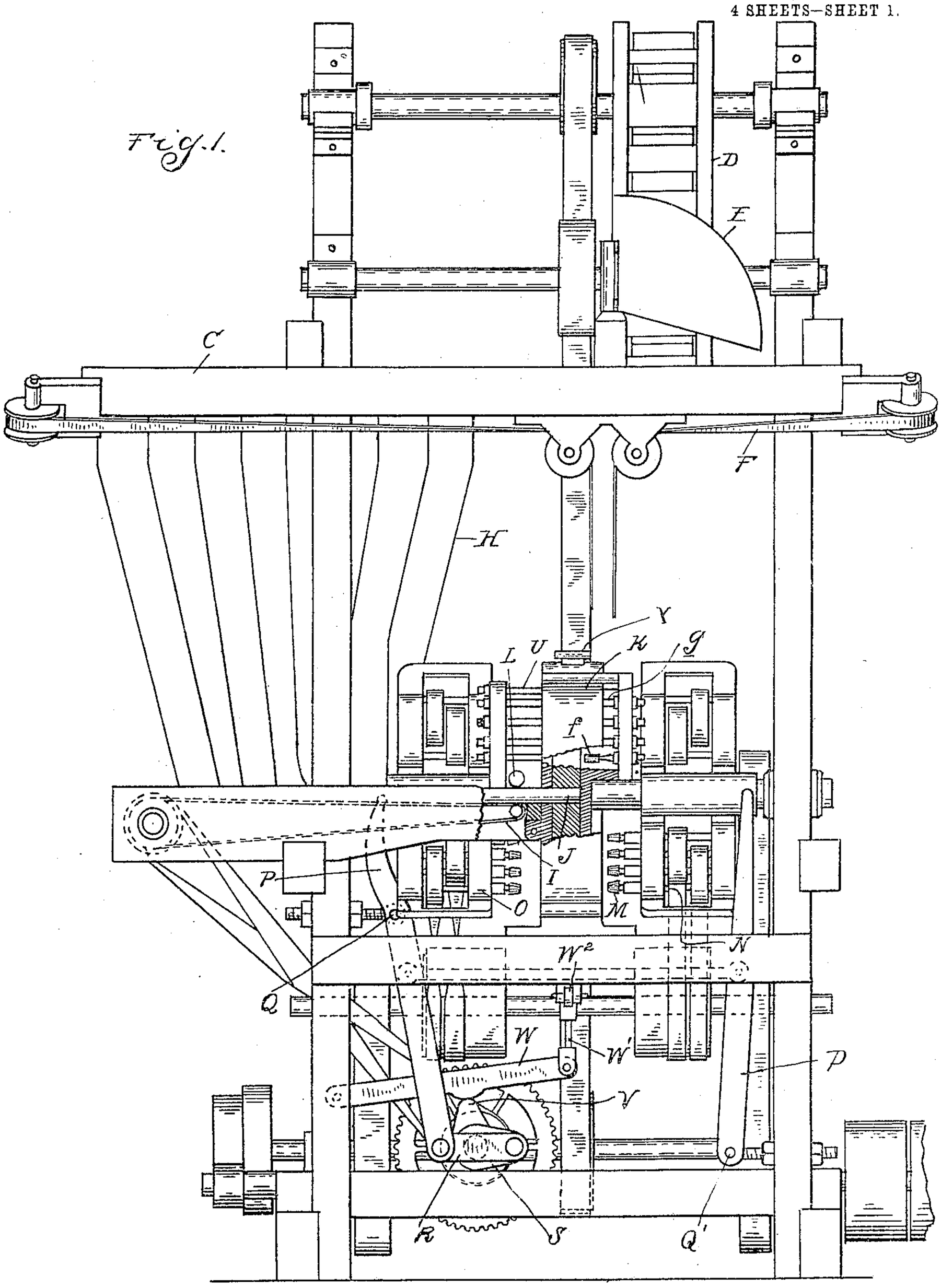
H. S. HOPPER.

APPARATUS FOR THE MANUFACTURE OF TOOTHPICKS.

APPLICATION FILED JAN. 27, 1905.

4 SHEETS—SHEET 1.

Fig. 1.



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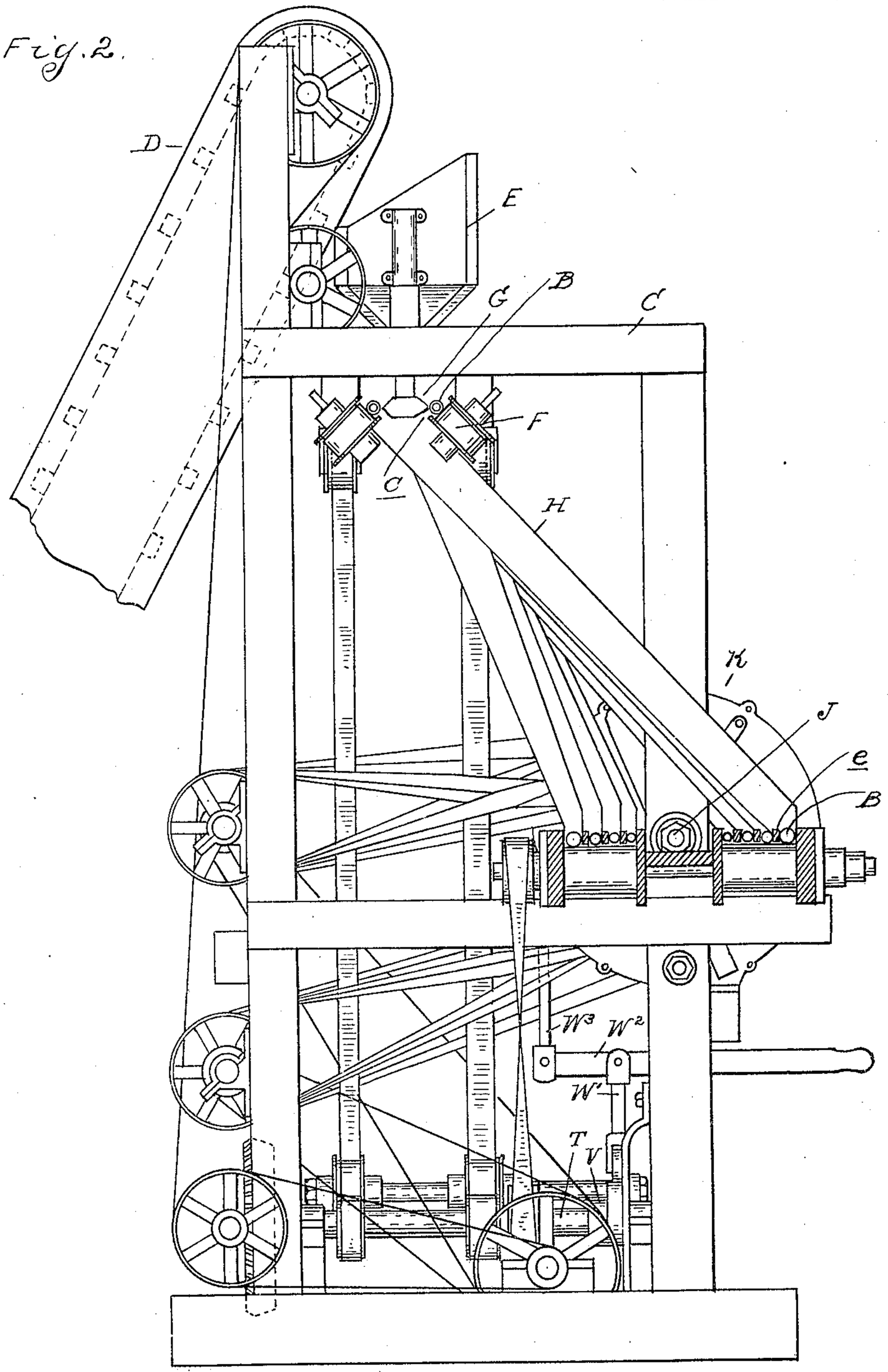
4 SHEETS—SHEET 2.

Fig. 2.



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4 SHEETS—SHEET 3.

Fig. 3.

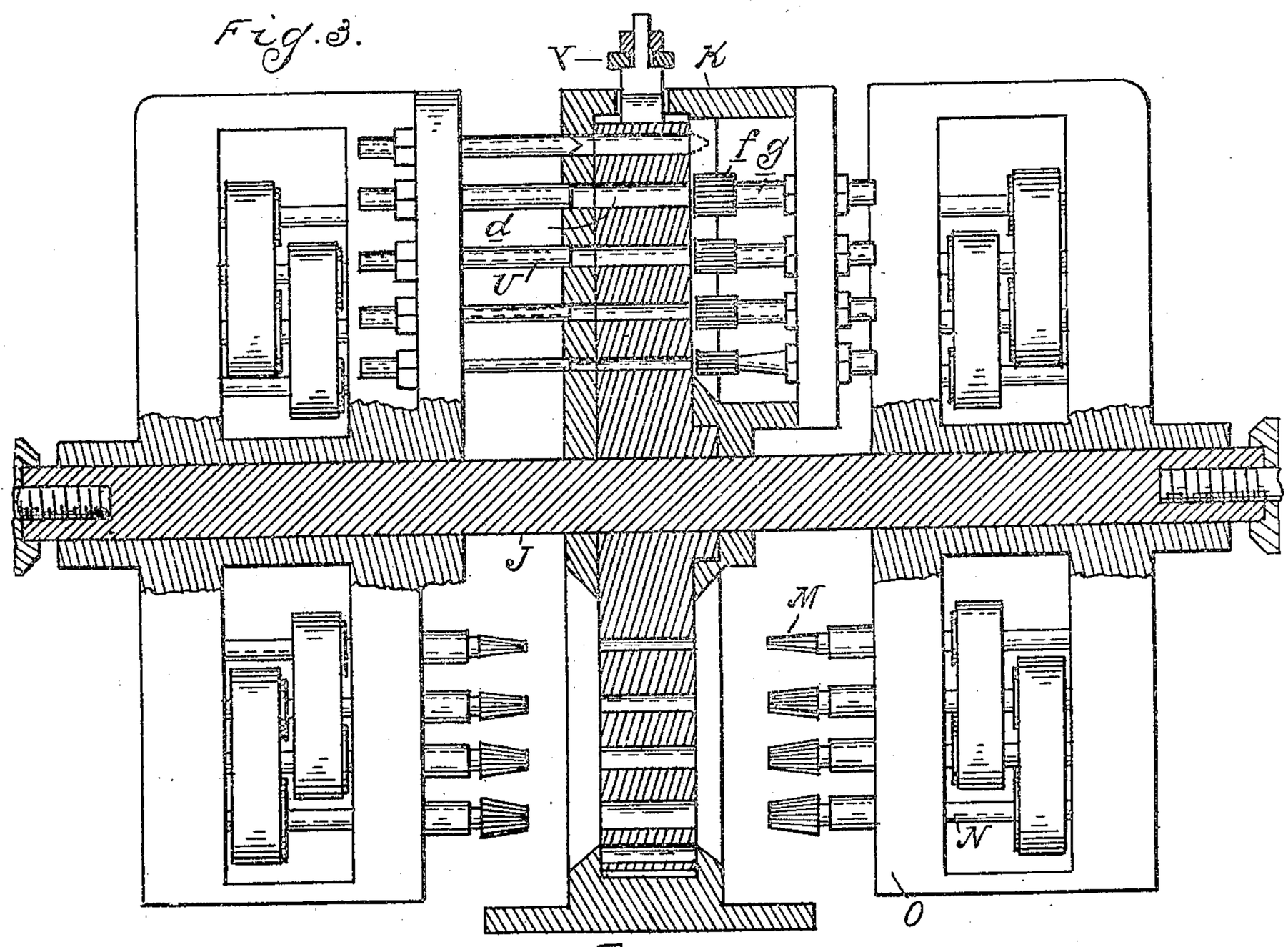
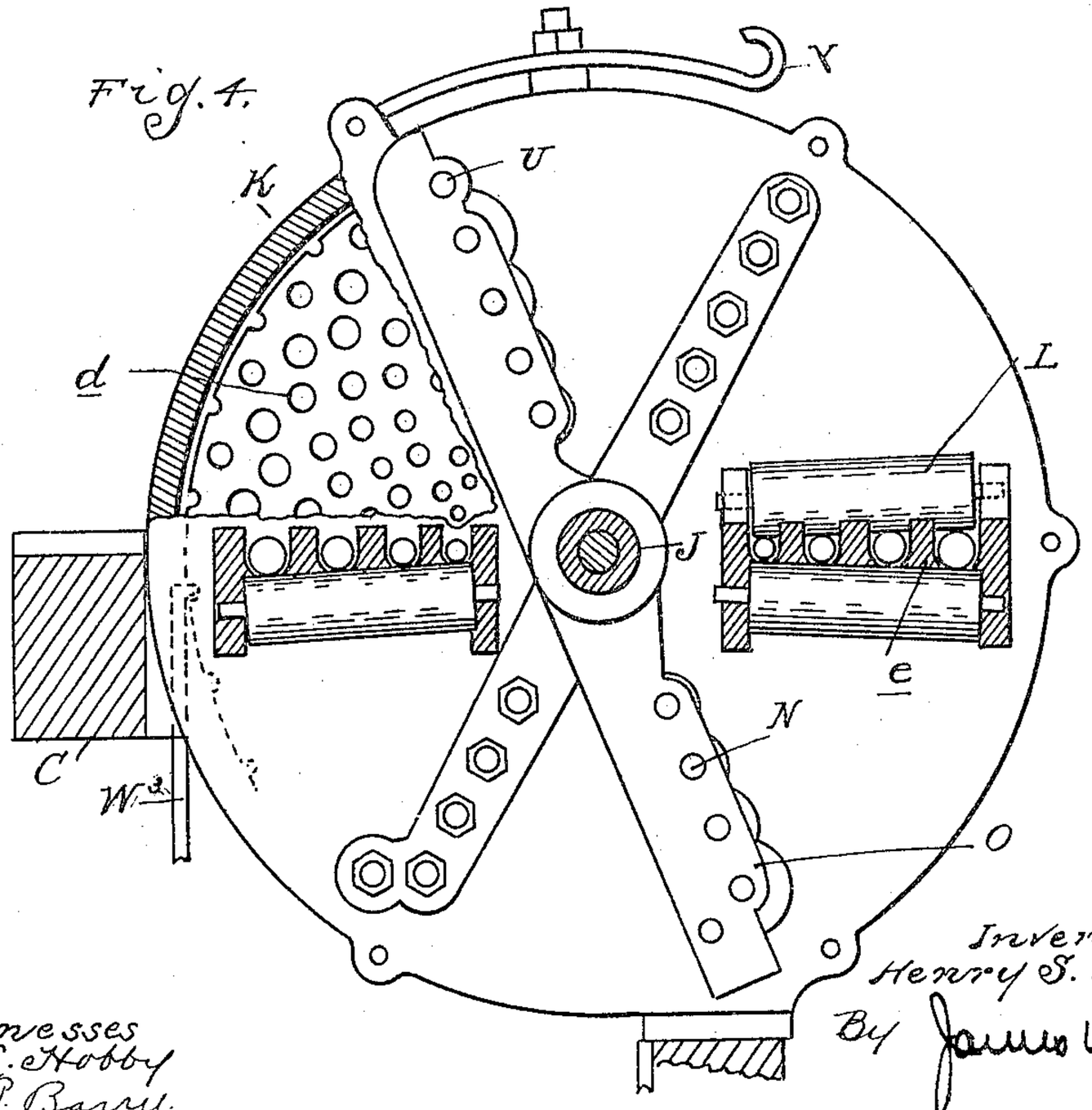


Fig. 4.



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4 SHEETS—SHEET 4.

Fig. 5.

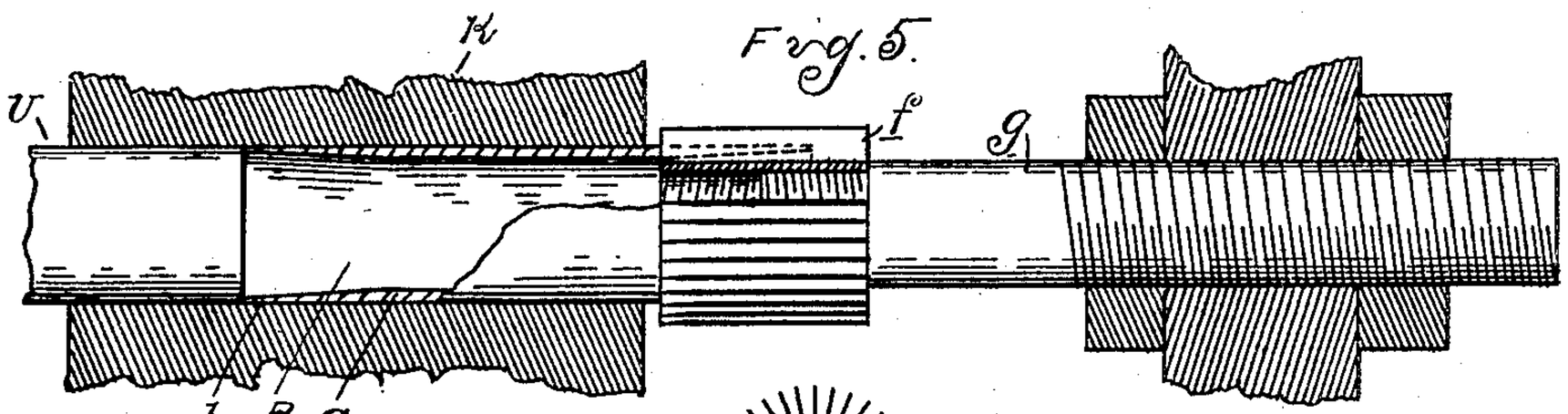
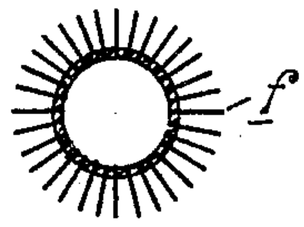


Fig. 6.



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UNITED STATES PATENT OFFICE.

HENRY S. HOPPER, OF DETROIT, MICHIGAN.

APPARATUS FOR THE MANUFACTURE OF TOOTHPICKS.

No. 808,841. Specification of Letters Patent. Patented Jan. 2, 1906.

Application filed January 27, 1905. Serial No. 242,965.

To all whom it may concern:

Be it known that I, HENRY S. HOPPER, a citizen of the United States, residing at Detroit, in the county of Wayne and State of Michigan, have invented certain new and useful Improvements in Apparatus for the Manufacture of Toothpicks, of which the following is a specification, reference being had therein to the accompanying drawings.

The invention relates to the manufacture of toothpicks, and has for its special object the obtaining of a construction of a flexible and tenacious wooden pick having a hardened point.

The invention consists in the peculiar construction of apparatus employed in the manufacture.

In the drawings, Figure 1 is a side elevation, partly in section, of a machine for manufacturing the toothpick. Fig. 2 is an end elevation thereof. Fig. 3 is a longitudinal section through the pointing and splitting mechanism. Fig. 4 is a sectional end elevation thereof. Fig. 5 is an enlarged section through one of the splitting-knives. Fig. 6 is a cross-section thereof.

In the present state of the art of manufacturing wooden toothpicks the picks are formed from splints of wood cut from comparatively large timber. The fiber of the wood is therefore of uniform character throughout the splint, and the sharpened points are very brittle and frequently break off between the teeth.

It is the object of the present invention to obtain a construction of pick which is strong and flexible by cutting the same from an annular growth in which the portion forming the point of the pick is harder and tougher than the body portion.

The cane is first cut into sections B of suitable length. The operations of sharpening and splitting the cane-sections are preferably automatically accomplished in a single machine of the following construction. C is a suitable framework, upon which is mounted the operating parts of the mechanism. D is an elevator for conveying the sections B of the cane to the top of the machine and for depositing them in a chute E, from which they are discharged on a belt conveyer F, extending longitudinally of the machine. The chute E is of V-shaped cross-section and is inclined, so as to successively deposit the cane-sections upon the belt F in alinement with each other. The sections B will vary in diameter according to the size of the growth from which they are cut. This necessitates the assorting of the varying sizes into groups, the members of which are all of approximately the same size, and this is accomplished as illustrated in Fig. 2. The belts F travel in inclined planes and the tube-sections B are carried by said belts resting against the central guide G. The arrangement is such that the sections will be slid along in an angle between said guide and the belt until they are brought into registration with slots or discharge-apertures *c* in the guide G. These discharge-apertures are of varying widths, and whenever a section B is of lesser width than a registering slot it will fall through and into a chute H. A series of these chutes H are arranged side by side or longitudinally of the belts F and extend downward to conveyer-belts I, upon which the sections B are deposited. The discharge ends of said chutes H are, however, out of line with each other, so that the sections B passing through each chute are deposited on the belt in line with each other, but out of line with those passing through other chutes. As illustrated in Fig. 2, two conveyer-belts I are arranged parallel to each other and upon opposite sides of an arbor J. This arbor has mounted thereon a work-holding head K, which is provided with a plurality of cylindrical bores *d*, arranged in radial and circumferential series. The bores of each circumferential series are of uniform diameter; but the bores in radial series vary in diameter, as illustrated in Fig. 4. The conveyer-belts I terminate adjacent to the face of the head K and are so arranged to aline the sections B, deposited thereon by the various chutes H, with the bores *d* of one radial series. The slots *c*, which grade the sections B, are so proportioned to the diameter of the bores *d* that the sections discharged through the respective chutes H will be alined with bores of sufficient diameter to receive them. Thus in the travel of the belts I the sections B are carried longitudinally, being preferably guided by division-strips *e*, and are finally inserted into the bores *d* of the head K. For forcing the sections into these bores presser-rolls L are preferably arranged above the roll at the discharge end of the belt I and in coöperation with the latter will positively feed the section into the bore. The head K is intermittently revolved to shift one radial series of apertures *d* out of alinement with the sections B

on the belts I and to register another radial series with said sections. The movement imparted to the belts I is preferably constant. The feeding of the sections B thereon is intermittent and is arrested during the shifting of the head K. Thus in the continuous operation of the machine the feeding movement of the sections and of the head K alternate, so as to successively insert sections B into the bores *d* of the head and to then carry them around with said head to the positions for respectively reaming and splitting.

For reaming the sections B a series of tapering reamers M are mounted upon arbors N, journaled in the heads or bearings O and arranged in alinement with the respective bores *d* of the radial series. As shown in Fig. 5, the heads O are so positioned that the reamers M will register with a series of bores *d*, spaced from the bores in alinement with the belts I by one-sixth of a revolution of the head K. These reamers are arranged upon opposite sides of the head K and are driven by a suitable mechanism, so as to revolve in opposite directions. The heads O are mounted for movement toward and from the rotating head K, being preferably sleeved upon the arbor J. A mechanism is also provided for periodically reciprocating said heads, so as to cause the arbors N to enter the ends of the tubular sections B and ream them during the period of rest of the head K and then to retract the reamers to permit of the rotation of the head K. As shown, this mechanism comprises levers P, which are attached at one end to the heads O and are fulcrumed at Q and Q′ to the frame. These levers are operated by a link R from a crank S upon a shaft T, and in the rotation of said crank the levers will be rocked and cause the reciprocation of the heads O.

In addition to the reamers M the heads O carry a radial series of pushers U. These, as illustrated in Fig. 4, are arranged substantially one-sixth of a revolution from the reamers M or one-third of a revolution from the point of insertion of the sections B. The arrangement is such that whenever the heads O are reciprocated one radial series of the sections B will be rocked and simultaneously one radial series of the ream-sections will be pushed out from the head K. The splitting of the sections is performed during the operation of pushing them out from the head by arranging a series of splitting-knives on the opposite sides of the head K. These, as illustrated in detail in Figs. 5 and 6, comprise a series of radially-extending blades *f*, secured to a shank *g*, which is arranged in axial alinement with the bore *d*. The shank *g* at its inner end is slightly smaller than the reamed end of the section within the bore *d*, and as a consequence when said section is shoved out it will engage with the knives *f* and will be split into splints of the proper width.

The various parts of the mechanism are driven by suitable belt and gear connections, and the head K is intermittently actuated by a cam V on the shaft T, which operates a lever W, link W′, lever W², and pawl W³, the latter engaging notches in the periphery of the head. The head is also preferably provided with a spring-latch Y for holding it stationary between actuations of the pawl W³.

In the operation of the machine the sections B are elevated to the chute E, alined by the latter upon the belts F, and are assorted while traveling on said belts by the various widths of slots *c* in the guides G, so as to fall into the proper chute H. These chutes deposit the sections on the belts I in alinement with the radial series of bores *d* in the head K, while the latter is stationary. The movement of the belt I in coöperation with the feed-roll L will then insert the sections in the head K, and after one-third of a revolution of said head they will be alined with the reamers M. The reciprocation of the heads O will then cause said reamers to enter the opposite ends of the sections, reaming them out to form the knife-edge, and by reason of the fact that the reamers rotate in opposite directions the sections are held from rotation. When another one-third of a revolution of the head K is accomplished, the pushers U press out the sections against the splitting-knives *f*, which will sever them into the separate splints. These splints, as illustrated in Fig. 10, have their points formed by the outer skin or tough fiber, while the softer fiber forms the body of the central portion of the splint. To complete the manufacture, the splints are preferably subjected to the process of sanding, which removes any roughness and prepares them for use.

What I claim as my invention is—

1. A machine for forming toothpicks, comprising a holder for a tubular blank, a tapering reamer for engaging the end of said tube while secured by said holder, means for ejecting the reamed tube from said holder, and a cutter for severing the tube into splints during ejection from said holder.

2. A machine for forming toothpicks comprising means for assorting tubular blanks of varying diameters and arranging the different sizes in parallelism, a work-holder having sockets for the various sizes of tubes adapted to be alined therewith, and means for feeding the tubes into the sockets.

3. A machine for forming toothpicks, comprising means for assorting the tubular blanks of varying diameters, means for feeding the tubes of the various assorted sizes longitudinally and in parallelism, an intermittently-rotating work-holder, having a series of sockets for the respective sizes of tubes, adapted to be successively alined for engagement therewith, reamers for engaging said tubes while in said sockets to sharpen the ends

thereof, means for ejecting said tubes from their sockets, and cutters for severing said tubes longitudinally into separate splints during ejection.

4. A machine for forming toothpicks comprising a work-holder provided with a socket for receiving the tubular blank, reamers arranged at opposite sides of said holder and rotating in opposite directions, and means for simultaneously inserting said opposite reamers into the ends of the tube to sharpen the edges thereof.

5. In a machine for forming toothpicks, the combination with a rotary work-holder, having a series of open-ended, cylindrical sockets therein, of means for feeding tubular blanks into engagement with said sockets, reamers upon opposite sides of said holder, with which said tubes are adapted to be registered at one point in the rotation of said holder, said reamers rotating in opposite directions, means for simultaneously inserting said opposite reamers into the ends of said tubes to sharpen the same, splitting-knives arranged to register with said tubes at another point in the movement of said holder, and ejectors simultaneously actuated with the actuation of said reamers to move the sharpened tubes longitudinally out from their sockets, and to simultaneously sever the same into separate splints by engagement with said cutters.

6. In a machine for forming toothpicks, the combination with a traveling holder for the tubular blanks, of means for ejecting said tube longitudinally from said holder, and a cutter comprising a circular series of radial blades, arranged in a position to aline with said tube at the point of ejection, whereby said tube will be severed into separate splints during the ejection.

7. A machine for forming toothpicks, comprising means for assorting the tubular blanks of varying diameters, means for feeding said blanks of the assorted sizes longitudinally and in parallelism, an intermittently-rotating work-holder having a series of sockets for the respective sizes of tubes, adapted to be successively alined for engagement therewith, reamers for engaging said tubes while in said sockets to sharpen the ends thereof, and means for ejecting said tubes from their sockets.

8. The combination of a trough, having discharge-openings of varying widths in one side thereof, and a traveling belt adjacent to the opposite side of said trough, adapted to feed cylindrical blanks of varying sizes longitudinally thereof, whereby said blanks are discharged through said openings from different points in the trough, according to their respective sizes.

9. The combination with a trough, having discharge-openings of varying widths in one side thereof, of means for feeding cylindrical blanks of varying sizes into said trough, and a traveling belt adjacent to the opposite side of said trough, upon which said blanks are deposited, whereby the movement of said belt will aline the blanks and carry the same longitudinally of the said trough, to discharge them through their respective discharge-openings.

10. The combination with a series of chutes, for the feeding of cylindrical blanks of varying sizes, of a traveling belt upon which said blanks are discharged through their respective tubes in parallel arrangement, and a stationary guide above said belts for separating the blanks from the different chutes.

In testimony whereof I affix my signature in presence of two witnesses.

HENRY S. HOPPER.

Witnesses:
H. C. SMITH,
JAS. P. BARRY.