M. Randolph,

Jointing Staves.

No. 66,737. Patented July 16, 1867.

Fig. 1.

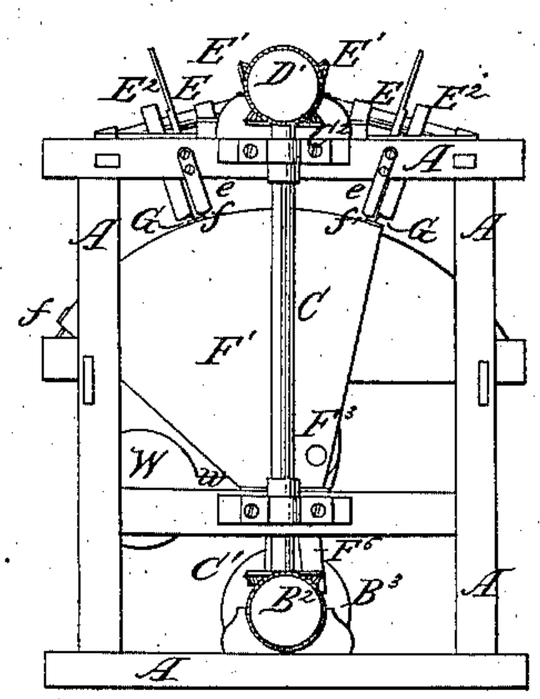
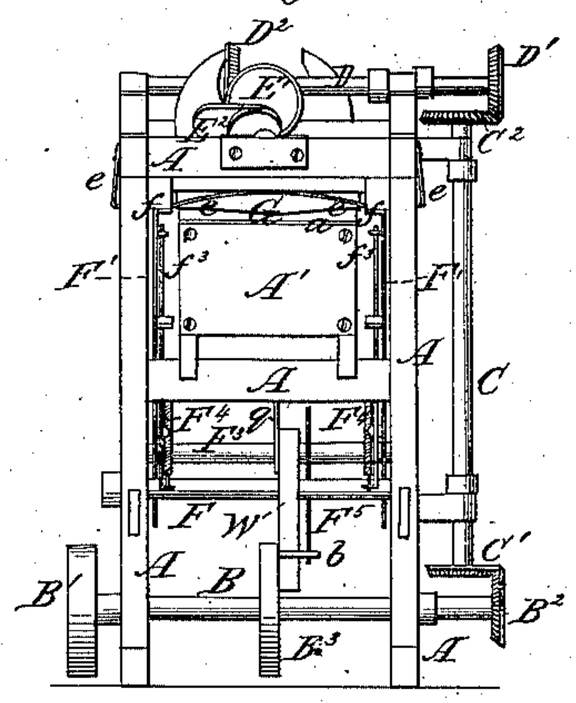


Fig. 2.



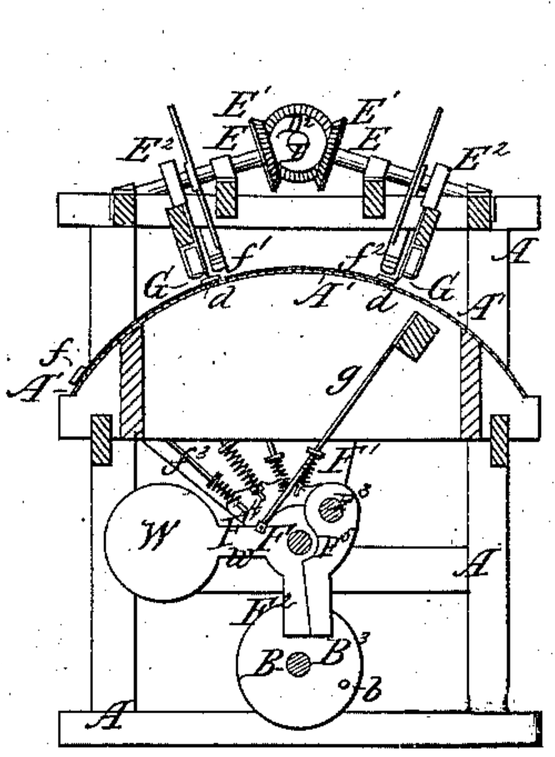
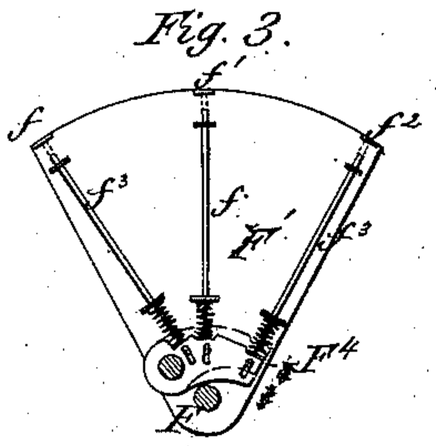


Fig. 3.



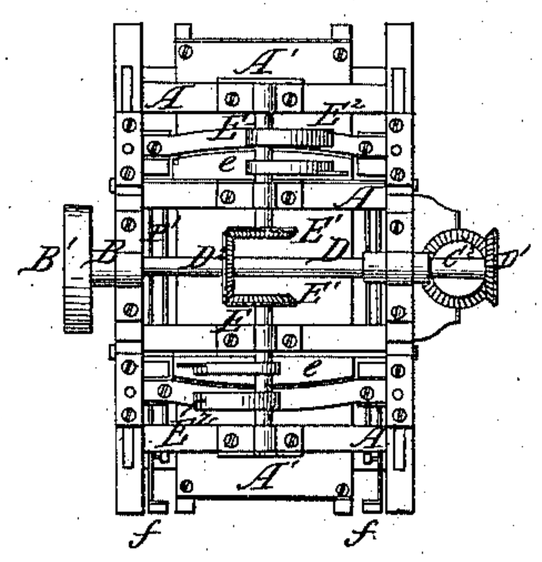


Fig. 4.

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Letters Patent No. 66,737, *dated July* 16, 1867.

IMPROVEMENT IN BARREL-STAVE JOINTERS.

The Schedule referred to in these Letters Patent and making part of the same.

TO ALL WHOM IT MAY CONCERN:

Be it known that I, M. RANDOLPH, of the city and county of St. Louis, and State of Missouri, have invented a new and useful Improvement in Stave-Jointing Machines; and I do hereby declare that the following is a full and clear description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon and made to form part of this specification.

This invention consists in so arranging automatically operating machinery that staves laid on a stationary table will be seized by grippers and conveyed to a knife or cutter, where one edge will be jointed in the proper form to be set up into a barrel, and then when the first edge is properly jointed a second set of grippers will convey the stave to a second cutter, where the remaining edge will be jointed to the proper shape, the whole machinery being operated in harmony with every other part, and so arranged that only the minimum of wastage or chips shall be made from a stave, whether it be wide or narrow.

To enable those skilled in the art to make and use my improved stave-jointer, I will proceed to describe its construction and operation.

Figure 1, of the drawings, is a side elevation of the improved machine.

Figure 2 is a front elevation of it.

Figure 3 is a sectional elevation.

Figure 4 is a plan of the top of it.

A is a frame, of either wood or iron, on which the machine is built. B is the driving-shaft, which receives its motion from the driving-wheel B^1. The vertical shaft C has a bevel-geared cog-wheel, C^1, on its lower end, which gears into a similar cog-wheel, B^2, on the outer end of the shaft B, and another, C^2, on its upper end, which gears into the wheel D^1 on the shaft D, which lies across the top of the frame A. There are two cam-shafts, E, also on top of the frame, which have bevel-geared cog-wheels E^1 that gear into and are driven by the wheel D^2 on the shaft D. The wheels B^2, C^1, C^2, D^1, D^2, and E^1 are to be made all of the same size so that the shafts E will revolve in the same time as the shaft B. As the speed of this machine will have to be quite slow, say from twenty to thirty-five revolutions per minute, it may become necessary to put in a counter-shaft (that is not here exhibited) in order to get speed enough for the driving-pulley B^1, but this will not be done so as to affect the relative speed of the shafts B and E. There is a rock-shaft, F, on the frame A, just above and vertically over the shaft B. To this rock-shaft, and near its ends, are attached two gripper-plates, F^1. These gripper-plates may be formed of solid sheets of metal, as herein represented, or they may be built up of light latticed work. A detailed elevation of the inside of these plates more clearly represents their construction. To each plate there are three lugs, $f f^1 f^2$, turned inward, as clearly shown in fig. 2, far enough to take hold of the ends of the staves. These lugs are equidistant from each other, as shown in the detail, and are arranged around the periphery of a circle drawn from the centre of the shaft F. An arm, F^2, is secured to the shaft F in such a position that a wrist, *b*, projecting from the wheel B^3, will strike it at every revolution and turn the shaft F just far enough to carry the periphery of the plates F^1 forward a distance equal to the distance of the face of lug *f* from that of f^1. There is another rock-shaft, F^3, which has its bearings in the plates F^1, and to this shaft, just inside of the plates F^1, are secured two cams, F^4. An arm, F^5, attached to the rock-shaft F^3, projects downward so as to be struck by the wrist *b* in the same manner as the arm F^2 is. There are gripper-rods f^3 attached to the cams F^4 so as to shut up against the lugs $f f^1 f^2$, as clearly shown in the detail. The arms F^2 and F^5 are relatively arranged in such positions that the wrist *b* will strike the arm F^5 first, or just an instant before it does the arm F^2, so that the gripper-rods f^3 may be thrown up tightly to the staves which are embraced between the rods f^3 and the lugs $f f^1 f^2$. This motion of the said rods is indicated in the detail by the red lines. As soon as the said grippers f, f^1, f^2, and f^3 have firmly seized the staves, the plates F^1 will be moved forward enough to carry the first stave, which is held between the grippers $f f^3$, to the proper position for the jointing-knife G to joint off the back edge of that stave. As the forward motion of the gripper-plates will always be arbitrarily the same, it is evident that if the table A^1 on which the staves are to be first placed be arranged with a guard, (not shown,) against which the staves are to be placed when laid thereon, the staves so conveyed forward by the said grippers can always be stopped with just enough of their

back edges behind the knife G to make a clean, fair joint. At the same time that the grippers $f f^3$ convey a new stave from its table A^1 to the knife G, the grippers $f^1 f^3$ will convey the stave which has just been jointed on one edge by knife G to the knife G^1, where the remaining edge is to be jointed by that knife. The forward motion of the grippers $f^1 f^3$ being just as arbitrary as $f f^3$, it is evident that the parts might all be so arranged as to cut off the minimum of chips from both edges, provided all the staves were of the same width, but inasmuch as the width of the staves varies very widely, it is necessary to arrange all of the parts so as to carry the second edge of one of the narrowest of the staves up to the second knife G^1, and for wider staves one or more stops, *g*, may be thrown up above the table A^1 so as to stop them just at the proper point to joint the second edge with the least amount of chips. The stop *g* may be operated from the shaft F, and must be arranged so as to drop below the table A^1 as soon as it shall have stopped the stave at G^1, so as to be out of the way in order to let the stave pass over it as soon as jointed. After the second edge has been jointed the grippers $f^2 f^3$ throw the finished stave out of the machine.

From the foregoing description it will appear that there are three staves in the machine at one and the same time. The staves to be jointed are to be first placed on the front edge of the table A^1, from which point they are to be carried by grippers successively to the knives G and G^1, where they will be jointed and then thrown out of the machine in a finished condition without further manual labor. The knives G and G^1 are set at such an angle of inclination with the table A^1 as to give the proper bevel to the edges of the staves, and they are forced down at the proper moment by the cams E^2, and upward, after the jointing is completed, by the springs *e* or some equivalent device.

As has already been stated, the motion of the cam-shaft is, by the use of cog-wheels of the same size, as before stated, arbitrarily the same as the driving-shaft B; hence the knives G and G^1 are forced down upon the staves at the very moment the grippers have ceased to move forward. The lengths of the arms F^2 and F^5 are so arranged that the wrist *b* will drop below the end of F^5 just an instant sooner than the other arm so as to release the grippers from the staves before the said grippers drop back to the front of the table, as they do the moment the wrist passes below the end of the arm F^2, by the action of the weight W attached to the rock-shaft F by the horizontal arm *w*. As the staves are to be released from the grippers before the jointing-knives come down upon them, it is necessary to have some means of holding them in place while being jointed, and this may be done by means of a spring, H, fastened to the upper portion of the frame by their ends, and forced down upon the staves by the cams H′, attached to the shafts E. The chips from the first edge are allowed to fall down through an orifice in the table at *a*, and those cut from the last edge may be allowed to go over with the finished staves. The knives G and G^1 used with this machine may be such knives as are commonly used on foot jointing-machines, and so need not be described.

Having described my invention, what I claim, is—

1. The automatic feeding grippers F^1, *f*, f^1, f^2, and f^3, for the purpose of conveying staves to and from the jointing-knives, substantially as described.

2. I claim the jointing-knives G and G^1, when arranged in combination with the table A^1 and the feeding-grippers, so as to allow two staves to be jointed on opposite edges simultaneously and at one stroke or revolution of the machine.

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Witnesses:
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