J. D. CRAIG.

Improvement in Machines for Making Wooden Boxes.

No. 129,462.

Patented July 16, 1872.

Fig. 1.

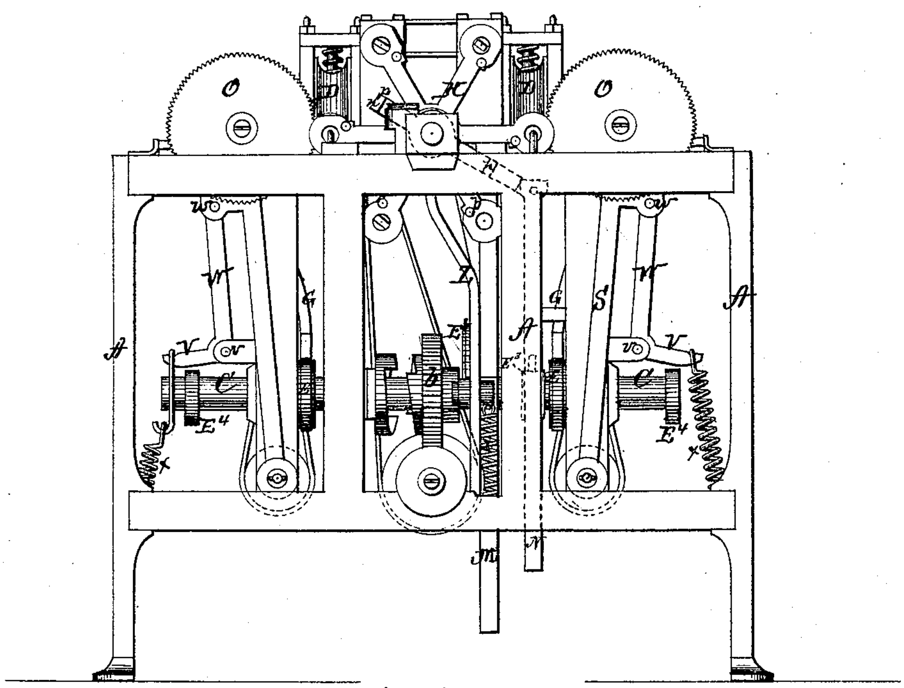

Fig. 2.

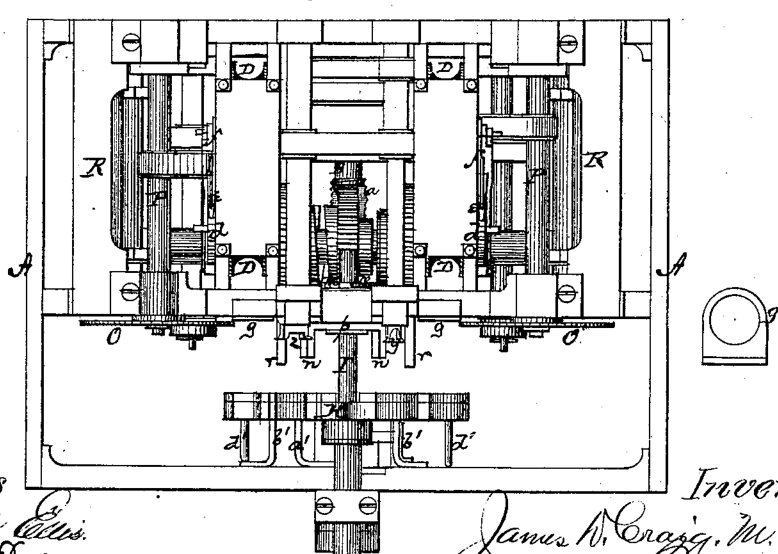

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Fig. 3.

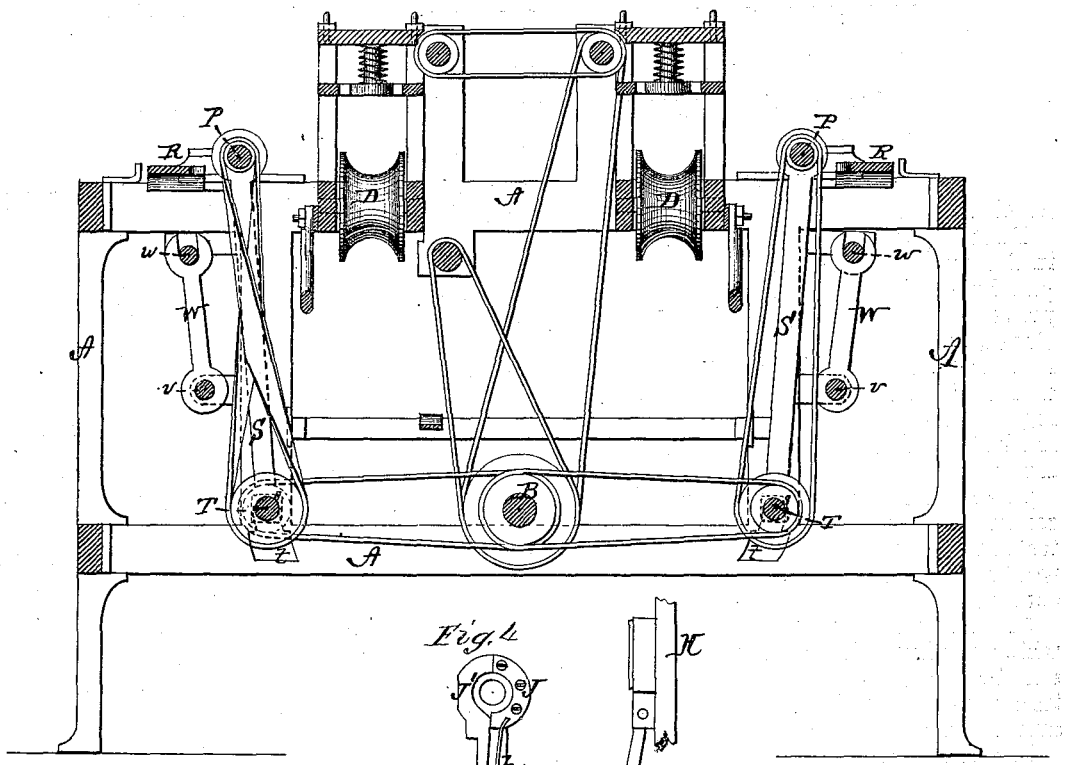


Fig. 4.

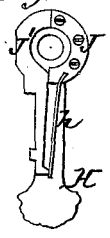


Fig. 5.

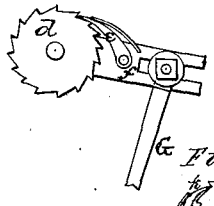


Fig. 6.

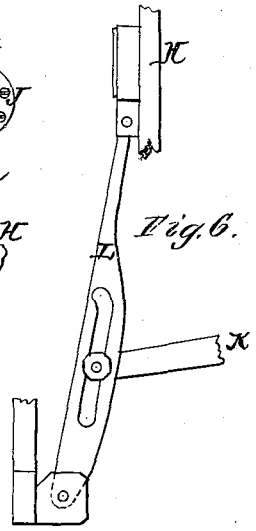
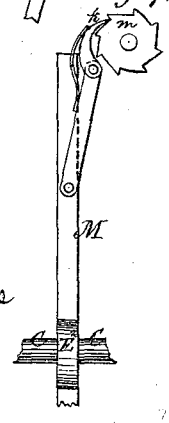


Fig. 7.



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UNITED STATES PATENT OFFICE.

JAMES D. CRAIG, OF NILES, MICHIGAN.

IMPROVEMENT IN MACHINES FOR MAKING WOODEN BOXES.

Specification forming part of Letters Patent No. 129,462, dated July 16, 1872.

SPECIFICATION.

To all whom it may concern:

Be it known that I, J. D. CRAIG, of Niles, in the county of Berrien and State of Michigan, have invented certain new and useful Improvements in Machines for Making Wooden Boxes, &c.; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawing, and to the letters of reference marked thereon which form a part of this specification.

The nature of my invention consists in the construction and arrangement of a "machine for making wooden boxes or other hollow woodenware," as will be hereinafter more fully set forth.

In order to enable others skilled in the art to which my invention appertains to make and use the same, I will now proceed to describe its construction and operation, referring to the annexed drawing, in which—

Figure 1 is a side elevation, Fig. 2 a plan view, and Fig. 3 an enlarged longitudinal vertical section, of my machine. Figs. 4 to 7 are detached views of certain parts thereof, enlarged.

A represents the frame of my machine, transversely in the center of which is a shaft, B. This shaft is provided with a worm, *a*, gearing into a cog-wheel, *b*, upon another shaft, C, which runs lengthwise through the frame. These two shafts are the two main driving-shafts from which motion is communicated to the various parts of the machine, the power being applied to the shaft B. From the center outward toward each end the machine is exactly a duplicate, except in a few particulars hereinafter to be mentioned, so that in the description of the machine it must be understood that there are the same parts on both sides of the center. The wood for the boxes is first to be turned in a lathe the desired size, and of any desired length—four, six, eight, or ten feet—as may be convenient. The wood is then placed in concave rollers D D in the upper part of the frame, near the center, which rollers are connected by suitable cog-wheels, and one of the rollers moved, so as to feed the wood the proper length, by a ratchet-wheel, *d*, and pawl *e*, this pawl being attached to a pivoted arm, *f*, and said arm operated by another arm, G, from an eccentric, E, on the shaft C. The outer end of the arm *f* is slotted, so that the arm G attached in said slot may be moved out from and in toward the center, thereby regulating the length of the feed, and hence the length of the box. Between the rollers D D and the jaws which receive and hold the wood there is a ring, *g*, through which the stick passes to guide it into the jaw and steady it while being sawed. This guide-ring, on a full-sized machine, will be fastened by a set-screw, so as to be adjusted to different-sized sticks for different-sized boxes. H represents a six-armed wheel attached to a shaft, I, placed above and parallel with the shaft B, and capable of sliding backward and forward in its bearings. To the outer end of each arm of the wheel H is attached a stationary jaw, J, and a movable jaw, J′, which latter is held against the stationary jaw by a spring, *h*. The stationary jaw should be attached by screws, so as to be readily removed and replaced by another when desired to make boxes of different size. In like manner the movable jaw is pivoted by a screw, so that it can readily be exchanged for another. This shaft I with its wheel and jaws is moved in and out at the proper times by an eccentric, E^1, on the shaft C, from which an arm, K, extends to and connects, in a slot, with a pivoted lever, L. The upper end of this lever is forked and works in a groove on the hub of the wheel. This device is only on one side of the machine and not duplicated. The shaft I, with the wheel and jaws, is revolved one-sixth of a revolution at each revolution of the shaft C by the following means: On the shaft C is a cam, E^2, which raises an upright sliding bar, M, once during each revolution of the shaft, and as soon as the cam ceases to operate on said sliding bar a spring, *i*, throws it downward again. To this sliding bar is attached a pawl, *k*, which operates a ratchet-wheel, *m*, provided with a collar passing through the inner bearing for the shaft I, and through which collar said shaft passes. This collar and shaft are connected by the usual feather and groove, so that when the ratchet-

wheel is turned by the pawl the shaft also will be turned, while the shaft is allowed to move in and out in the same. This device also is only on one side of the center and not duplicated. As the wheel moves inward one jaw, on each side of the center, is opened by an arm, *n*, projecting from a lever, *p*, which works on the collar of the ratchet-wheel *m*. This lever *p* is held in its place by a washer, which is to be screwed onto the aforesaid collar. From one end of the lever *p* depends a bar, N, which moves in a guide on the frame, and is operated by a cam, E^3, on the shaft C. This device for operating the lever *p* is only on one side of the center and not duplicated. The cam E^3, through the bar N, raises the lever *p* to open the jaws as soon as the jaws get engaged with guides *r* attached to the frame, and releases it as soon as the forward movement is completed, thus clamping and holding the end of the stick by means of the spring *h* operating upon the movable jaw. At the same time the saw O is moved forward, cutting off the stick, and the saw is just far enough behind in its forward movement so as to finish cutting through the stick before the wheel with the jaws commences running backward. At this stage of the operation there are thus two sticks held in the wheel H, or rather in two of the six sets of jaws attached to said wheel, one of which sticks is to form the box itself and the other the cover to the same, the difference in the length of said sticks being caused by unequal speed of the two feeding mechanisms, one on each side of the center of the machine. The saw O is mounted upon a shaft, P, placed in suitable bearings upon a carriage, R, which slides back and forth upon the frame A. The saw-shaft P runs through arms S, which extend downward, and through their lower ends passes a counter-shaft, T. This countershaft receives its rotating motion by a belt from the shaft B, and communicates motion by another belt to the saw-shaft. In order that the counter-shaft may be at all times the same distance from the saw-shaft, the boxes *s* of the counter-shaft move in slots *t* in the frame, which are on a circle, the center being the driving-shaft B. The saw-carriage R is moved forward at the proper time by means of a cam, E^4, on the end of the shaft C, which operates upon an arm, V, extending from a shaft, *v*, in the frame. From the same shaft two other arms, W, extend upward, the upper ends of which are forked and straddle a rod, *w*, in the carriage. As soon as the cam E^4 ceases to operate on or has passed by the arm V, a spring, X, throws the whole, including the saw-carriage, back into its former position. At the same time as the saw is thus, after finishing its work, moved back, the jaws also move back, and as soon as they are disengaged from the guides *r* the shaft I is turned one-sixth around by means of the ratchet-wheel *m*, which movement brings the pieces of wood held by the jaws opposite bits *y*. As the shaft again moves forward these bits bore them, they being attached to mandrels connected in suitable manner by belts with the driving-shaft B, from which they thus receive their motion. From the very nature of the case it is evident that one of the bits *y* is in the upper part of the machine while the other is in the lower part and on the opposite side of the center. The upper bit *y*, which is for boring the box itself, will be made in such a manner as to bore the box in the inside and cut the rim for the cover; at the same time the lower bit bores the cover, but in neither case will they cut the full size. While this is being done two other pieces of wood are inserted in the next two sets of jaws, and cut off by the saws in the same manner as already described. The next turn of the wheel brings the incompleted box and cover in front of other bits *z*, which take a thin chip, and finish them. These bits are inserted in mandrels run from the mandrels of the bits *y* by suitable belts. While this is being done the second set of pieces is being bored out, and a third set sawed off and inserted in the third and last set of jaws. When the wheel H revolves by means of the ratchet-wheel *m*, as above described, it has only accomplished about two-thirds of its backward movement, and as it finishes this movement it moves into guides *a'* and *b'* *b'* and against two punches, *d' d'*, attached to the frame A.

The guide *a'* steadies the wheel and prevents its revolving, while the other two, *b' b'*, open the jaws, and the punches *d' d'* push the box and cover out forward, there being openings made in the outer ends of the arms of the wheel opposite to the wheel for that purpose.

Having thus fully described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. The ring *g*, arranged, as described, between the feeding-rollers and the receiving-jaws, for guiding and steadying the stick of wood, substantially as herein set forth.

2. The six-armed wheel H, placed upon the sliding shaft I, and carrying upon each arm a stationary jaw, J, a movable jaw, J', and a spring, *h*, substantially as and for the purposes herein set forth.

3. The arrangement of the eccentric E^1, arm K, and slotted lever L, pivoted at its lower end and its upper end forked, and working in a groove on the hub of the wheel H, for moving said wheel and shaft I back and forth, substantially as herein set forth.

4. The oscillating lever *p*, provided with projecting arms *n n*, and operated by means of the bar N and cam E^3, substantially as and for the purposes herein set forth.

5. The guides *r*, arranged, as described, for steadying the wheel H while completing its forward movement, as herein set forth.

6. The arrangement of the cam E^4, arm V, shaft *v*, forked arms W, rod *w*, and spring *f*, for operating the saw-carriage, substantially as herein set forth.

7. The guides *a'* and *b' b'*, for steadying the wheel H and opening the jaws J', substantially as herein set forth.

In testimony that I claim the foregoing as my own I affix my signature in presence of two witnesses.

JAMES D. CRAIG, M. D.

Witnesses:

CLEMENT L. BARRON,

ROBERT FOWLER.