No. 858,671. PATENTED JULY 2, 1907.

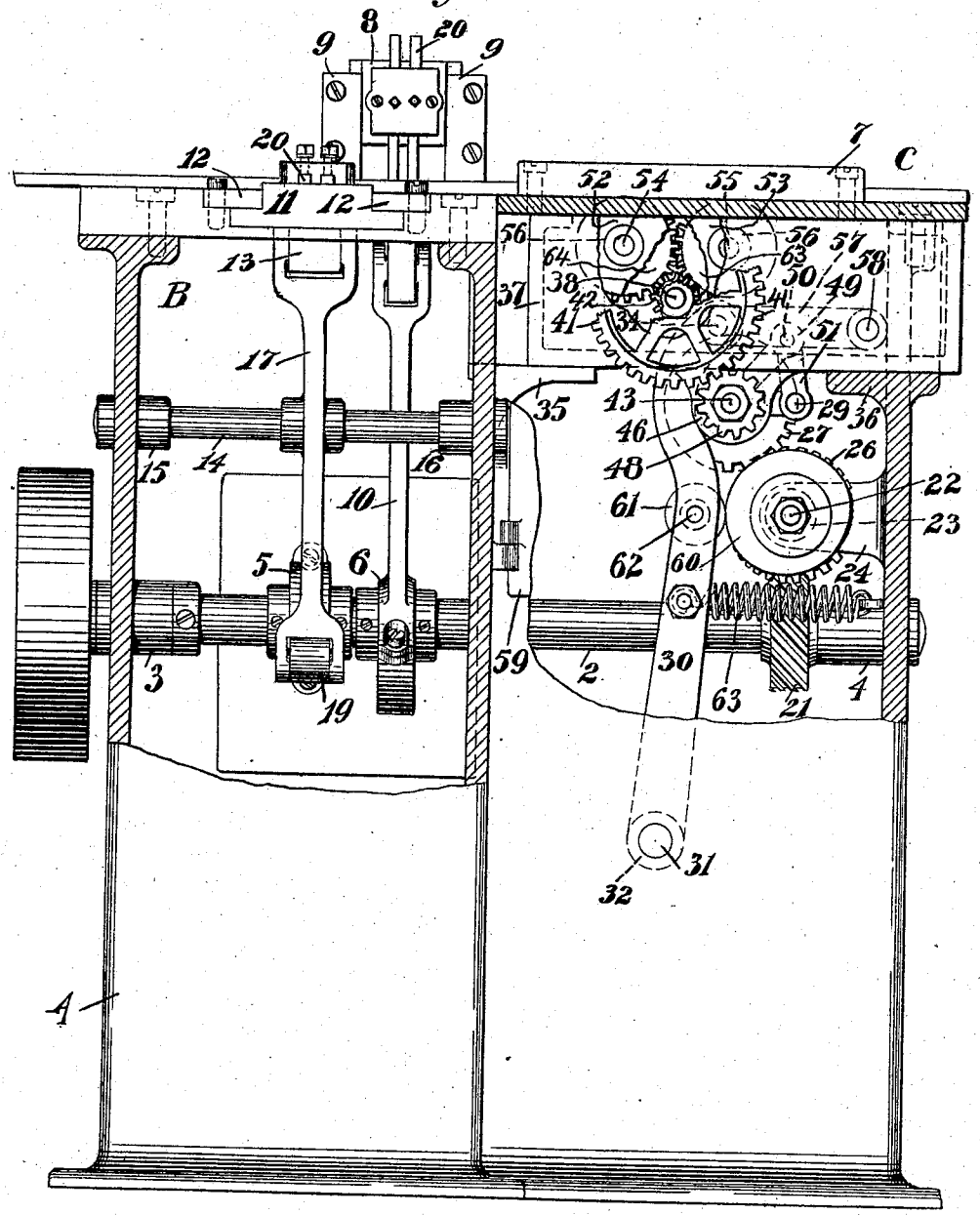
F. H. RICHARDS.

AUTOMATICALLY FED MACHINE.

APPLICATION FILED OCT. 1, 1902.

5 SHEETS—SHEET 1.

Fig. 1.



Witnesses

J. C. Davidson

Fred. E. Maynard.

Inventor:

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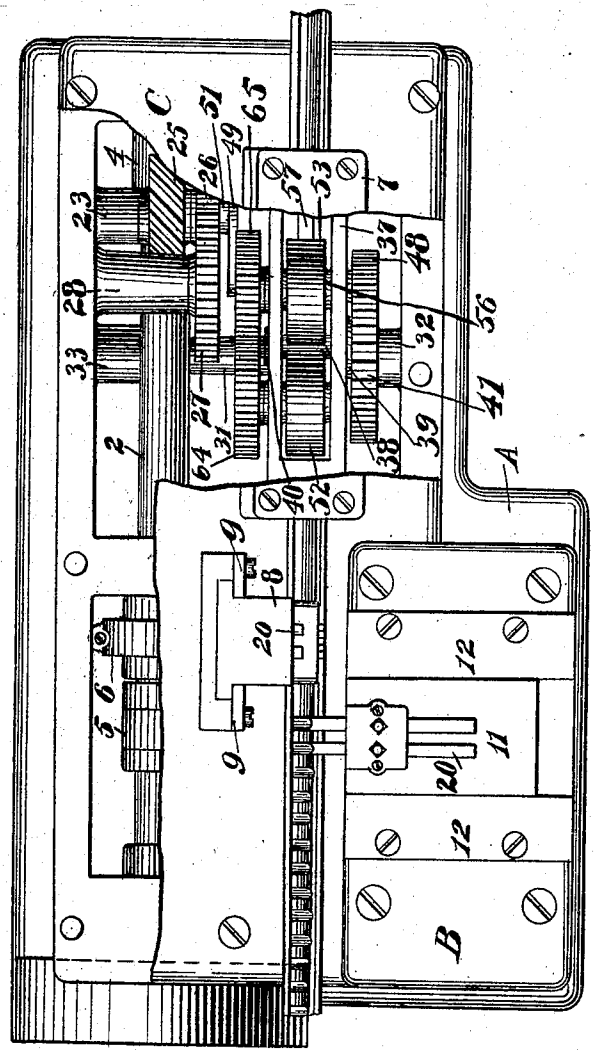
5 SHEETS—SHEET 2.

Fig. 2.



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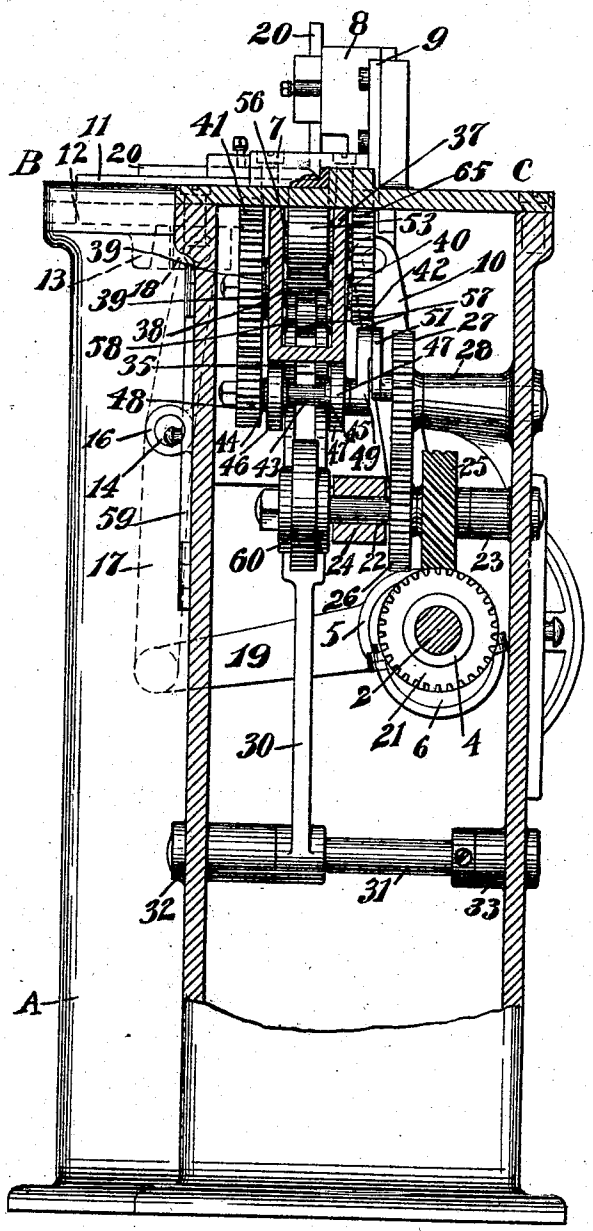
5 SHEETS—SHEET 3.

Fig. 3.



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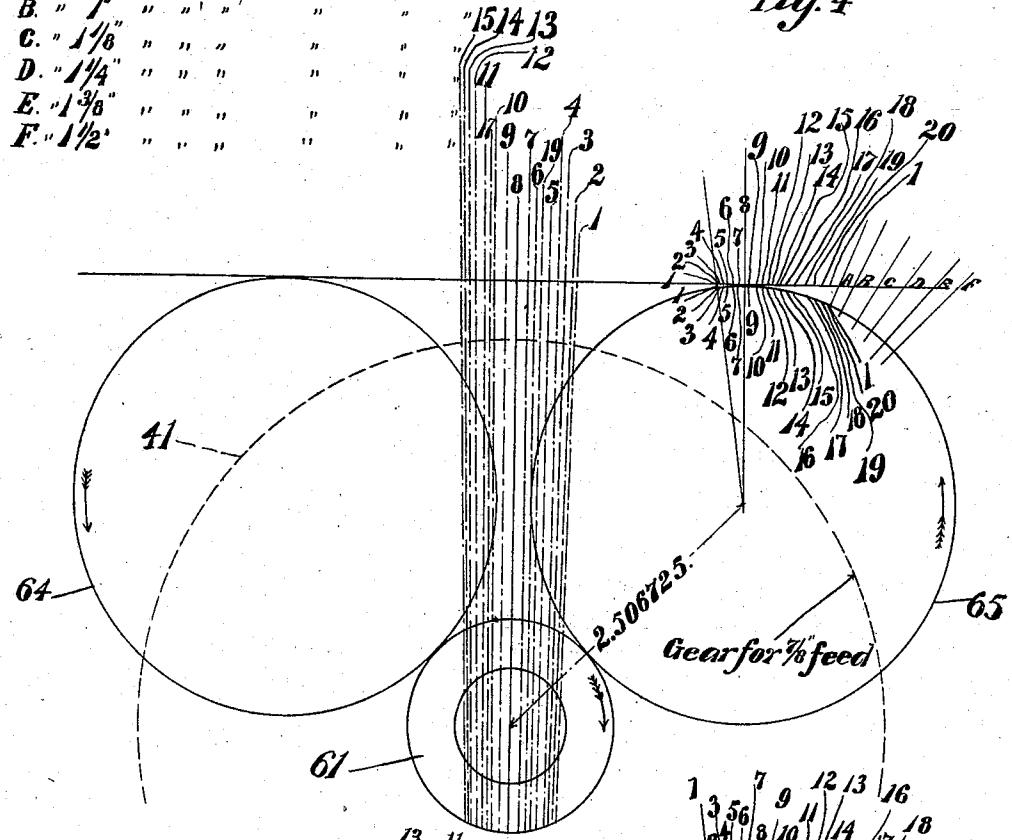
5 SHEETS—SHEET 4.

Proportion Of Feed Roll Used.

A.—For 7/8" Feed To One Revolution Of Driver.
B. " 1" " " " " " "
C. " 1 1/8" " " " " " "
D. " 1 1/4" " " " " " "
E. " 1 3/8" " " " " " "
F. " 1 1/2" " " " " " "

Fig. 4



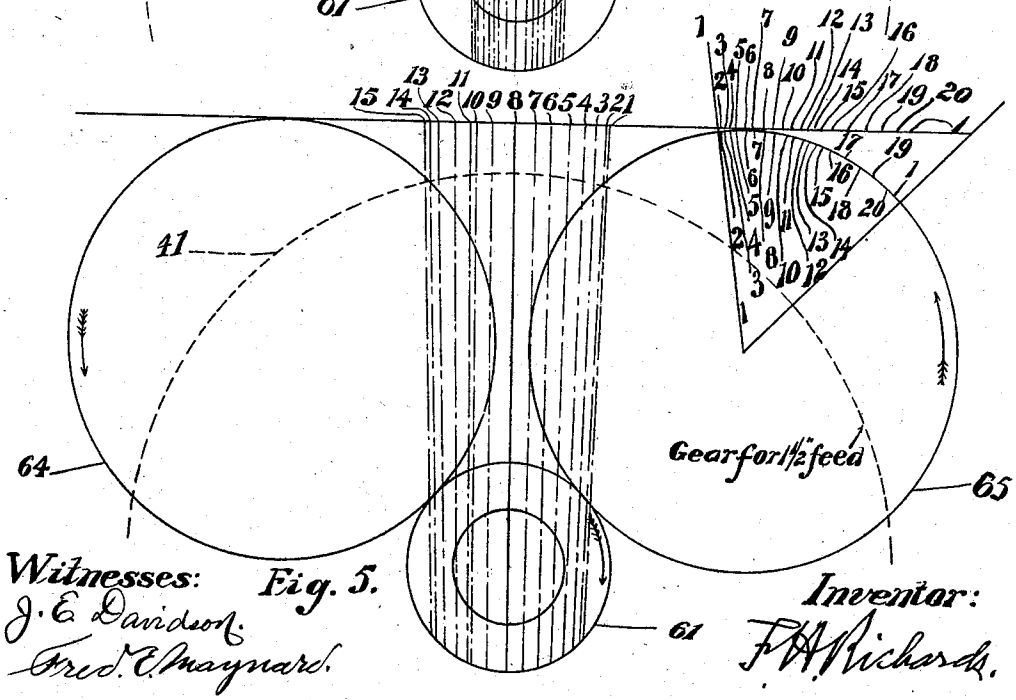


Fig. 5.

Witnesses:
J. E. Davidson.
Fred. C. Maynard.

Inventor:
F. H. Richards.

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5 SHEETS—SHEET 5.

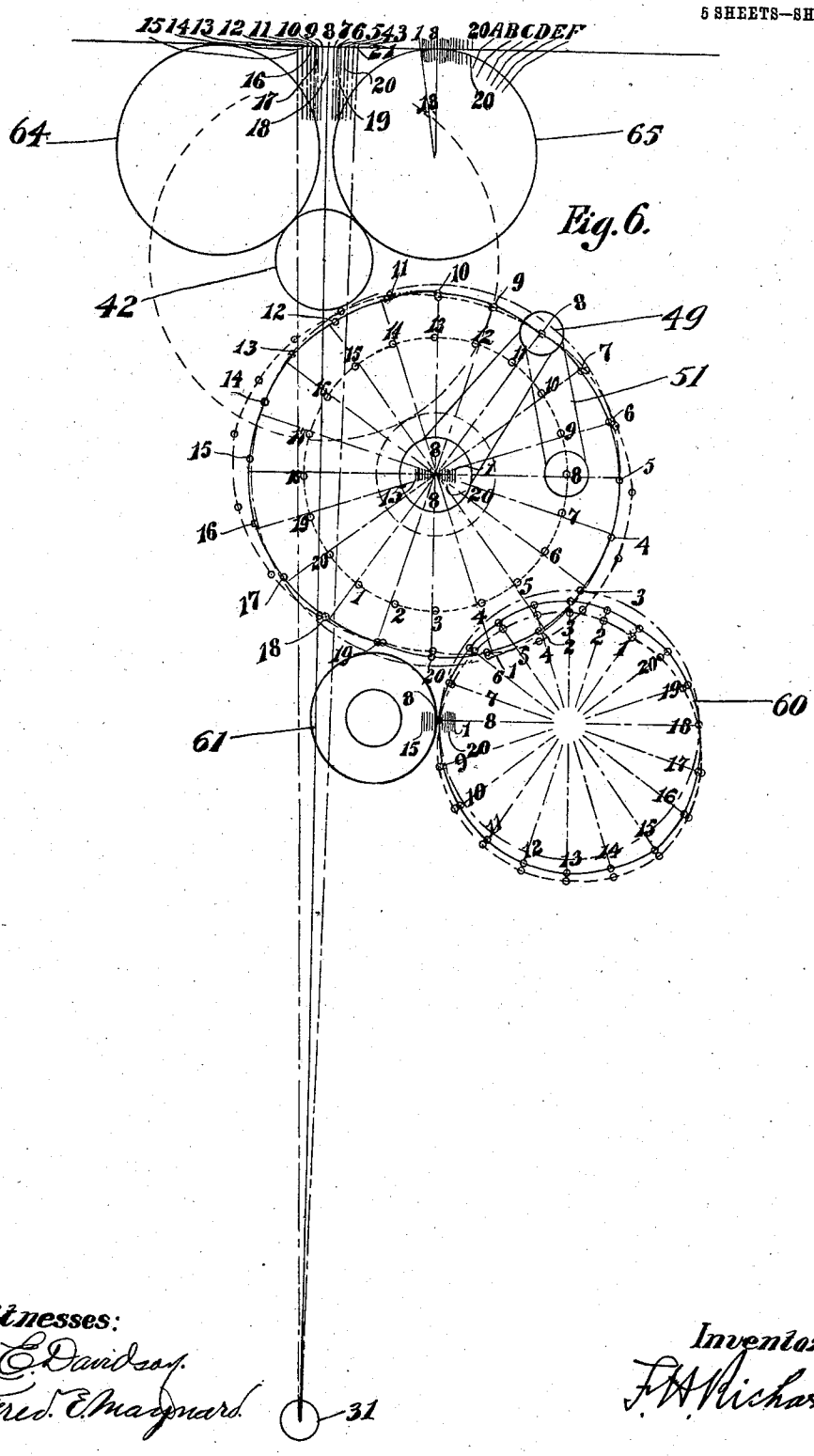

Fig. 6.

Witnesses:
J. C. Davidson.
Fred. E. Maynard.

Inventor:
F. H. Richards.

UNITED STATES PATENT OFFICE.

FRANCIS H. RICHARDS, OF HARTFORD, CONNECTICUT.

AUTOMATICALLY-FED MACHINE.

No. 858,671. Specification of Letters Patent. Patented July 2, 1907.

Application filed October 1, 1902. Serial No. 125,524.

To all whom it may concern:

Be it known that I, FRANCIS H. RICHARDS, a citizen of the United States, residing at Hartford, in the county of Hartford and State of Connecticut, have invented certain new and useful Improvements in Automatically-Fed Machines, of which the following is a specification.

My present invention pertains to stock-feeding apparatus designed to co-operate with automatic machinery, and more particularly relates to an intermittent feed and its connection and co-operation with an automatic machine having intermittently operating instrumentalities.

This invention consists in an intermittent feed in which a feed roll is constantly rotated in a forward direction through the medium of a driving connection the parts of which are relatively shiftable, and is carried by mechanism operatively connected with the driving mechanism of said roll forward and backward to alternately augment and detract from the feeding action of said roll and effect an intermittent feed of stock engaged by said roll and also consists in the organization and co-operative disposition and arrangements of the parts and in the peculiarly effective structure of the parts, together with means for regulating and adjusting said parts to attain perfect action and to obtain any desired movement of feed.

The invention also consists in a novel organization of the feeding mechanism with that of an automatic machine to produce positive co-action between the feed and the operating instrumentalities.

Some of the objects of this invention are to provide a practical operatively, continuously and positively connected intermittent feed mechanism capable of positive co-operation with an intermittently operating automatic machine, and to provide improved mechanism comprising such a device in which the several correlated parts are more effectually organized.

I have illustrated in the accompanying drawings one form of feed mechanism embodying my invention, in combination with a carving machine in which reciprocating cutters co-operate during a portion of each cycle of the machine to form ornamental character upon molded stock or the like, but I desire to point out that my device may also be embodied in and combined with other intermittently operative machines intended for the same or other purposes.

In the drawings like reference characters designate like parts throughout the several views.

Figure 1 is a left side view of a carving machine and feed mechanisms embodying my invention with portions of the walls of the frame broken away showing the inclosed mechanisms; Fig. 2, a plan view with portions of the top of the frame broken away showing inclosed mechanisms; Fig. 3, a vertical section looking from the front of the machine; Fig. 4, a diagrammatic representation of the movement of the feed rolls in which twenty successive positions taken by the feed rolls at twenty successive moments separated by equal intervals in the revolution of the driver are indicated by numerals 1 to 20; Fig. 5, a view similar to Fig. 4 disclosing the positions of the feed rolls after a change of gears to effect a feed of greater extent, and Fig. 6, a diagrammatic representation of the movements of all the parts of the feed mechanism in which the successive positions are indicated in a similar manner to that in Figs. 4 and 5.

Referring to the drawings, the entire mechanism is mounted in and on the box-like frame A, the intermittently operating machine being mounted in and on a main part B of the frame A, and the feed mechanism is in an ell C of the frame A. A horizontal driving shaft 2 is mounted longitudinally of the frame A in bearings 3 and 4 in the end walls of the frame A. Two eccentrics 5 and 6 are mounted fast upon the driving shaft 2 within the main part B of the frame A.

A stock guide 7 is formed in and longitudinally of the top of the frame A extending over both the main part B and the ell C. A tool-carriage 8 is mounted to reciprocate in vertical guide-ways 9, 9, upstanding from the top of the frame A adjacent to the stock guide 7, and said tool-carriage 8 extends downwardly through an aperture in the top of the frame A to within the main part B, said aperture being alined with the guide-ways 9, 9. That portion of the tool-carriage extending downwardly within the main part B of the frame A is connected by means of an eccentric rod 10 with the eccentric 6 upon the driving shaft 2.

A tool-carriage 11 is mounted in horizontal guideways 12, 12 in the top of the main part B of the frame A, and is provided with depending vertical guideways 13 which extend downwardly through an aperture in said top and to within the main part B of the frame A. A horizontal shaft 14 is mounted longitudinally of the machine and parallelly with the driving shaft 2, in bearings 15 and 16 in the walls of the main part B of the frame A. The shaft 14 is mounted below what would be approximately the center of the path of travel of the tool-carriage 11. A rocking lever 17 is mounted fast upon the shaft 14 in substantially a vertical position and is bifurcated at its upper end to accommodate a slide block 18 which is pivoted within the bifurcated portion of the arm 17. The slide block 18 is mounted within the guideways 13 depending from the tool-carriage 11 and is adapted to slide vertically therein. The lower end of the lever 17 is also bifurcated and an eccentric rod 19 pivoted in said bifurcated portion connects the lower end of the lever 17 with the eccentric 5 upon the driving shaft 2. The eccentric 6 operating directly upon the tool-carriage 8 reciprocates the same in a vertical path. The eccentric 5 through the eccentric rod 19 rocks the lever 17, which rocking movement is communicated through the yoke connection made by the slide block 18 in the guideway 13 to the tool-carriage 11

reciprocating said tool-carriage horizontally and transversely of the machine. The eccentrics 5 and 6 are set in such a position and the connecting mechanism is so organized that the reciprocations of the two tool-carriages 8 and 11 are simultaneous and tools 20 mounted upon said tool-carriages in a suitable manner operate to incise stock lying in the stock guide 7 simultaneously. The tools 20—20 and 21—21 are arranged staggering one set relative to the other set and therefore their cutting edges do not meet. The tools 20 simultaneously incise complementary incisions of separate repeats of the design upon the stock and that part of the cycle of the machine during which the said tools 20 are within the profile of the stock either when making the incisions or being withdrawn occupies a fraction of the time employed in completing said cycle.

To complete the effective operation of such a machine as I have described it is necessary that the stock be fed intermittently to the tools during that period in the cycle of the machine when the tools are entirely without the profile of the stock, and it is also necessary that the amount of feed be substantially uniform and exact. To effect this feed and to time it so as to co-operate with the operation of the tools it is necessary that a positive co-operation should exist between the driving mechanism of the carving machine proper and that of the feeding mechanism.

Upon the driving shaft 2 within the ell of the frame A is mounted fast a spiral gear 21. A horizontal shaft 22 is mounted at right angles to and above the driving shaft in a bearing 23 in the side wall of the ell of the frame and a bearing 24 projecting from the end wall of the ell C of the frame A. A spiral gear 25 is mounted fast upon the shaft 22 and meshes with the spiral gear 21 upon the driving shaft 2 transmitting the rotation of the driving shaft 2 to the shaft 22 at the ratio of 1 to 1. A spur gear 26 is also mounted fast on shaft 22 and meshes with a spur gear 27 mounted loosely on a stud 28 projecting from the side wall of the ell C of the frame A. The spur gear 27 acting as a crank carries a wrist pin 29.

A comparatively long rocking frame 30 is pivoted at its lower end by means of horizontal shaft 31 mounted transversely of the ell C of the frame A in bearings 32 and 33 in the side walls of the ell C of the frame A, and is adapted to oscillate in a plane parallel to the stock guide 7. At the upper end of the rocking frame 30 a horizontal pin 34 is mounted transversely of the stock guide 7.

In the upper part of the ell C of the frame A projecting from the end walls of said ell C are formed slideways 35 and 36 in which a carriage 37 is mounted to slide parallelly of the stock guide 7 and directly beneath said stock guide 7. Upon the carriage 37 a horizontal shaft 38 is mounted transversely of the stock guide 7 in bearings 39 and 40 in the sides of said carriage 37. A change spur gear 41 is secured upon a forwardly projecting portion of the shaft 38, and a spur gear 42 is mounted fast upon the rearwardly projecting portion of the shaft 38. A horizontal shaft 43 is mounted parallel to the shaft 38 in bearings 44 and 45 in depending ears 46 and 47 upon the carriage 37. A change spur gear 48 is secured to a forwardly projecting portion of the shaft 43 and meshes with and to drive the change spur gear 41. A crank 49 is mounted fast on a rearwardly projecting portion of the shaft 43 and carries a wrist pin 50. A link 51 connects the wrist pin 29 on the spur gear 27 with the wrist pin 50 on the crank 49. Two feed rolls 52 and 53 are respectively mounted fast on spindles 54 and 55, said spindles being journaled in bearings 56 in the walls of the carriage 37 and both of which spindles are parallel with the shaft 38, and transverse of the stock guide 7 &c. The peripheries of the feed rolls 52 and 53 extend upwardly through apertures in the stock guide 7 and slightly above the floor of said stock guide. The spindles 54 and 55 respectively carry gears 64 and 65 which mesh with and are driven by the gear 42. The carriage 37 is connected with the rocking frame 30 by a connecting rod 57 which is pivoted to the carriage 37 upon the horizontal pivot 58 and to the rocking frame 30 upon the pin 34. An aperture in the left side wall of the ell C of the frame A closed by a door 59 is provided to give access to the feed mechanism, and that part of the feed mechanism toward the operator and said aperture is considered the front of said feed mechanism in this description.

The driving connection consisting of the crank 49, the spur gear 27 acting as a crank, and the link 51 connecting them, permits of the oscillation of the rocking frame 30 and the consequent reciprocating movement of the carriage 37 within certain limits without materially interfering with the operativeness of said connection, but when such movement is imparted to the carriage 37 a variable velocity will be imparted to the feed rolls carried by said carriage 37. In the first instance it may be considered that I set the carriage 37 in such a position that the shafts 43 thereon and the stud 28 upon the frame A will be disalined which therefore will cause the rotation of the feed roll 53 by the driving shaft 2 at varying velocities. It is now possible to rock the rocking frame 30 and thereby move the carriage 37 backward of the machine at velocities which will produce a change in the velocities imparted to the feed roll of such a nature that said feed rolls would be rolled back upon the stock lying at rest and in contact with their peripheries without causing the movement of said stock with relation to the machine as an entirety. This I accomplish by mounting a change cam 60 removably upon a forwardly projecting portion of the shaft 22 and so conforming a portion of its periphery that an idle roll 61 mounted upon the shaft 62 journaled on the rocking frame 30 when made to roll upon said shaft will impart the required motion to the rocking frame 30 to effect the desired movement of the carriage 37. When the rocking frame 30 is rocked forwardly of the machine the carriage 37 will be moved forwardly and the rotation of the feed rolls 52 and 53 from the driving shaft 2 will continue and augmented by the forward movement of the carriage 37 effect a quick feed of the stock. The cam 60 is conformed to also effect this forward movement of the rocking frame 30, and it is well to state here that I time the reciprocation of the carriage 37 with the variable movement attained through the crank and link connection in such a manner that the cam 60 will approximate a circular form, which is of course desirable. The mechanism of the feed is timed to cause the rolling back of the feed roll and the consequent stoppage of

the stock during that portion of the cycle of the machine in which the tools are entirely without the profile of the stock. The higher points upon the cam 60 force the rocking frame 30 forward and I have found that the peculiar connections used and the tendency of the feed rolls in contact with the stock is to return the carriage 37 and the rocking frame 30 without further aiding means, but I have employed a spring 63 to insure a contact of the idle roll 61 with the cam 60. The rocking of the rocking frame 30 effects an arcal movement of the pin 34 which is compensated for in the connecting rod 57 and such variation of movement as is present from this organization is made up for in the conformation of the cam 60. By substituting for the change gears 41 and 48 and the cam 60 other change gears of different ratio and their corresponding cam, different lengths of feed may be attained, and I intend to provide a set of change gears with their corresponding cam for each feed desired.

The organizing of the parts and construction in such manner as to bring the change gears and change cam within easy access is most desirable. Presser means for insuring a grip upon the stock by the feed rolls 52 and 53 may be of any suitable form, but that which I have illustrated is a bridge over the stock internally conforming to the face of the stock directly above the feed rolls.

It is obvious that various changes in details and construction may be made for the purpose of adapting this mechanism to different classes of work and environment and in combining the same with machines of various characters without departing from the spirit of my invention.

Having described my invention, I claim—

1. In an automatically fed machine, the combination of a stationary support, a stock guide mounted upon said support and a driving shaft mounted in said support, instrumentalities operatively connected with said driving shaft to intermittently operate in proximity to said stock guide, guideways on said support parallel with said stock guide, a carrier mounted to move forward and backward in said guideway, a roll rotatably mounted upon said carrier with its periphery in proximity to said stock guide, a yielding driving connection between said driving shaft and said roll, a rocking frame mounted on said support, operative connection between said carrier and the free end of said rocking frame, and means driven from said driving shaft independent of those driving said roll for oscillating said rocking frame all organized to effect a backward movement of said carrier concurrently with the proximity of said instrumentalities to said stock guide during which backward movement of said carrier velocities are developed at the point of contact of said roll with its tangential path equivalent to the concurrent peripheral velocities of said roll.

2. In an automatically fed machine, the combination with a stationary support and a driving shaft mounted in said support, of a crank mounted for rotation in said support and driven from said driving shaft, a guideway on said support transverse of the axis of said crank, a carrier mounted for a forward and backward movement in said guideway, a roll rotatably mounted on and carried by said carrier, a second crank mounted for rotation on said carrier and connected with it to drive said roll, a link connecting said first and second cranks, a rocking frame mounted on said support and operatively connected with said carrier at its free end, and a cam on said driving shaft operatively engaging said rocking frame to effect a forward and backward movement of said rocking frame.

3. In an automatically fed machine, the combination with a stationary support and a driving shaft mounted in said support, of a crank mounted for rotation in said support and driven from said driving shaft, a guideway on said support transverse to the axis of said crank, a carrier mounted for a forward and backward movement in said guideway, a roll rotatably mounted on and carried by said carrier, a second crank mounted for rotation on said carrier, a link connecting said first and second cranks, change gears forming a driving connection between said second crank and said roll, and change means operatively connecting said driving shaft and said rocking frame to effect a forward and backward movement of said rocking frame.

4. In an automatically fed machine, the combination with a stationary support and a driving shaft mounted in said support, of a crank mounted for rotation in said support and driven from said driving shaft, a guideway on said support transverse to the axis of said crank, a carrier mounted for a forward and backward movement in said guideway, a rocking frame mounted on said support and engaging said carrier at its free end, a roll rotatably mounted upon and carried by said carrier, a second crank mounted for rotation on said carrier, a link connecting said first and second cranks, change gears forming a driving connection between said second crank and said roll, and a change cam on said driving shaft engaging said rocking frame to effect a movement thereof in one direction and limiting the movement thereof in the other direction, and spring means for maintaining contact between said cam and said rocking frame all organized to develop velocities during the backward movement of said carrier at the point of contact of said roll with its tangential path equivalent to the concurrent peripheral velocities of said roll.

5. In an automatically fed machine, the combination with a stationary support and a driving shaft mounted in said support, of a crank mounted for rotation in said support and driven from said driving shaft, a guideway on said support transverse to the axis of said crank, a carrier mounted for a forward and backward movement in said guideway, a rocking frame pivoted upon said support, a connecting rod connecting said carrier with the free end of said rocking frame, a roll rotatably mounted on and carried by said carrier, a second crank mounted for rotation on said carrier, a link connecting said first and second cranks, change gears forming a driving connection between said second crank and said roll, and a change cam operatively connecting said driving shaft and said rocking frame to effect a forward and backward movement of said rocking frame.

6. In an automatically fed machine, the combination with a stationary support and a driving shaft mounted in said support, of a guideway on said support, a carrier mounted for a forward and backward movement in said guideway, a rocking frame pivoted upon said support and engaging said carrier at its free end, a roll rotatably mounted on and carried by said carrier, a yielding driving connection between said roll and said driving shaft, and means independent of such yielding driving connection operatively connecting said driving shaft and said rocking frame to effect a forward and backward movement of said rocking frame.

7. In an automatically fed machine, the combination with a stationary support and a driving shaft mounted in said support, of a guideway on said support, a carrier mounted for a forward and backward movement in said guideway, a rocking frame pivoted on said support, a connecting rod connecting said carrier with the free end of said rocking frame, a roll rotatably mounted on and carried by said carrier, a yielding driving connection between said driving shaft and said roll, and means independent of said yielding connection operatively connecting said driving shaft and said rocking frame to effect a forward and backward movement of said rocking frame.

8. In an automatically fed machine, the combination with a stationary support and a driving shaft mounted in said support, of a crank mounted for rotation in said support and driven from said driving shaft with its axis of rotation transverse of that of said driving shaft, a guideway on said support parallel with said driving shaft, a carrier mounted for a forward and backward movement in said guideway, a roll rotatably mounted on and carried by said carrier with its plane of rotation parallel to

the path of movement of said carrier, a second crank mounted for rotation on said carrier with its axis of rotation parallel to that of said roll, a link connecting said first and second cranks, change gears forming a driving connection between said second crank and said roll, and change means operatively connecting said driving shaft and said carrier to effect a forward and backward movement of said carrier.

9. In an automatically fed machine, the combination with a stationary support and a driving shaft mounted in said support, of a crank mounted for rotation in said support and driven from said driving shaft, a guideway on said support, a carrier mounted for a forward and backward movement in said guideway, a roll rotatably mounted on and carried by said carier, a second crank mounted for rotation on said carrier, a link connecting said first and second cranks, change gears forming a driving connection between said second crank and said roll, and change means operatively connecting said driving shaft and said carrier to effect a forward and backward movement of said carrier sufficiently limited to permit at all times the complete rotation of said second crank by said first crank.

10. In an automatically fed machine, the combination with a stationary support and a driving shaft mounted in said support, of a crank mounted for rotation in said support and driven from said driving shaft, a guideway on said support, a carrier mounted for a forward and backward movement in said guideway, a rocking frame pivoted on said support, a connecting rod connecting said carrier with the free end of said rocking frame, a roll rotatably mounted on and carried by said carrier, a second crank mounted for rotation on said carrier, a link connecting said first and second cranks, change gears forming a driving connection between said second crank and said roll, a change cam on said driving shaft, an idle roll on said rocking frame adapted to contact said change cam, and a spring maintaining contact between said idle roll upon said rocking frame and said change cam.

11. In an automatically fed machine, the combination with a stationary support and a driving shaft mounted in said support, of a guideway on said support, a carrier mounted for a forward and backward movement in said guideway, a rocking frame pivoted at a point other than that occupied by the axis of said driving shaft, a connecting rod connecting said carrier and the free end of said rocking frame, a roll rotatably mounted upon said carrier, a crank rotatably mounted upon said support at a point other than that occupied by the axis of said driving shaft and driven from said driving shaft, a second crank rotatably mounted on said carrier, a link connecting said first and second cranks, change gears forming a driving connection between said second crank and said roll, and a change cam mounted on said driving shaft and engaging said rocking frame to effect a forward and backward movement of said rocking frame and reciprocation of said carrier all organized to develop velocities during the backward movement of said carrier at the point of contact of said roll with its tangential path equivalent to the concurrent peripheral velocities of said roll.

12. The combination with a machine embodying a driving shaft and instrumentalities actuated thereby, of feed rolls to advance the stock thereto; and means for actuating the feed rolls comprising a carriage supporting the rolls, a track on which the carriage travels, a train of gear carried by the carriage and controlled by the driving shaft to rotate the rolls in unison; means to actuate said train at a variable speed, and means to shift the carriage toward the tools during the greatest speed thereof.

13. In an automatically fed machine, the combination with a support, a shaft mounted thereon, a guideway thereon, a carrier movable therein, a pivoted rocking frame, a connection between said carrier and frame, means rotatably mounted upon said carrier, a member rotatably mounted upon said support, a second member suitably mounted, and a connection for certain of said members.

14. The combination with intermittently operative instrumentalities and a driving shaft therefor, of rolls for feeding stock thereto, means for actuating said feed rolls and comprising a carriage supporting the rolls, a track for the carriage, a train of gear carried by the carriage for rotating the rolls in unison and controlled by the driving shaft, means for actuating said train at a variable speed, and means for shifting the carriage toward the said instrumentalities during the greater speed thereof.

15. The combination with a reciprocatory carriage, of feed rolls mounted therein with their axes transverse to the path of their reciprocation, an oscillatory arm, means for oscillating the same, a train of gear embodying a crank in operative relation with the rolls and mounted on the carriage, a driver adjacent to the carriage and embodying a crank, and a link connecting said cranks.

FRANCIS H. RICHARDS.

Witnesses:
MARCUS C. HOPKINS,
JOHN O. SEIFERT.