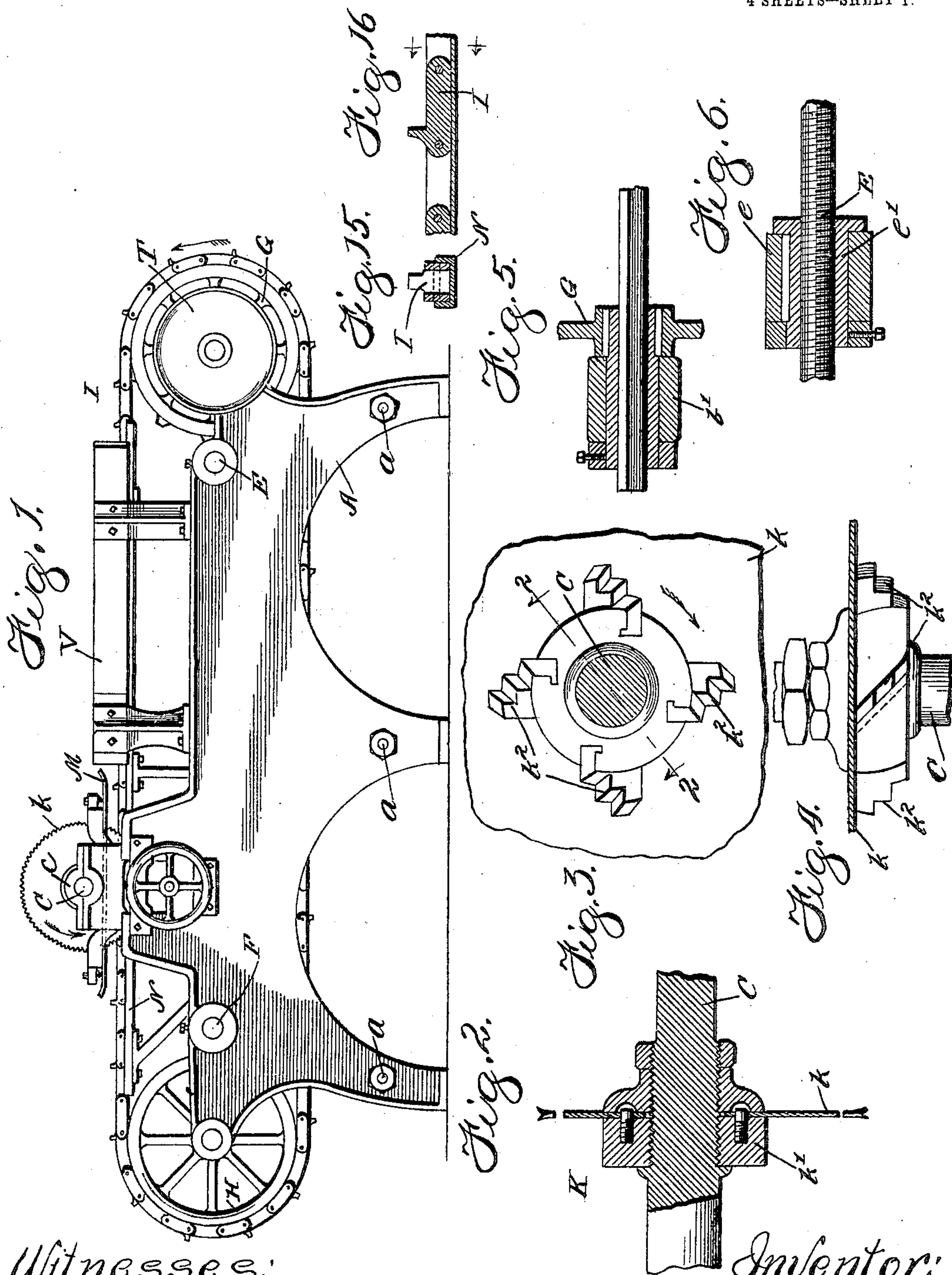


J. B. WEIR.
STEP MITERING MACHINE.
APPLICATION FILED MAR. 31, 1905.

4 SHEETS—SHEET 1.

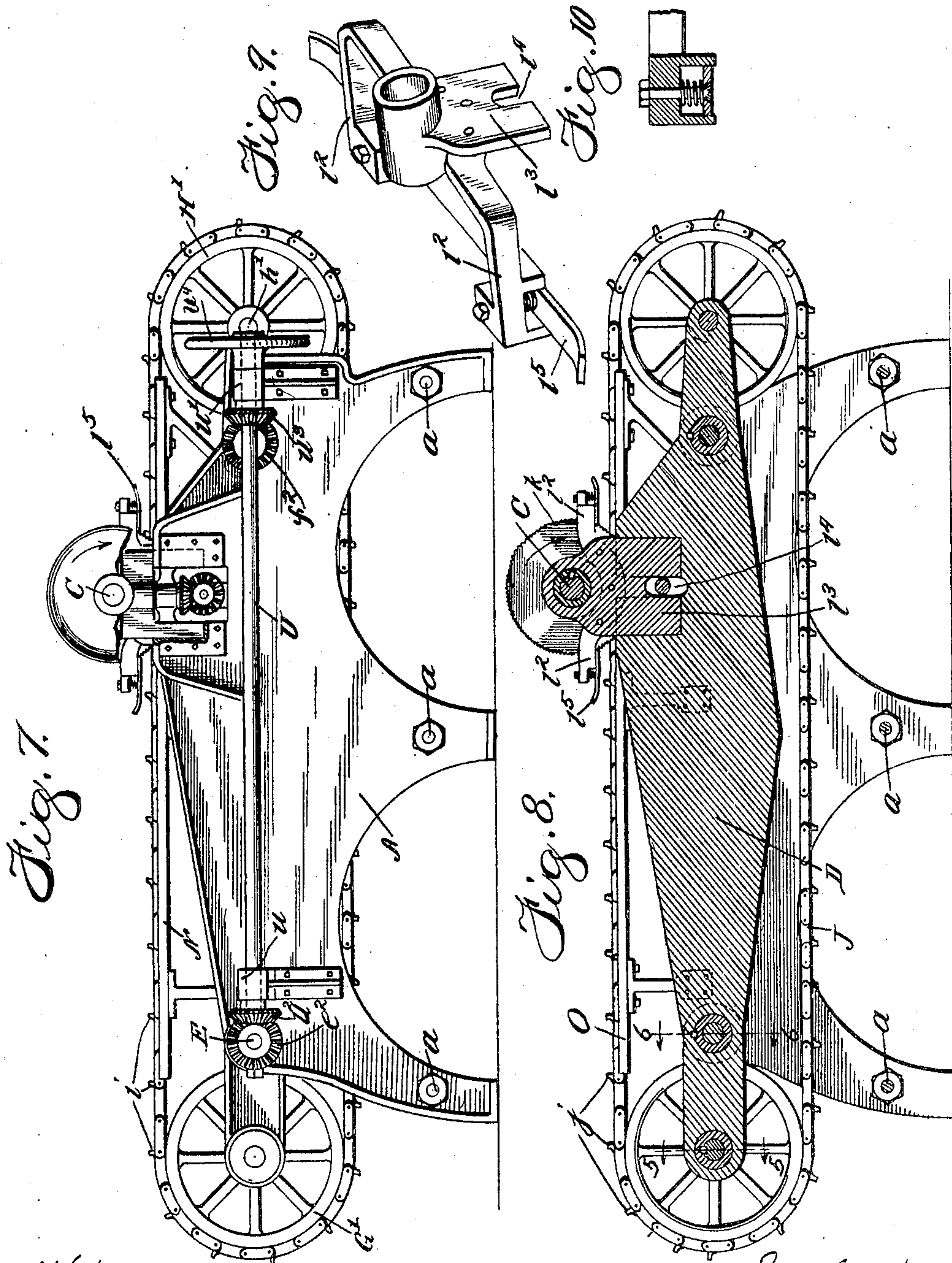


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4 SHEETS—SHEET 2

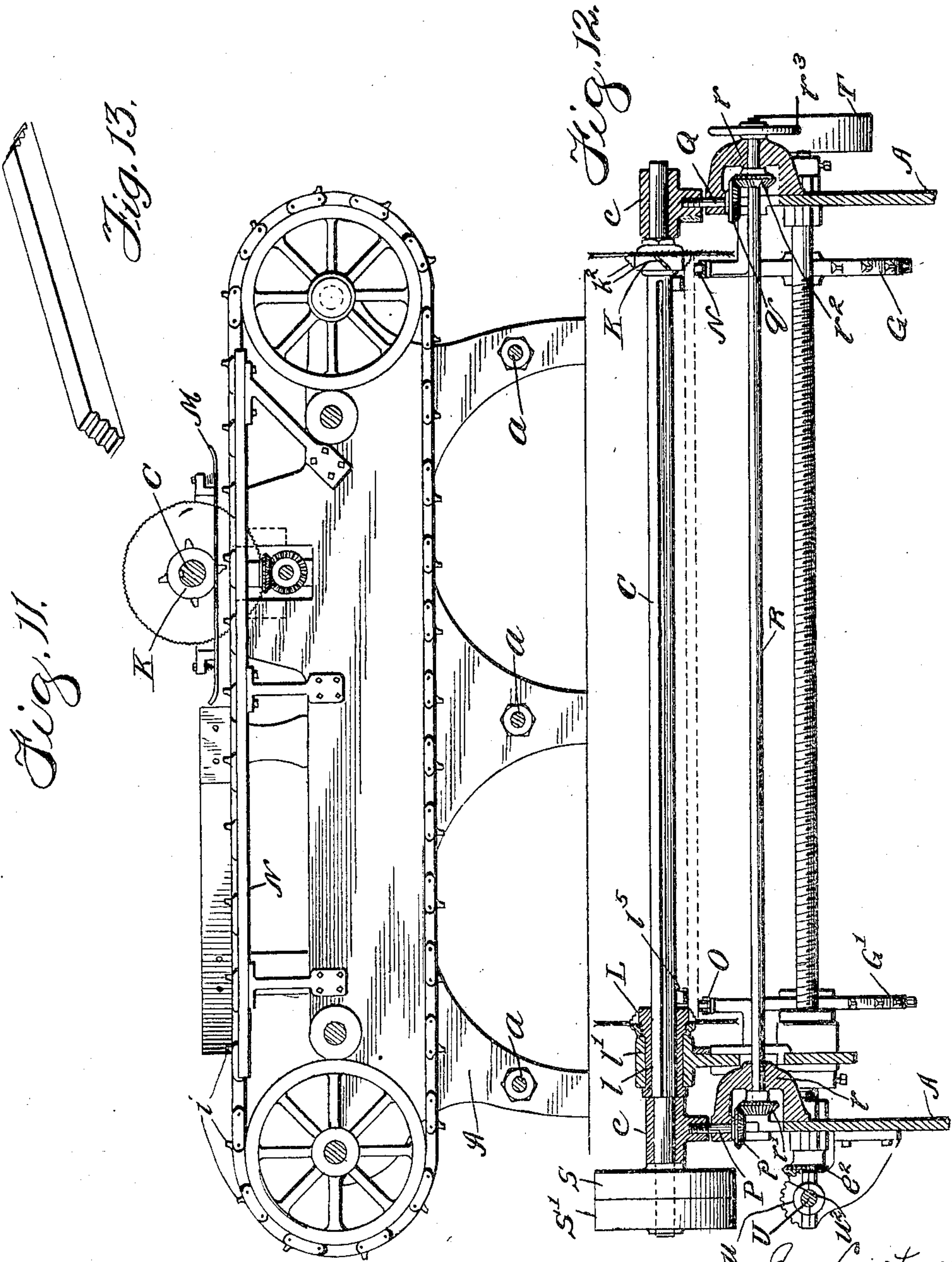


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4 SHEETS—SHEET 3.



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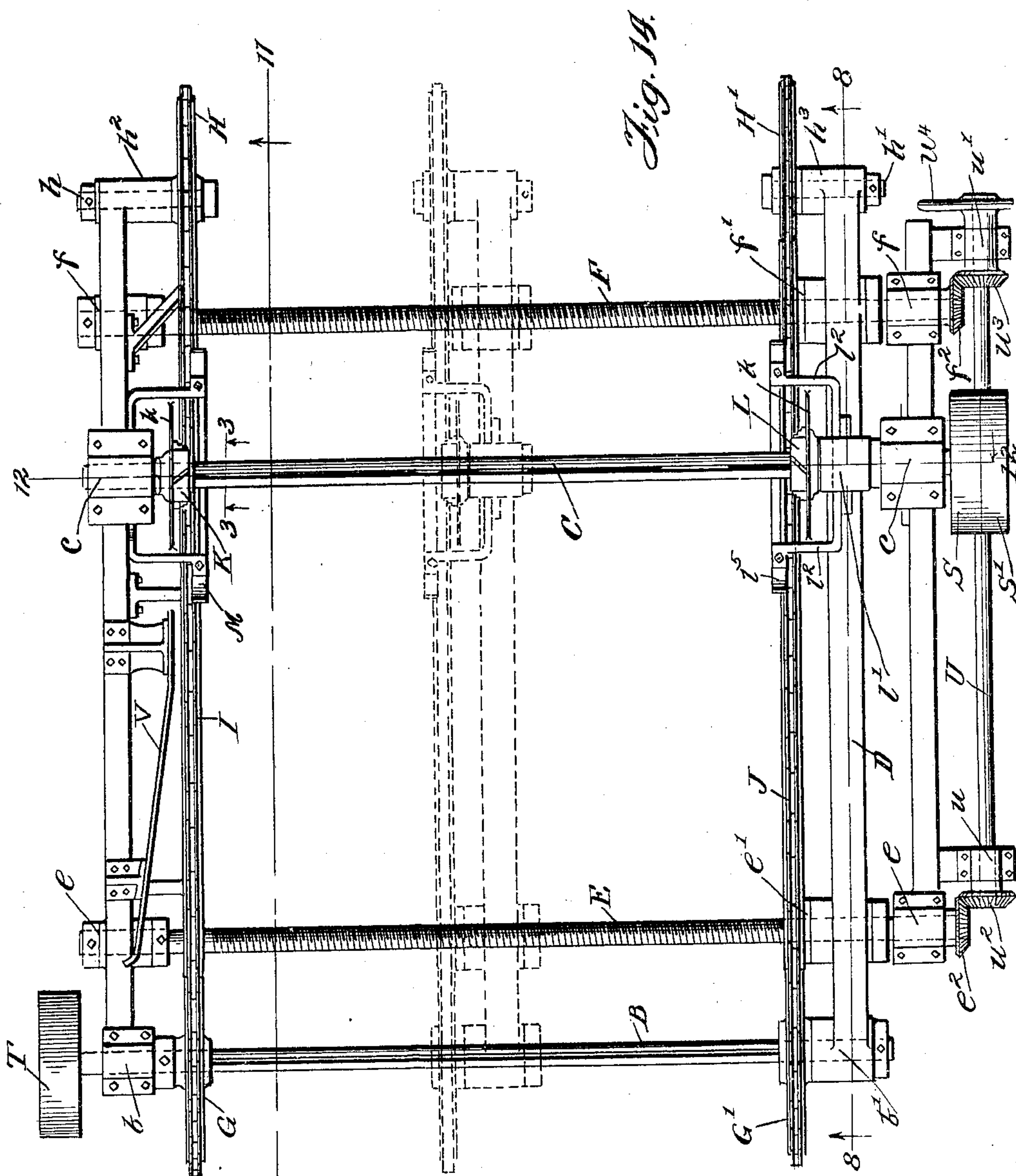
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No. 807,647.

PATENTED DEC. 19, 1905.

J. B. WEIR.
STEP MITERING MACHINE.
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4 SHEETS—SHEET 4.



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UNITED STATES PATENT OFFICE.

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STEP-MITERING MACHINE.

No. 807,647.

Specification of Letters Patent.

Patented Dec. 19, 1905.

Application filed March 31, 1905. Serial No. 253,027.

To all whom it may concern:

Be it known that I, JOHN B. WEIR, a citizen of the United States of America, and a resident of Chicago, Cook county, Illinois, have invented a certain new and useful Improvement in Step-Mitering Machines, of which the following is a specification.

My invention contemplates an improved machine for step-mitering the ends of cleats—such, for example, as the cleats to be employed in making wire-bound box-blanks.

In a machine characterized by my invention the step-mitering is accomplished by means of cutters, and the cleats are cut off at each end by means of circular saws. In this way the proper length is insured for each cleat, and the step-mitering is accomplished in a simple, effective, and highly efficient manner. Furthermore, I provide means for varying the distance between the cutter-heads, so that the step-mitering may be carried on with respect to cleats of different lengths. Again, I provide means for bodily raising and lowering the cutter-heads, thereby making it possible to employ the machine for operating on cleats or strips of different thicknesses. In addition the cutter-heads are of an improved and highly-efficient form, each head being composed of a plurality of knives mounted obliquely in the head and readily removable for purposes of repair or substitution.

Another important feature consists of the provision of an endless work holder or carrier adapted to receive and bodily carry the cleats forward in the direction required for passing the latter beneath the rotary cutter-heads.

Other advantages and features of improvement will hereinafter more fully appear.

In the accompanying drawings, Figure 1 is a side elevation of my improved step-mitering machine. Fig. 2 is an enlarged detail of one of the saws and cutter-heads, being a section on line 2 2 in Fig. 3. Fig. 3 is an enlarged section on line 3 3 in Fig. 14. Fig. 4 is a plan of the parts shown in Fig. 3. Fig. 5 is an enlarged detailed sectional view of one of the sprocket-wheel-shaft bearings. Fig. 6 is an enlarged detailed sectional view of one of the threaded supports on which the transverse adjusting-screws are mounted. Fig. 7 is a view of the other side of the said machine. Fig. 8 is a longitudinal view of the section on line 8 8 in Fig. 14. Fig. 9 is a perspective of one of the adjustable guards for holding

the cleats down upon the endless traveling work holder or carrier. Fig. 10 is a detailed sectional view of the portion of the device shown in Fig. 9. Fig. 11 is a longitudinal section on line 11 11 in Fig. 14. Fig. 12 is a transverse section on line 12 12 in Fig. 14. Fig. 13 is a perspective of one of the cleats or strips of wood, showing its ends step-mitered in the desired manner. Fig. 14 is a plan of my improved machine for step-mitering the ends of cleats or strips of wood or other articles. Figs. 15 and 16 are detailed sectional views of one of the chains and its support.

The frame or body A is adapted to support the shafts and other operative parts in suitably-elevated positions. Preferably the two sides of the frame are rigidly connected by the rods or braces *a*. The transversely-arranged shafts B and C are supported in bearings *b* and *c c* carried by the said frame. As shown, the bearing *b'* for one end of the shaft B is mounted on the end of a laterally-adjustable inner frame member D. Both of said shafts are preferably grooved substantially throughout their lengths. The two rotary screws E and F are arranged to extend across the machine and are supported in bearings *e e* and *f f*. In the inner frame member D these two screws extend through non-rotatable nuts *e'* and *f'*. (See Fig. 6.) Both the shafts and the screws are provided with means for preventing them from shifting endwise in their bearings in the two rigidly-connected sides of the frame. The shaft B is provided with sprockets G and G', the latter being adapted to slide along the spline or keyway in said shaft. With the arrangement shown the sprockets H and H' are mounted on stud-shafts *h* and *h'*, supported in bearings *h²* and *h³* on the frame A and the adjustable frame member D. A sprocket-chain I connects the sprockets G and H, and a similar chain J connects the sprockets G' and H'. The cutter-heads K and L are mounted on the shaft C, the cutter-head L being adapted for sliding movement along the spline or keyway in said shaft. Each cutter-head is provided with a circular saw, such as the saw *k*. (Shown in Fig. 2.) The hub *k'* of the cutter-head K is provided with oblique grooves adapted to removably receive the stepped cutters *k²*, and the cutter-head L is substantially the same in character. In this way the two cutter-heads

taper toward each other. The cutter-head L has a sleeve l , supported in a bearing l' on the frame member D, and the shaft C is supported in this sleeve. Referring to Fig. 9, it will be seen that the bearing l' is integral with the arms l^2 and with the foot l^3 , the latter having a notch l^4 . A spring-pressed guard l^5 is suitably supported by the arms l^2 and arranged just above the chain J and inside the cutter-head L. A similar but stationary guard M is secured to the bearing c .

The chain-supports N and O are supported by brackets secured to the frame A and the movable frame member D. The said chains are preferably provided with lugs i and j .

As shown, the bearings c are supported on the upper threaded end portions of the short adjusting-screws P and Q, which are provided with bevel-gears p and q . A horizontally and transversely disposed adjusting-shaft R is supported in bearings r on the frame A and is provided with bevel-gears r' and r^2 , adapted to engage the bevel-gears p and q . A hand-wheel r^3 is provided for rotating the said shaft.

The end of the cutter-head shaft C can be provided with fast and loose pulleys S and S'. The chain-shaft B can be provided with a pulley T.

At one side of the machine the longitudinal adjusting-shaft U is supported in bearings u and u' on the frame. This adjustable shaft is provided with bevel-gears u^2 and u^3 , adapted to engage the bevel-gears e^2 and f^2 , secured to the ends of the screws E and F. A hand-wheel u^4 is provided for rotating the shaft U. The guard V is secured to the frame A.

In operation the strips of wood are laid on the chain across the machine, and the direction of motion is such that the ends of the strips are cut off by the circular saws and the ends step-mitered by the cutters in the heads as the said strips are carried forward under the cutter-heads. The distance between the cutter-heads can be varied, according to the length desired for the cleats or strips of wood, by rotating the hand-wheel u^4 , and the cutter-heads, together with the shaft C, can be adjusted bodily up and down, according to the thickness of the cleats, by rotating the hand-wheel r^3 .

It will be seen that the two lower portions of the foot l^3 straddle the shaft R and that this foot is adapted to move up and down in a recess in the frame member D. The lugs i and j engage and carry the strips of wood forward, and the guards l^5 and M keep the same down in place on the chains, which latter are supported by the supports N and O, as explained.

It will be seen that the sliding connection between the inner or lateral frame member and the laterally-movable cutter-head not only permits the two cutter-heads to be simultaneously raised and lowered, these cutter-heads being supported independently of the mov-

able frame member, but also permits the simultaneous lateral adjustment of the said cleat-holding and cleat-cutting means—that is to say, the simultaneous lateral movement of one chain and one cutter-head.

It will be seen that the knives or cutters k^2 have their base portions widened, flanged, or otherwise adapted to fit correspondingly-shaped oblique grooves in the periphery of the hub k' . In this way each knife or cutter has practically a dovetail sliding connection with the hub upon which it is movably mounted.

What I claim as my invention is—

1. Machinery for step-mitering the ends of cleats before the same are secured to the edges of wire-bound box-blanks, comprising a rotary cutter-head, a laterally-movable cutter-head, a laterally-movable inner frame member, an endless traveling work-holder provided with means for presenting the cleats to said cutter-heads and passing the same below the latter, said work-holder being laterally adjustable and entirely below the axis of the two cutter-heads, means for moving the cutter-heads up and down, and a sliding connection between the inner or laterally-movable frame member and the laterally-movable cutter-head, permitting the simultaneous raising and lowering of the two cutter-heads, which are supported independently of said movable frame member, without interfering with the simultaneous lateral adjustment of said cleat-holding and cleat-cutting means, all in combination, substantially as shown and described.

2. Machinery for step-mitering the ends of cleats before the same are secured to the edges of wire-bound box-blanks, comprising a pair of rotary cutter-heads provided with step-mitering knives, and having circular saws for cutting off the ends of the cleats, one cutter-head being laterally movable, a traveling work-holder adapted to receive and bodily carry the cleats in the direction necessary for passing the same beneath the said cutter-heads, said work holder being laterally adjustable and entirely below the axis of the two cutter-heads, an inner and laterally-movable frame member, means for moving the cutter-heads up and down, and a sliding connection between the inner or laterally-movable frame member and the laterally-movable cutter-head, permitting the simultaneous raising and lowering of the two cutter-heads, which are supported independently of said movable frame member, without interfering with the simultaneous lateral adjustment of said cleat-holding and cleat-cutting means, all in combination, substantially as shown and described.

3. Machinery for step-mitering the ends of cleats before the same are secured to the edges of wire-bound box-blanks, comprising a pair of rotary cutter-heads, one cutter-head being laterally movable, a shaft carrying said cutter-heads, a pair of endless link belts constituting an endless work-holder for carrying

the cleats in the direction necessary for passing the same beneath the cutter-heads, means for varying the distance between said belts in accordance with the distance between said cutter-heads, the two endless chains or belts being entirely below the axis of the two cutter-heads, an inner and laterally-movable frame member, means for moving the cutter-heads up and down, and a sliding connection between the inner or laterally-movable frame member and the laterally-movable cutter-head, permitting the simultaneous raising and lowering of the two cutter-heads, which are supported independently of said movable frame member, without interfering with the simultaneous lateral adjustment of said cleat-holding and cleat-cutting means, all in combination, substantially as shown and described.

4. Machinery for step-mitering the ends of cleats before the same are secured to the edges of wire-bound box-blanks, comprising a horizontal shaft mounted for up-and-down movement, a pair of rotary cutter-heads mounted on said shaft and adapted for step-mitering the ends of the cleats, means for varying the distance between said cutter-heads according to the length of the cleats, a pair of traveling parallel members adapted to carry the said cleats in the direction necessary for passing the same beneath the cutter-heads, hand-operated means for varying the distance between said traveling members in accordance with the distance between the two cutter-heads, the two traveling members being entirely below the axis of the two cutter-heads, an inner and laterally-movable frame member, and a sliding connection between the inner or laterally-movable frame member and one cutter-head, permitting the simultaneous raising and lowering of the two cutter-heads, which are supported independently of said movable frame member, without interfering with the simultaneous lateral adjustment of said cleat-holding and cleat-cutting means, all in combination, substantially as shown and described.

5. Machinery for step-mitering the ends of cleats before the same are secured to the edges of wire-bound box-blanks, comprising a pair of rotary cutter-heads, means for moving the cutter-heads up and down, an endless and laterally adjustable and traveling work-holder provided with means for presenting the cleats to said cutter-heads and passing the same below the latter, a shaft on which the cutter-heads are mounted, suitable means whereby one of the two cutter-heads is adjustable toward and away from the other on the said shaft on which they are both mounted and rotated in unison, an inner frame member mounted for lateral movement, and a sliding connection between the inner or laterally-movable frame member and the laterally-movable cutter-head, permitting the raising and lowering of the two cutter-heads, which are supported independently of said movable frame member,

without interfering with the simultaneous lateral adjustment of said cleat-holding and cleat-cutting means, all in combination, substantially as shown and described.

6. Machinery for step-mitering the ends of cleats before the same are secured to the edges of wire-bound box-blanks, comprising a pair of rotary cutter-heads provided with step-mitering knives, and provided also with circular saws for cutting off the ends of the cleats, a laterally adjustable and traveling work-holder adapted to receive and bodily carry the cleats in the direction necessary for passing the same beneath the said cutter-heads, means for moving the cutter-heads up and down, a shaft on which the cutter-heads are mounted, suitable means whereby one of the two cutter-heads is adjustable toward and away from the other on the said shaft on which they are both mounted and rotated in unison, an inner and laterally-movable frame member, and a sliding connection between the inner or laterally-movable frame member and the laterally-movable cutter-head, permitting the raising and lowering of the two cutter-heads, which are supported independently of said movable frame member, without interfering with the simultaneous lateral adjustment of said cleat-holding and cleat-cutting means, all in combination, substantially as shown and described.

7. Machinery for step-mitering the ends of cleats before the same are secured to the edges of wire-bound box-blanks, comprising a pair of rotary cutter-heads, a shaft carrying said cutter-heads, means for varying the distance between the two cutter-heads, means for moving the shaft and cutter-heads up and down, a pair of endless link belts constituting an endless work-holder for carrying the cleats in the direction necessary for passing the same beneath the cutter-heads, means for varying the distance between said chains in accordance with the distance between said cutter-heads, an inner and laterally-movable frame member, and a sliding connection between the inner or laterally-movable frame member and one cutter-head, permitting the raising and lowering of the two cutter-heads, which are supported independently of said movable frame member, without interfering with the simultaneous lateral adjustment of said cleat-holding and cleat-cutting means, all in combination, substantially as shown and described.

8. Means for step-mitering the ends of cleats before the same are secured to the edges of wire-bound box-blanks, comprising a rotary shaft mounted for up-and-down adjustment, a pair of cutter-heads mounted on said shaft and adapted for step-mitering the ends of the cleats, a pair of traveling parallel members adapted to carry the said cleats in the direction necessary for passing the same beneath the cutter-heads, means for varying the distance between said traveling members in accordance with the distance between the two

cutter-heads, suitable means whereby one of the two cutter-heads is movable toward and away from the other on the said shaft on which they are both mounted and rotated in unison, means for moving the cutter-heads up and down, an inner and laterally-movable frame member, and a sliding connection between the inner or laterally-movable frame member and the laterally-movable cutter-head, permitting the raising and lowering of the two cutter-heads, which are supported independently of said movable frame member, without interfering with the simultaneous lateral adjustment of both the cleat-holding and cleat-cutting means, all in combination, substantially as shown and described.

9. Machinery for step-mitering the ends of cleats before the same are secured to the edges of wire-bound box-blanks, comprising a pair of vertically-movable rotary cutter-heads, a shaft carrying the cutter-heads, an endless traveling work-holder provided with means for presenting the cleats to said cutter-heads and passing the same below the latter, one cutter-head being laterally movable, suitable means whereby the two cutter-heads and the said shaft on which they are mounted are simultaneously adjustable up and down, an inner and laterally-movable frame member, and a sliding connection between the inner or laterally-movable frame member and the laterally-movable cutter-head, permitting the raising and lowering of the two cutter-heads, which are supported independently of said movable frame member, without interfering with the simultaneous lateral adjustment of both the cleat-holding and cleat-cutting means, all in combination, substantially as shown and described.

10. Machinery for step-mitering the ends of cleats before the same are secured to the edges of wire-bound box-blanks, comprising a pair of rotary cutter-heads provided with step-mitering knives, and provided also with circular saws for cutting off the ends of the cleats, one cutter-head being movable side-wise, a shaft carrying the cutter-heads, a traveling work-holder adapted to receive and bodily carry the cleats in the direction necessary for passing the same beneath the said cutter-heads, suitable means whereby the two cutter-heads and the said shaft on which they are mounted are simultaneously adjustable up and down, an inner and laterally-movable frame member, and a sliding connection between the inner or laterally-movable frame member and the laterally-movable cutter-head, permitting the raising and lowering of the two cutter-heads, which are supported independently of said movable frame member, without interfering with the simultaneous lateral adjustment of both the cleat-holding and cleat-cutting means, all in combination, substantially as shown and described.

11. Machinery for step-mitering the ends of

cleats before the same are secured to the edges of wire-bound box-blanks, comprising a pair of rotary cutter-heads, a shaft carrying said cutter-heads, a pair of endless link belts constituting an endless work-holder for carrying the cleats in the direction necessary for passing the same beneath the cutter-heads, means for moving one cutter-head toward and away from the other, for varying the distance between said link belts in accordance with the distance between said cutter-heads, an inner and laterally-movable frame member, suitable means whereby the two cutter-heads and the said shaft on which they are mounted are simultaneously adjustable up and down, and a sliding connection between the inner or laterally-movable frame member and the laterally-movable cutter-head, permitting the raising and lowering of the two cutter-heads, which are supported independently of said movable frame member, without interfering with the simultaneous lateral adjustment of both the cleat-holding and cleat-cutting means, all in combination, substantially as shown and described.

12. Machinery for step-mitering the ends of cleats before the same are secured to the edges of wire-bound box-blanks, comprising a rotary shaft mounted for up-and-down adjustment, a pair of rotary cutter-heads mounted on said shaft and adapted for step-mitering the ends of the desired cleats, means for varying the distance between said cutter-heads according to the length of the said cleats, a pair of traveling parallel members adapted to carry the said cleats in the direction necessary for passing the same beneath the cutter-heads, an inner and laterally-movable frame member, hand-operated means for varying the distance between said traveling members in accordance with the distance between the two cutter-heads, means whereby the two cutter-heads and the said shaft on which they are mounted are simultaneously adjustable up and down, and a sliding connection between the inner or laterally-movable frame member and the laterally-movable cutter-head, permitting the raising and lowering of the two cutter-heads, which are supported independently of said movable frame member, without interfering with the simultaneous lateral adjustment of both the cleat-holding and cleat-cutting means, all in combination, substantially as shown and described.

13. Machinery for step-mitering the ends of cleats before the same are secured to the edges of wire-bound box-blanks, comprising a pair of rotary cutter-heads, one cutter-head being laterally movable, an endless traveling work-holder provided with means for presenting the cleats to said cutter-heads and passing the same below the latter, an inner and laterally-movable frame member, a pair of transversely-arranged adjusting-screws, suitable means whereby one of the two cutter-heads is adjust-

able toward and away from the other by a simultaneous rotation of the two transversely-arranged adjusting-screws, and a sliding connection between the inner or laterally-movable frame member and the laterally-movable cutter-head, permitting the raising and lowering of the two cutter-heads, which are supported independently of said movable frame member, without interfering with the simultaneous lateral adjustment of said cleat-holding and cleat-cutting means, all in combination, substantially as shown and described.

14. Machinery for step-mitering the ends of cleats before the same are secured to the edges of wire-bound box-blanks, comprising a pair of rotary cutter-heads provided with step-mitering knives, and provided also with circular saws for cutting off the ends of the cleats, one cutter-head being laterally movable, a traveling work-holder adapted to receive and bodily carry the cleats in the direction necessary for passing the same beneath the said cutter-heads, an inner and laterally-movable frame member, a pair of transversely-arranged adjusting-screws, suitable means whereby one of the two cutter-heads is adjustable toward and away from the other by a simultaneous rotation of the two transversely-arranged adjusting-screws, and a sliding connection between the inner or laterally-movable frame member and the laterally-movable cutter-head, permitting the raising and lowering of the two cutter-heads, which are supported independently of said movable frame member, without interfering with the simultaneous lateral adjustment of both the cleat-holding and cleat-cutting means, all in combination, substantially as shown and described.

15. Machinery for step-mitering the ends of cleats before the same are secured to the edges of wire-bound box-blanks, comprising a pair of rotary cutter-heads, a shaft carrying said cutter-heads, a pair of endless link belts constituting an endless work-holder for carrying the cleats in the direction necessary for passing the same beneath the cutter-heads, means for varying the distance between said chains in accordance with the distance between said cutter-heads, an inner and laterally-movable frame member, a pair of transversely-arranged adjusting-screws, suitable means whereby one of the cutter-heads is adjustable toward and away from the other by a simultaneous rotation of the two transversely-arranged adjusting-screws, and a sliding connection between the inner or laterally-movable frame member and the laterally-movable cutter-head, permitting the raising and lowering of the two cutter-heads, which are supported independently of said movable frame member, without interfering with the simultaneous lateral adjustment of both the cleat-holding and cleat-cutting means, all in combination, substantially as shown and described.

16. Machinery for step-mitering the ends of

cleats before the same are secured to the edges of wire-bound box-blanks, comprising a rotary shaft mounted for up-and-down adjustment, a pair of rotary cutter-heads mounted on said shaft and adapted for step-mitering the ends of the cleats, a pair of traveling parallel members adapted to carry the cleats in the direction necessary for passing the same beneath the cutter-heads, hand-operated means for varying the distance between said traveling members in accordance with the distance between the two cutter-heads, an inner and laterally-movable frame member, a pair of transversely-arranged adjusting-screws, suitable means whereby one of the two cutter-heads is adjustable toward and away from the other by a simultaneous rotation of the two transversely-arranged adjusting-screws, and a sliding connection between the inner or laterally-movable frame member and the laterally-movable cutter-head, permitting the raising and lowering of the two cutter-heads, which are supported independently of said movable frame member, without interfering with the simultaneous lateral adjustment of said cleat-holding and cleat-cutting means, all in combination, substantially as shown and described.

17. Machinery for step-mitering the ends of cleats before the same are secured to the edges of wire-bound box-blanks, comprising a pair of rotary cutter-heads, one cutter-head being laterally movable, an endless traveling work-holder provided with means for presenting the cleats to said cutter-heads, and passing the same below the latter, transversely-arranged adjusting-screws, an inner and laterally-movable frame member supported on the transversely-arranged and simultaneously-rotatable adjusting-screws, and a sliding connection provided between the inner and laterally-movable frame member and the laterally-movable cutter-head, permitting the raising and lowering of the two cutter-heads, which are supported independently of said movable frame member, without interfering with the simultaneous lateral adjustment of both the cleat-holding and cleat-cutting means, all in combination, substantially as shown and described.

18. Machinery for step-mitering the ends of cleats before the same are secured to the edges of wire-bound box-blanks, comprising a pair of rotary cutter-heads provided with step-mitering knives, and provided also with circular saws for cutting off the ends of the articles to be step-mitered, one cutter-head being laterally movable, a traveling work-holder adapted to receive and bodily carry the cleats in the direction necessary for passing the same beneath the said cutter-heads, transversely-arranged adjusting-screws, an inner and laterally-movable frame member supported on the transversely-arranged and simultaneously-rotatable adjusting-screws, and a sliding connection between the inner or laterally-mov-

able frame member and the laterally-movable cutter-head, permitting the raising and lowering of the two cutter-heads, which are supported independently of said movable frame member, without interfering with the simultaneous lateral adjustment of both the cleat-holding and cleat-cutting means, all in combination, substantially as shown and described.

19. Machinery for step-mitering the ends of cleats before the same are secured to the edges of wire-bound box-blanks, comprising a pair of rotary cutter-heads, a shaft carrying said cutter-heads, one cutter-head being laterally movable, a pair of endless link belts constituting an endless work-holder for carrying the cleats in the direction necessary for passing the same beneath the cutter-heads, means for varying the distance between said chains in accordance with the distance between said cutter-heads, transversely-arranged adjusting-screws, an inner and laterally-movable frame member supported on the transversely-arranged and simultaneously-rotatable adjusting-screws, and a sliding connection between the inner or laterally-movable frame member and the laterally-movable cutter-head, permitting the raising and lowering of the two cutter-heads, which are supported independently of said movable frame member, without interfering with the simultaneous lateral adjustment of both the cleat-holding and cleat-cutting means, all in combination, substantially as shown and described.

20. Machinery for step-mitering the ends of cleats before the same are secured to the edges of wire-bound box-blanks, comprising a rotary shaft mounted for up-and-down adjustment, a pair of rotary cutter-heads mounted on said shaft and adapted for step-mitering the ends of the cleats, the distance between said cutter-heads being according to the length of the cleats, a pair of traveling parallel members adapted to carry the said cleats in the direction necessary for passing the same beneath the cutter-heads, hand-operated means for varying the distance between said traveling members in accordance with the distance between the two cutter-heads, transversely-arranged adjusting-screws, an inner and laterally-movable frame member supported on the two transversely-arranged and simultaneously-rotatable adjusting-screws, and a sliding connection between the inner or laterally-movable frame member and one cutter-head, permitting the raising and lowering of the two cutter-heads, which are supported independently of said movable frame member, without interfering with the simultaneous lateral adjustment of both the cleat-holding and cleat-cutting means, all in combination, substantially as shown and described.

21. Machinery for step-mitering the ends of cleats before the same are secured to the edges of wire-bound box-blanks, comprising a shaft, a pair of rotary cutter-heads, one cutter-head

being splined on the shaft, an endless traveling work-holder provided with means for presenting the cleats to said cutter-heads, and passing the same below the latter, an inner and laterally-movable frame member supporting one side of the work-holder, means whereby the cutter-head which is splined on the shaft is supported in a bearing having a sliding connection with the laterally-movable frame member, the sliding connection provided between the inner or laterally-movable frame member and the laterally-movable cutter-head permitting the raising and lowering of the two cutter-heads, which are supported independently of said movable frame member, without interfering with the simultaneous lateral adjustment of both the cleat-holding and cleat-cutting means, all in combination, substantially as shown and described.

22. Machinery for step-mitering the ends of cleats before the same are secured to the edges of wire-bound box-blanks, comprising a pair of rotary cutter-heads provided with step-mitering knives, and provided also with circular saws for cutting off the ends of the article to be step-mitered, a shaft, one cutter-head being splined on the shaft, a traveling work-holder adapted to receive and bodily carry the cleats in the direction necessary for passing the same beneath the said cutter-heads, an inner and laterally-movable frame member carrying one side of the work-holder, means whereby the cutter-head which is splined on the shaft is supported in a bearing having a sliding connection with the laterally-movable frame member, the sliding connection provided between the inner or laterally-movable frame member and the laterally-movable cutter-head permitting the raising and lowering of the two cutter-heads, which are supported independently of said movable frame member, without interfering with the simultaneous lateral adjustment of both the cleat-holding and cleat-cutting means, all in combination, substantially as shown and described.

23. Machinery for step-mitering the ends of cleats before the same are secured to the edges of wire-bound box-blanks, comprising a pair of rotary cutter-heads, a shaft carrying said cutter-heads, one cutter-head being splined on the shaft, a pair of endless link belts constituting an endless work-holder for carrying the cleats in the direction necessary for passing the same beneath the cutter-heads, an inner and laterally-movable frame member carrying one of said link belts, means whereby the cutter-head which is splined on the shaft is supported in a bearing having a sliding connection with the laterally-movable frame member, the sliding connection provided between the inner or laterally-movable frame member and the laterally-movable cutter-head permitting the raising and lowering of the two cutter-heads, which are supported inde-

pendently of said movable frame member, without interfering with the simultaneous lateral adjustment of both the cleat-holding and cleat-cutting means, all in combination, substantially as shown and described.

24. Machinery for step-mitering the ends of cleats before the same are secured to the edges of wire-bound box-blanks, comprising a rotary shaft mounted for up-and-down adjustment, a pair of rotary cutter-heads mounted on said shaft and adapted for step-mitering the ends of the cleats, one cutter-head being splined on the shaft, a pair of traveling parallel members adapted to carry the said cleats in the direction necessary for passing the same beneath the cutter-heads, hand-operated means including an inner and laterally-movable frame member for varying the distance between said traveling members in accordance with the distance between the two cutter-heads, the frame member carrying one of said parallel members, suitable means whereby the cutter-head which is splined on the vertically-adjustable shaft is supported in a bearing having a sliding connection with the laterally-movable frame member, the sliding connection provided between the inner or laterally-movable frame member and the laterally-movable cutter-head permitting the raising and lowering of the two cutter-heads, which are supported independently of said movable frame member, without interfering with the simultaneous lateral adjustment of both the cleat-holding and cleat-cutting means, all in combination, substantially as shown and described.

25. Machinery for step-mitering the ends of cleats before the same are secured to the edges of wire-bound box-blanks, comprising a pair of rotary cutter-heads, an endless traveling work-holder provided with means for presenting the cleats to said cutter-heads, and passing the same below the latter, means whereby a portion of said work-holder and one of the cutter-heads are splined upon separate shafts and simultaneously adjustable thereon, an inner and laterally-movable frame member, and a sliding connection between the inner or laterally-movable frame member and the laterally-movable cutter-head, permitting the raising and lowering of the two cutter-heads, which are supported independently of said movable frame member, without interfering with the simultaneous lateral adjustment of both the cleat-holding and cleat-cutting means, all in combination, substantially as shown and described.

26. Machinery for step-mitering the ends of cleats before the same are secured to the edges of wire-bound box-blanks, comprising a pair of rotary cutter-heads provided with step-mitering knives, and provided also with circular saws for cutting off the ends of the cleats, a traveling work-holder adapted to receive and bodily carry the cleats in the direction

necessary for passing the same beneath the said cutter-heads, means whereby a portion of the work-holder and one of the cutter-heads are splined upon separate shafts and simultaneously adjustable thereon, an inner and laterally-movable frame member, and a sliding connection between the inner or laterally-movable frame member and the laterally-movable cutter-head, permitting the raising and lowering of the two cutter-heads, which are supported independently of said movable frame member, without interfering with the simultaneous lateral adjustment of both the cleat-holding and cleat-cutting means, all in combination, substantially as shown and described.

27. Machinery for step-mitering the ends of cleats before the same are secured to the edges of wire-bound box-blanks, comprising a pair of rotary cutter-heads, a shaft carrying said cutter-heads, a pair of endless link belts constituting an endless work-holder for carrying the cleats in the direction necessary for passing the same beneath the cutter-heads, means including a laterally-movable and inner frame member for varying the distance between said chains in accordance with the distance between said cutter-heads, means whereby one of the endless sprocket-chains and one of the cutter-heads are splined upon separate shafts and simultaneously adjustable thereon, and a sliding connection between the inner or laterally-movable frame member and the laterally-movable cutter-head, permitting the raising and lowering of the two cutter-heads, which are supported independently of said movable frame member, without interfering with the simultaneous lateral adjustment of both the cleat-holding and cleat-cutting means, all in combination, substantially as shown and described.

28. Machinery for step-mitering the ends of cleats before the same are secured to the edges of wire-bound box-blanks, comprising a rotary shaft mounted for up-and-down adjustment, a pair of rotary cutter-heads mounted on said shaft and adapted for step-mitering the ends of the cleats, a pair of traveling parallel members adapted to carry the said cleats in the direction necessary for passing the same beneath the cutter-heads, hand-operated means including an inner and laterally-movable frame member for varying the distance between said traveling members in accordance with the distance between the two cutter-heads, means whereby one of the parallel members and one of the cutter-heads are splined upon separate shafts and simultaneously adjustable thereon, and a sliding connection between the inner or laterally-movable frame member and the laterally-movable cutter-head, permitting the raising and lowering of the two cutter-heads, which are supported independently of said movable frame member, without interfering with the simultaneous lateral adjustment of

both the cleat-holding and cleat-cutting means, all in combination, substantially as shown and described.

29. Machinery for step-mitering the ends of
5 cleats before the same are secured to the edges
of wire-bound box-blanks, comprising a pair
of cutter-heads, a pair of parallel link belts
supporting the cleats in position to be acted
on by the cutter-heads, a frame, an inner and
10 laterally-movable frame member supporting
one of said link belts, a sliding connection
between said frame member and one of said

cutter-heads, permitting the two cutter-heads
to be raised and lowered without interfering
with the simultaneous lateral adjustment of 15
the cleat-holding and cleat-cutting means,
substantially as set forth.

Signed by me at Chicago, Illinois, this 23d
day of March, 1905.

JOHN B. WEIR.

Witnesses:

SARAH LEWIS,
CLARENCE M. THORNE.