No. 865,345. PATENTED SEPT. 3, 1907.

H. F. BUSCH.

CORK CUTTING MACHINE.

APPLICATION FILED APR. 14, 1905.

4 SHEETS—SHEET 1.

Fig. 1.

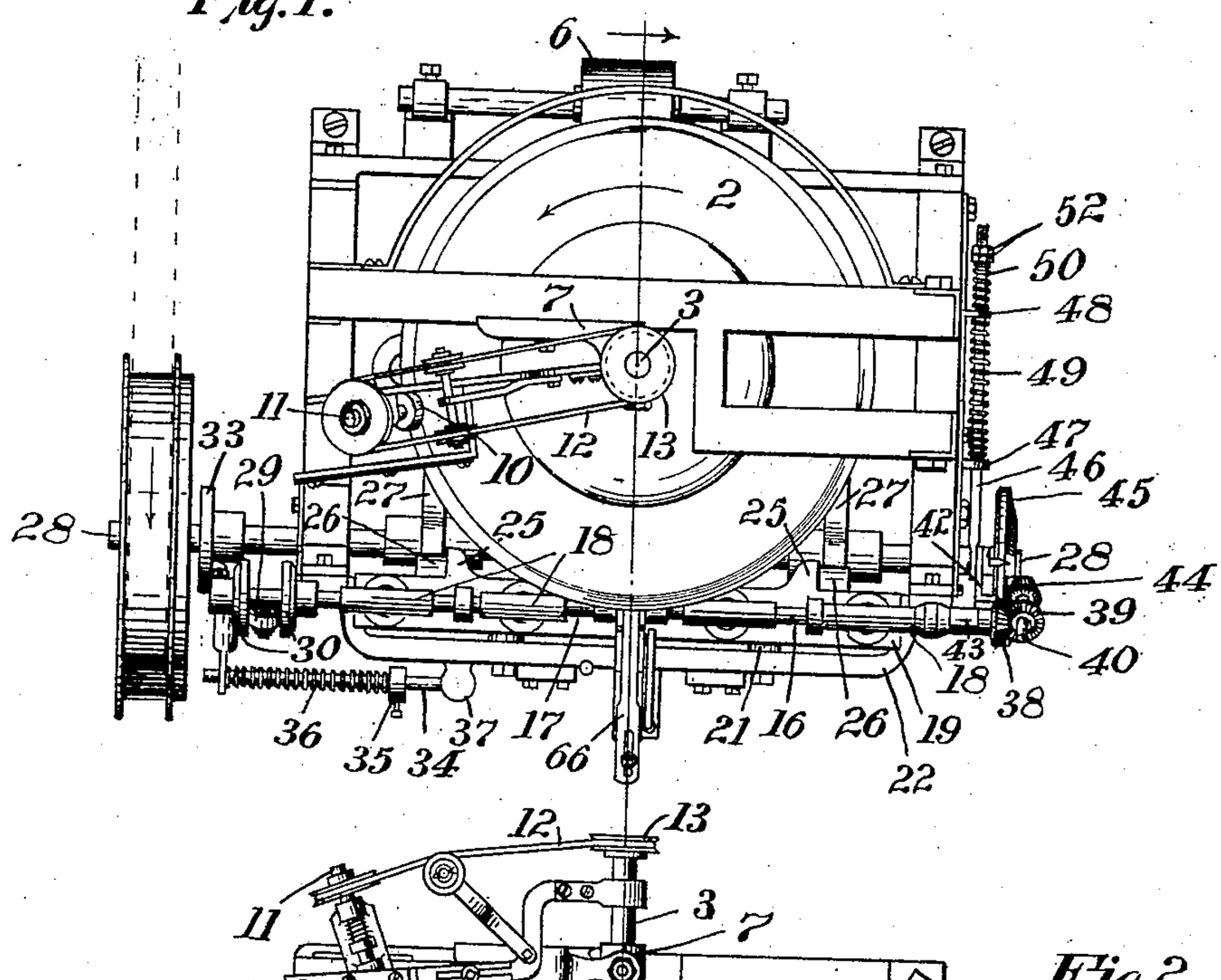
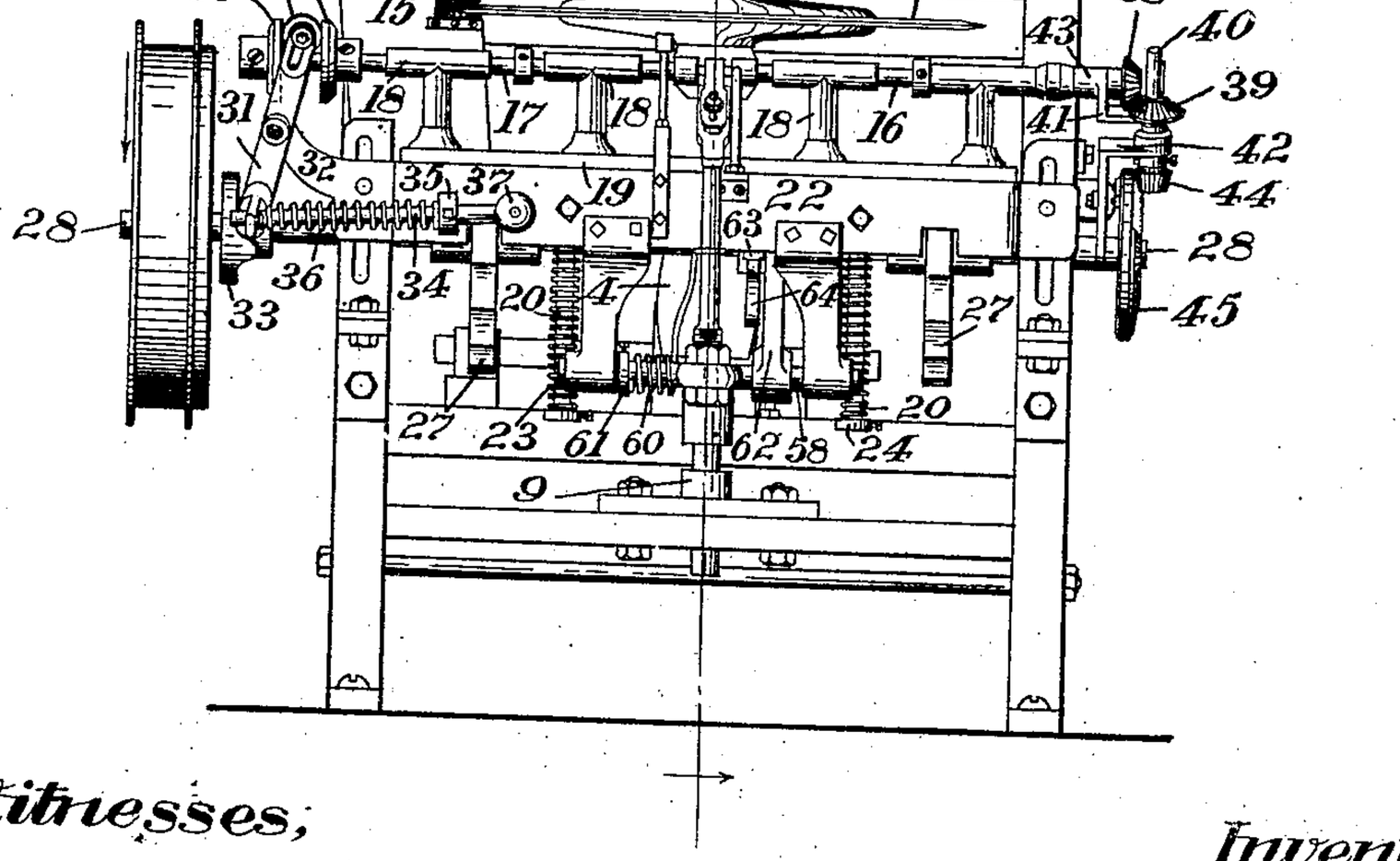


Fig. 2.



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4 SHEETS—SHEET 2.

Fig. 3.

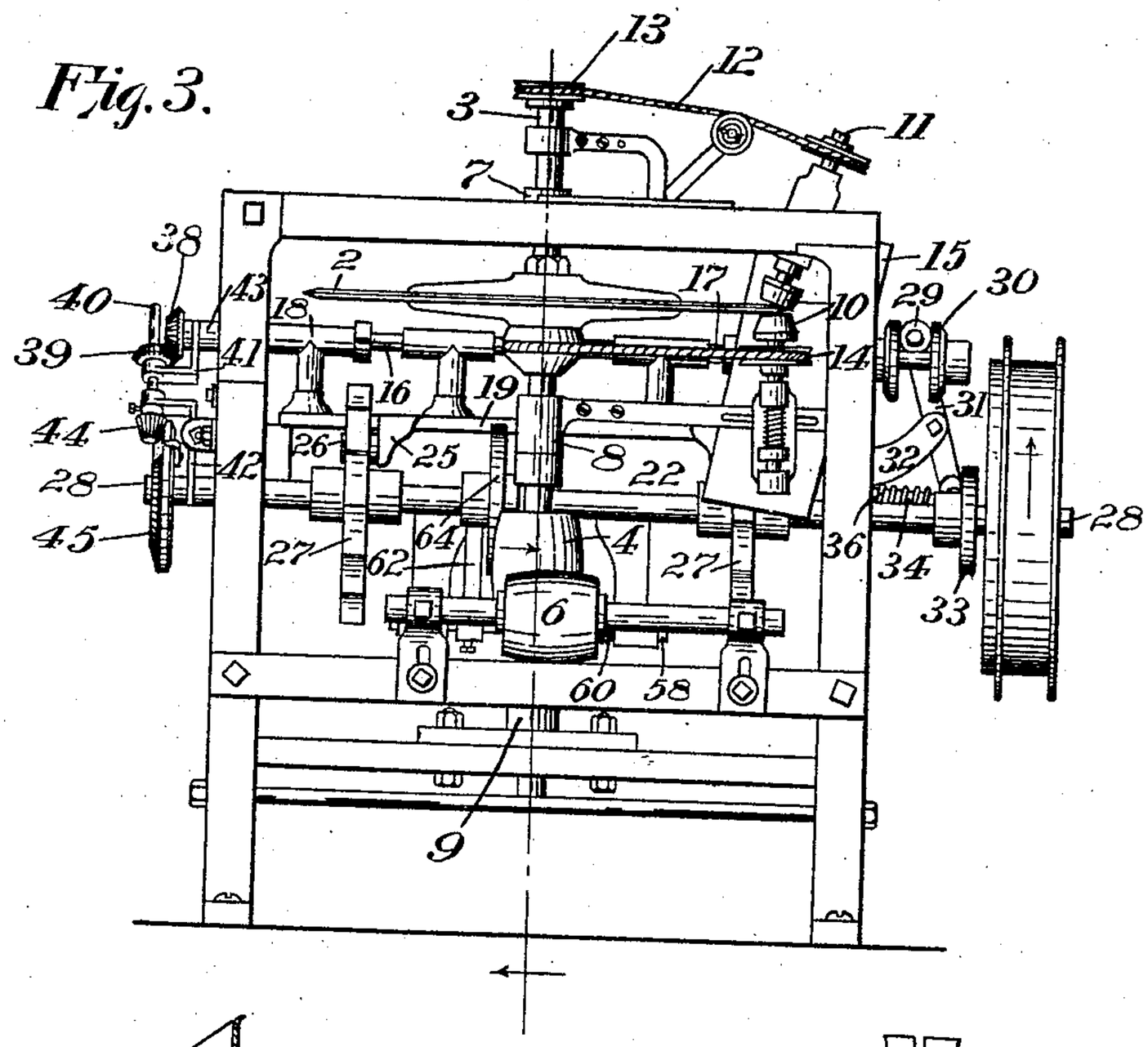


Fig. 8.

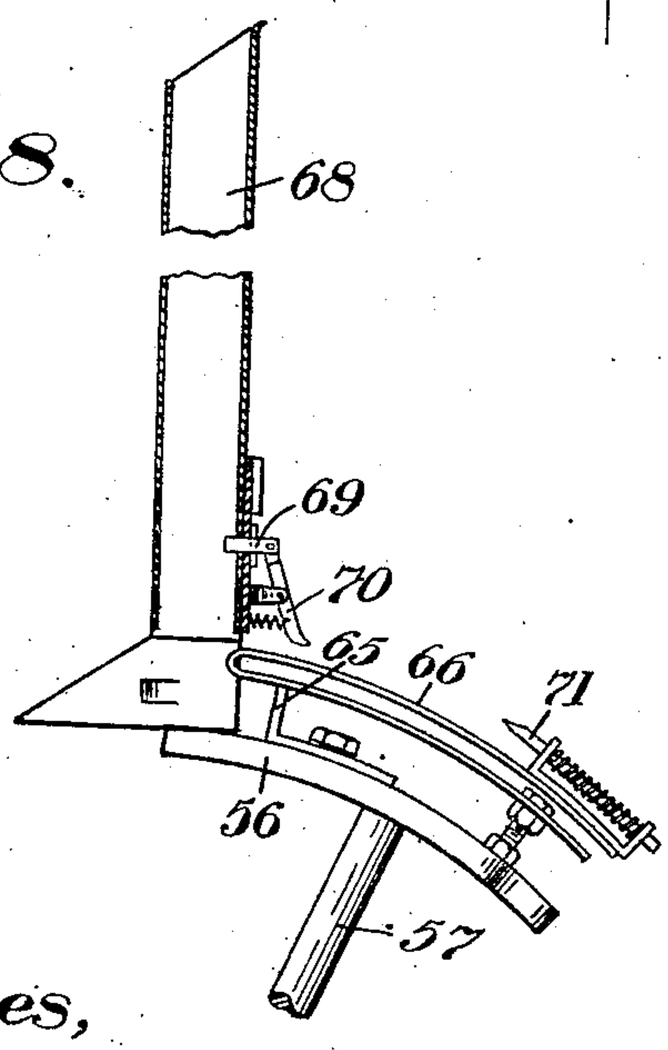
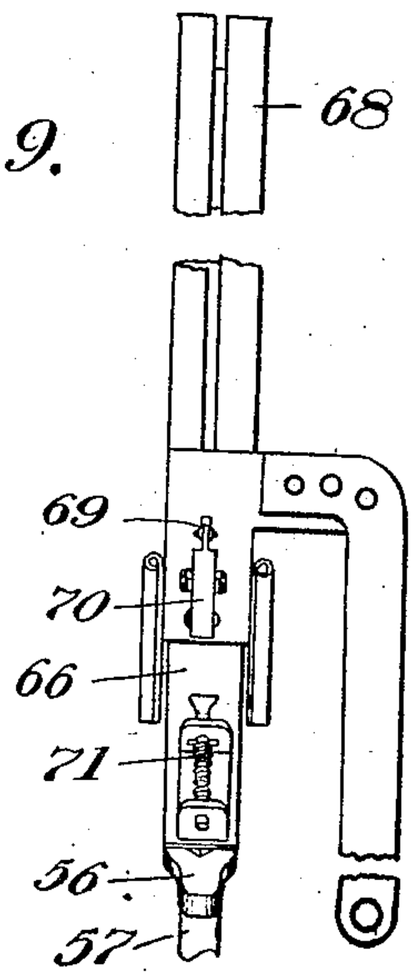


Fig. 9.



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4 SHEETS—SHEET 3.

Fig. 4.

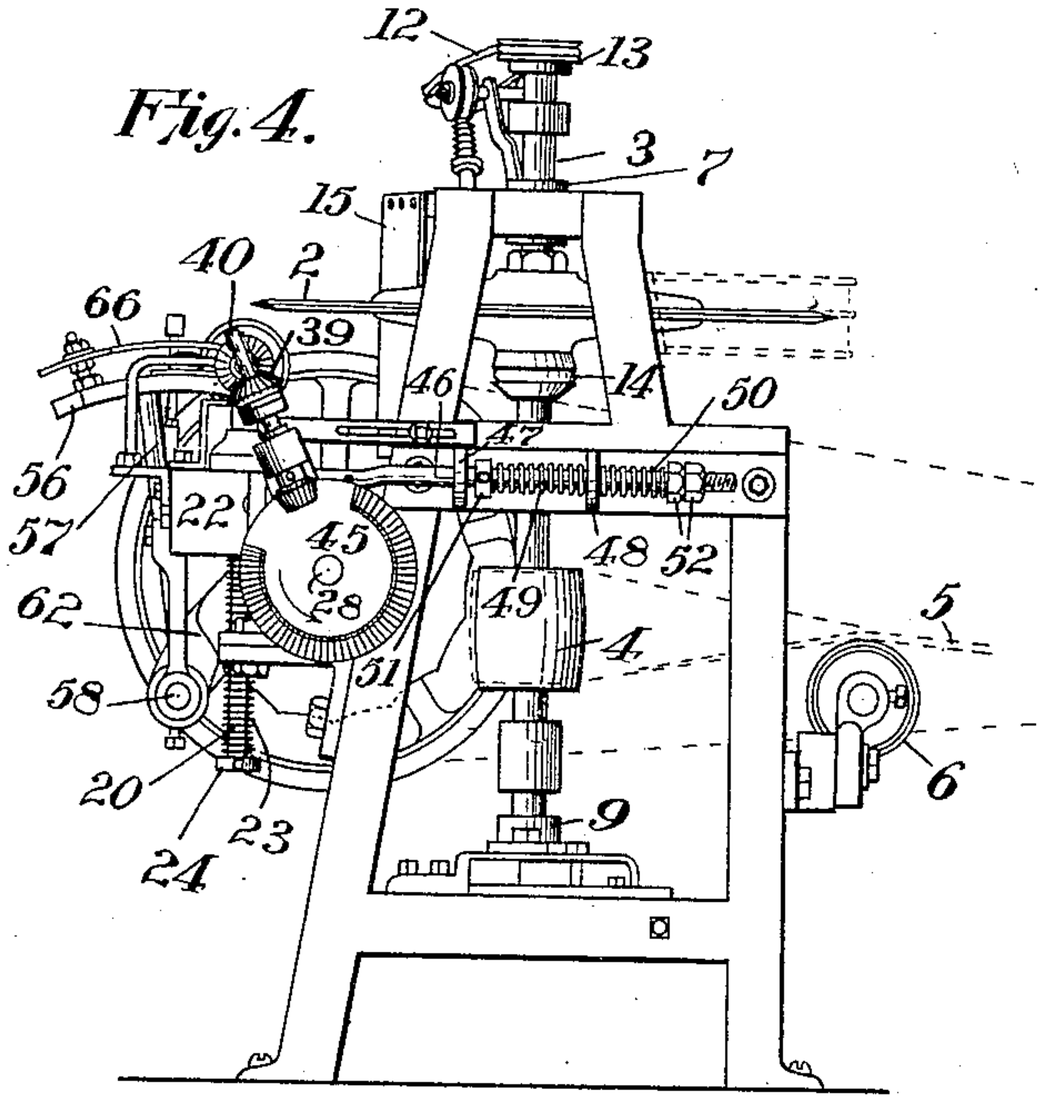


Fig. 10.

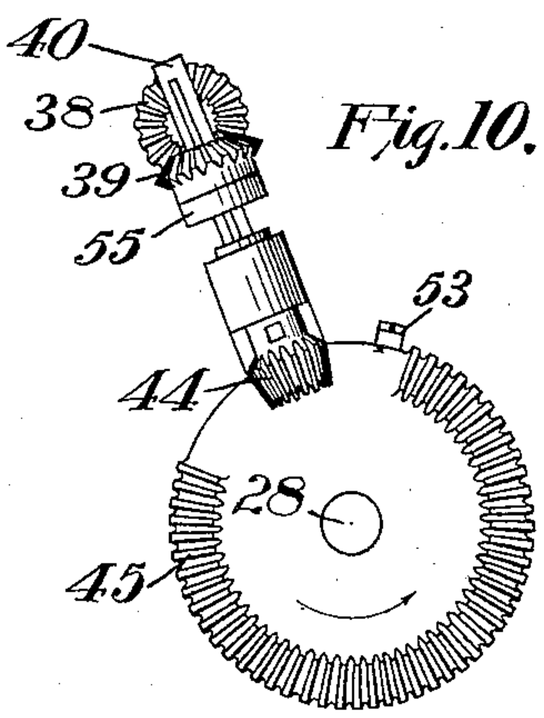


Fig. 5.

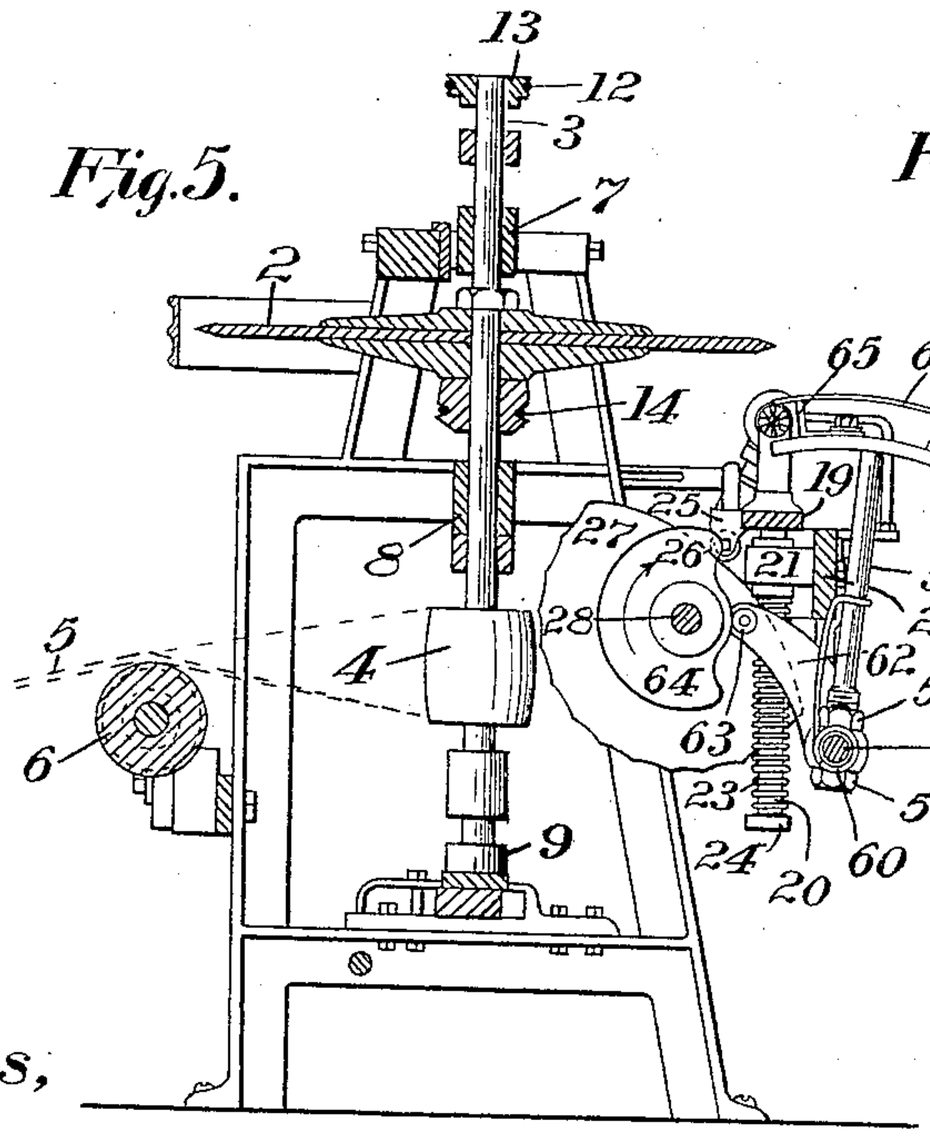
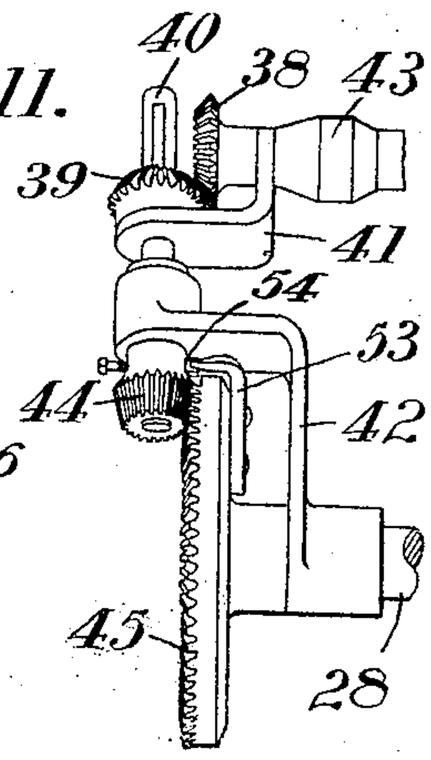


Fig. 11.



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CORK CUTTING MACHINE.

APPLICATION FILED APR. 14, 1905.

4 SHEETS—SHEET 4.

Fig. 13.

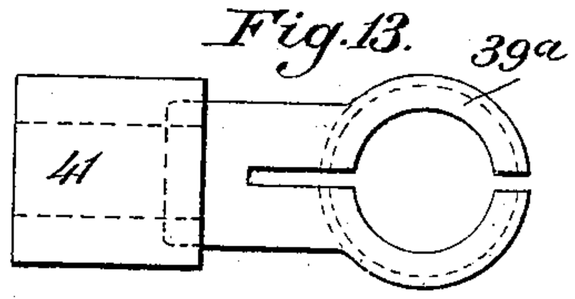


Fig. 6.

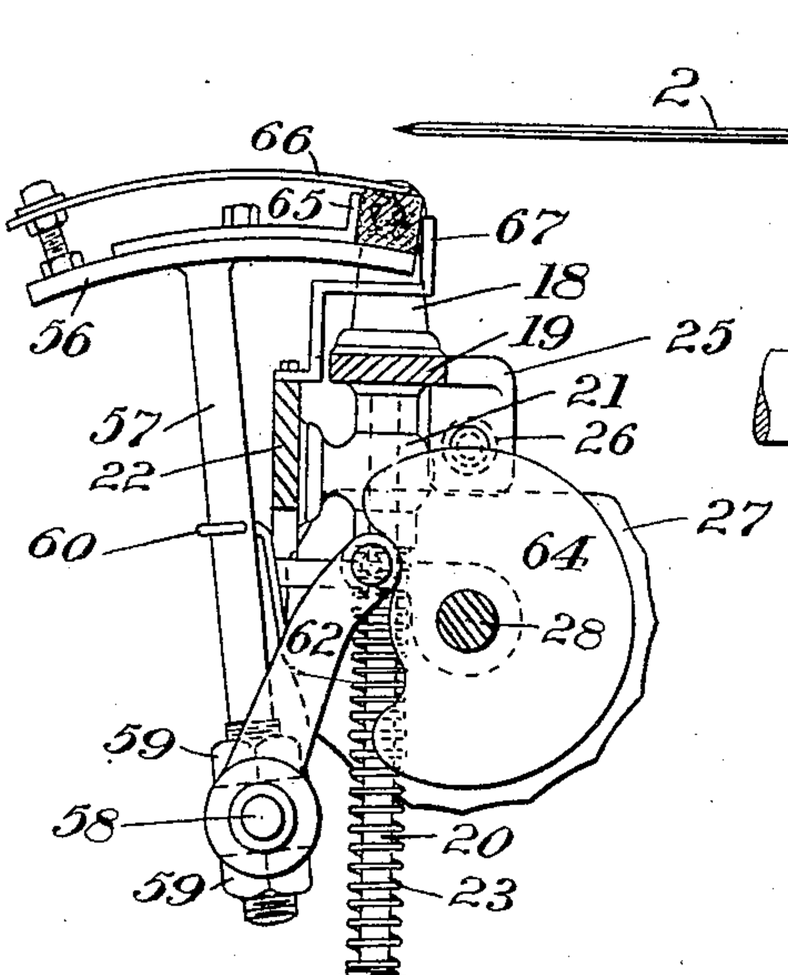
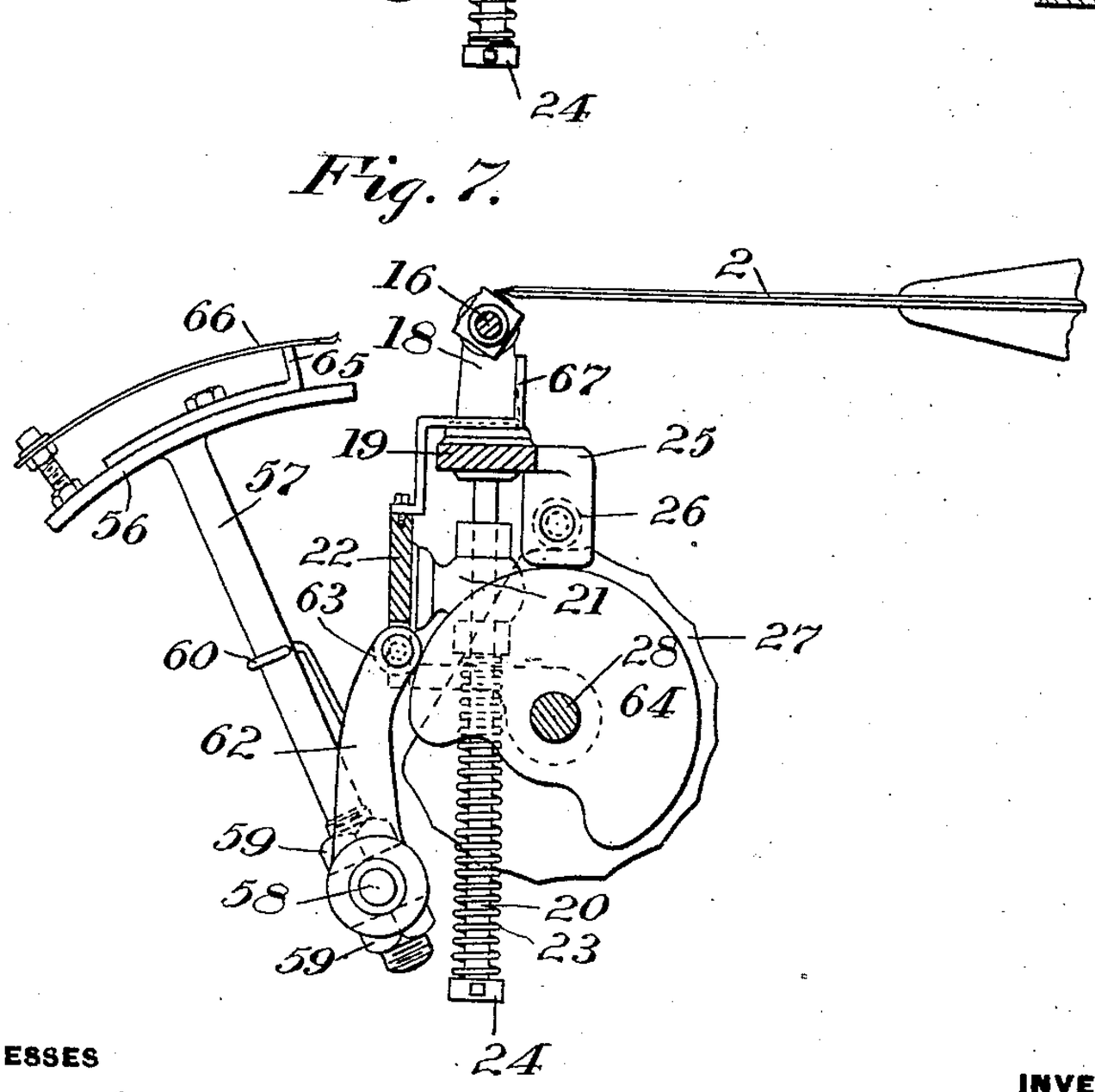


Fig. 12.

Fig. 7.



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UNITED STATES PATENT OFFICE.

HERMAN F. BUSCH, OF MILLVALE, PENNSYLVANIA, ASSIGNOR TO ARMSTRONG CORK COMPANY, OF PITTSBURG, PENNSYLVANIA, A CORPORATION OF PENNSYLVANIA.

CORK-CUTTING MACHINE.

No. 865,345. Specification of Letters Patent. Patented Sept. 3, 1907.

Application filed April 14, 1905. Serial No. 255,489.

To all whom it may concern:

Be it known that I, HERMAN F. BUSCH, of Millvale, Allegheny county, Pennsylvania, have invented a new and useful Cork-Cutting Machine, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a top plan view of my improved machine; Fig. 2 is a front elevation ot the same; Fig. 3 is a rear elevation; Fig. 4 is a side elevation; Fig. 5 is a central cross-section; Figs. 6 and 7 are partial detail views showing the cork blank in different positions; Figs. 8 and 9 are detail views of one form of cork feeding mechanism; and Fig. 10 is a detail view showing a chuck-driving connection provided with a friction device; Fig. 11 is another view of the same with the friction device omitted; Fig. 12 is a detail sectional view of the friction device of Fig. 10; and Fig. 13 is a detail view of the tapered collar of said device.

My invention relates to machines for cutting corks, and is designed to provide a machine which will cut the cork in an irregular form instead of a circular form in cross-section. These corks of irregular cross-section have heretofore been cut by hand, and consequently have been expensive.

My invention consists in providing a rotating knife, in combination with cork-holding means such as end-chucks, which rotate the cork, mechanism also being provided for moving the cork or the knife relative to each other during the cutting operation.

The invention further consists in cutting successive shavings from the cork while moving the cork or knife relative to each other during each complete rotation of the cork.

The invention further consists in the construction and arrangement of the parts, as hereinafter more fully described and claimed.

In the drawings, 2 represents the cutting knife or disk which is secured upon a vertical shaft 3 having a pulley 4 driven by a belt indicated at 5 in Fig. 5 and extending over a guide-pulley 6 to a pulley on a suitable driving shaft. I have shown the shaft 3 as being carried in bearings 7 and 8 and a lower step-bearing 9. The knife is preferably sharpened during its rotation by "whetters" or disks 10 which act upon the edge of the knife, the upper one being mounted on the shaft 11 and driven by the cord 12 extending to the pulley 13 on shaft 3, while the lower one is driven by the cord 14 extending around a pulley secured to the shaft 3 below the cutting disk.

15 indicates a guard which prevents the emery used on the whetters from entering the chuck bearing.

In carrying out my invention, the knife shaft must be moved endwise or the cork holder must be moved relatively to the knife, during the cutting operation. In the present form of apparatus I have shown the cork as being moved relatively to the knife, and this is the form which I prefer for the reason that it enables the cutting operation to be carried out more rapidly than in the case where the knife is moved. My broader claims, however, are not restricted to the moving of the cork.

The cork holding and rotating chucks are secured to shafts 16 and 17, which are carried in bearings or standards 18 secured to the frame 19, which extends across the front of the machine. This chuck-frame is guided in its vertical movement by downwardly projecting stems 20, which extend through guides 21 secured to the cross-brace 22 at the front of the machine. Spiral springs 23 surround the guide-stems and bear upon heads 24 at their lower ends, thus exerting a constant downward pressure upon the chuck-frame. To the chuck-frame 19 are secured brackets 25 carrying rollers 26 which rest upon the cams 27. These cams, of which I have shown a pair mounted upon the shaft 28, are provided with a curved peripheral portion having a series of steps. In making a cork with four faces and rounded corners there are four of these steps, which are formed upon an arc-shaped portion struck from the shaft as a center. The next four steps will be on a slightly greater radius by an amount equal to say $\frac{1}{64}$th of an inch, and so on. I have shown twelve of these steps in three groups of four; and in this case the cork is given three complete rotations, the steps giving the irregular contour at each rotation. The remaining portions of these cams act upon the rollers idly, no cutting operation being carried on. The central portions of these inactive faces are preferably formed on a curve struck from the shaft of the center for a short distance, say an inch and a half or two inches. This is merely to hold the chucks stationary as regards vertical movement at the time that they are gripping the block.

The shaft 16 rotates in the same position at all times that it is turned, while the shaft 17 is moved endwise to clamp the cork between the chucks. This endwise movement of the shaft 17 is accomplished by the roller 29, which rotates between two disks 30 secured to the shaft 17, and is carried on a lever 31 fulcrumed to a bracket 32 on the machine frame. The lower end of this lever carries a roller which moves on the cam 33 secured to the main driving shaft 28. The chuck is forced yieldingly against the end of the cork and the roller is held against the cam by the spring-pressed rod 34 which extends through a hole in the bracket 35, and is provided with a spring 36 which forces the roller against the cam. There is a loose connection between this spring-pressed rod and the link 31. The cam 33 acts to retract the chuck from the block, while the spring forces the chuck toward the block whenever the cam allows it.

37 is a bearing at the end of the spring-pressed rod.

The shaft 16 is provided at its outer end with a bevel-wheel 38 which intermeshes at all times with a bevel-wheel 39 splined on the shaft 40. This shaft 40 is carried upon two hangers 41 and 42. The hanger 41 is secured to a collar 43 loosely surrounding the shaft 16, while the hanger 42 is provided with a collar loosely surrounding the shaft 28. The shaft 40 extends from the axis of the shaft 16 toward the shaft 28 but not directly in line between the two centers, in the case shown. To the lower end of the shaft 40 is secured a bevel-wheel 44, which is actuated by a mutilated bevel-gear 45 secured to the shaft 28. The teeth of the gear 45 are cut away for a portion of the circumference,—in the present case one-fourth. During this quarter of the revolution the cork-block is being clamped and the chucks are dropped and then lifted after gripping the cork. As the chuck-shaft 16 is raised and lowered, this would tend to change the angular position of the shaft 40; and to overcome this, in the case shown, I provide a rod 46, one end of which is connected to the lower hanger 42 at an intermediate point, this rod extending through the brackets 47 and 48 on the side-frame of the machine. Two springs 49 and 50 surround the rod, the spring 49 bearing against an adjustable collar 51 secured to the rod, while the spring 50 bears against adjustable nuts 52 screwed on the rod. This provides a yielding bearing for the shaft 40 which allows it to shift as the shaft 16 is raised and lowered. It will be understood that if the shaft 16 were directly above the shaft 28 this shifting device would not be necessary, since the shaft 40 would have no movement sidewise and the baffle-wheel 39 would merely slide up and down upon it.

In order to insure the proper meshing of the wheel 44 with the mutilated gear 45, I provide on the gear 45 a pawl 53 which is arranged to act upon a lug 54 projecting from the bevel-wheel 44. The pawl is so positioned that it strikes the lug and starts the rotation of the shaft 40 and brings the teeth into proper mesh with each other. By applying friction to the shaft 40 the wheel 44 may be held in its correct relative position, but to insure the proper intermeshing I preferably use this pawl device. This frictional holding of the shaft is important inasmuch as the timing of this shaft relative to the movement of the other parts must be accurate in order to insure the proper cutting of the cork. This friction I obtain in the present case by providing a jam-nut 55 which may be forced over a tapering collar 39^a around the sleeve 39^b of the bevel-gear 39, thus acting on the friction brake. By screwing up the nut 35, the collar 39^a (which is split) may be forced against the sleeve of the bevel gear 39 to thereby give sufficient friction to stop the shaft 40 as soon as the gear 44 is out of mesh. This is a well known device which has long been used in connection with jam nuts and other friction devices and for which I make no specific claim, it being simply illustrative of one form of arrangement which may be employed for preventing rotation of the shaft 40 after the gear 44 is out of mesh. This friction may of course be applied in any other desirable way.

The feeding of the cork-blocks into proper position between the chucks may be carried out in any desirable manner. In the present case I feed the corks by hand to an oscillating carrier. This carrier comprises a curved plate 56 secured to an oscillating stem 57 which extends through a hole in an enlarged portion of the shaft 58. The lower portion of the support 57 is screw-threaded so that it may be vertically adjusted by means of the nuts 59. A spiral spring 60 surrounds this shaft and is secured to an adjustable sleeve 61 having a set-screw securing it to the shaft. The upsetting end portion of this spring is bent upwardly and surrounds the support 57. To the shaft 58 is secured a lever-arm 62 provided with a roller 63 bearing upon a cam 64 secured to the shaft 28. A part of this cam 64 is of arc-shape struck on a radius from the axis of the shaft 28 as a center, while the remaining portion is curved in such a manner as to oscillate the carrier in proper time to the movement of the chucks. To the plate 56 is secured a stop 65 and also a reversely bent leaf-spring 66, which extends over and in front of the stop. The cork-block is inserted between the end of the spring 66 and the plate 56, when the oscillating carrier is in its retracted position. The carrier then is swung forwardly to bring the cork-block into proper alinement with the chuck-shafts. The endwise moving chuck-shaft is then moved forward to grip the cork between the chucks, whereupon the oscillating carrier moves back. In Fig. 6 I show the relative position of the parts at the moment when the cork-block has been carried forward to its registering position. This movement of the cork to its registering position is regulated by the bracket or stop device 67, shown in Figs. 6 and 7, and secured to the plate 22 of the frame. When the cork has been gripped by the chucks and the oscillating carrier is retracted, the chucks are lifted by the cams 27 into the position shown in Fig. 7, when the cutting operation at once begins, the rollers 26 entering upon the stepped portions of the cams, as shown in Fig. 7. The cutting operation then proceeds, the cork being moved up and down through the successive steps at each rotation, the number of these steps depending upon the number of sides which it is desired to give the cork. In the present case, as above stated, the cork is given four sides, and consequently each set of steps is four in number, the successive sets being at a slightly greater distance from the center, so as to remove successive shavings from the cork until given the desired shape and size.

If it is desired the corks may be fed automatically by the device shown in Figs. 8 and 9. In this device the vertical chute 68 is arranged to contain a vertical row of blocks and is provided with an inwardly projecting detent 69 acted upon by the spring-pressed pawl lever 70. In this case the oscillating carrier is provided with a spring-pressed dog 71 which acts upon the pawl lever 70 to release the row of cork-blocks when the bottom block is carried forward into chucking position. As the carrier moves back the detent 69 is released and holds the blocks of the row except the bottom block which drops upon the plate 56.

The advantages of my invention result from the automatic cutting of cork-blocks into corks of irregular cross-section. This does away with a large amount of hand labor and produces corks better than hand-cut corks, as they are more uniform and regular in size and shape.

By the word "knife" in my claims I intend to include not only a rotary disk having a cutting edge, but

also a rotary cylinder or disk composed of or provided with grinding or abrading material.

In giving the irregular contour to the cork, the rotating knife may be moved relatively to the cork during the rotation of the knife and cork; the manner of feeding and chucking the cork-blocks may be varied, and many other variations may be made in the form and arrangement of the parts without departing from my invention.

I claim:—

1. In a cork-cutting machine, a rotary knife, a cork-holding device, means for intermittently rotating the cork-holding device, withdrawing mechanism arranged to release the cut cork, a positioning device arranged to present the successive blanks to the chucks in the same angular relation to the knife, connections arranged to give the knife and chucks a plurality of motions toward and from each other during a single rotation of the chucks, and mechanism for timing the beginning of rotation of the blank in a specified relation to the relative motions of the knife and chucks; substantially as described.

2. In a cork-cutting machine, a rotary knife arranged to rotate in a fixed plane, a frame carrying rotary cork chucks, connections arranged to intermittently rotate the cork chucks and provide periods of rest, mechanism for giving a plurality of motions to the chuck carrier to and from the knife during a single rotation of the chucks, a feed device arranged to present each blank to the gripping chucks in a specified angular relation to the knife, and connections arranged to start the rotation of the cork chucks in a predetermined relation to the beginning of the reciprocatory movement of the chuck carrier whereby the corners of the cork are cut from the corners of the blank; substantially as described.

3. In a cork-cutting machine, a rotary knife, a cork-holding device, means for intermittently rotating the cork-holding device, a friction brake device, withdrawing mechanism arranged to release the cut cork, a positioning device arranged to present the successive blanks to the chucks in the same angular relation to the knife, connections arranged to give the knife and chucks a plurality of motions toward and from each other during a single rotation of the chucks, and mechanism for timing the beginning of rotation of the blank in a specified relation to the relative motions of the knife and chucks; substantially as described.

4. In a cork-cutting machine, a rotary knife, a cork-holding device, positive gear driving mechanism for intermittently rotating the cork-holding device, withdrawing mechanism arranged to release the cut cork, a positioning device arranged to present the successive blanks to the chucks in the same angular relation to the knife, connections arranged to give the knife and chucks a plurality of motions toward and from each other during a single rotation of the chucks, and mechanism for timing the beginning of rotation of the blank in a specified relation to the relative motions of the knife and chucks; substantially as described.

5. In a cork-cutting machine, the combination with a knife-operating in a fixed plane, of a chuck frame, a chuck-rotating shaft carried by the frame, means for reciprocating said frame while a cork is being cut and for holding the frame stationary while a cork is being placed in the chuck, mutilated driving gearing for the said shaft arranged to rotate it while the frame is being reciprocated, and to hold it stationary while the frame is at rest, and means for maintaining the proper relation of the gearing during the reciprocation of the frame; substantially as described.

6. In a cork-cutting machine, a relatively fixed knife, a reciprocable chuck-carrying frame, mechanism for reciprocating said frame during a single rotation of the chuck a chuck-rotating shaft carried by the said frame, gearing for driving said shaft having a movable member carried by said frame, and a mutilated driving member, and a pawl device arranged to control the proper meshing of the mutilated gear; substantially as described.

7. The combination of a knife or cutter arranged to rotate in a fixed plane, a movable chuck frame, means for moving said frame towards and away from the knife, rotary chucks mounted on the frame, a gear wheel on one of the chuck shafts, a gear wheel in mesh with the first named wheel and arranged to move with the chuck frame, a shaft on which said wheel moves, and a mutilated gear wheel for driving said shaft; substantially as described.

8. In a machine of the character described, the combination with a vertically-movable chuck frame, and chucks mounted thereon, one of said chucks having its shaft provided with a driving pinion, a shaft having a movable intermeshing pinion connected to the chuck-frame, a mutilated gear-wheel geared to the last named shaft, and a pawl device for insuring the proper action of the mutilated gear; substantially as described.

9. In a machine of the character described, the combination with a vertically-movable chuck frame, and chucks mounted thereon, one of said chucks having its shaft provided with a driving pinion, a shaft having a movable intermeshing pinion connected to the chuck-frame, a mutilated gear-wheel geared to the last named shaft, and a pawl device for insuring the proper action of the mutilated gear, together with a brake device for checking movement of the shaft having the movable pinion; substantially as described.

10. A cork cutting machine comprising in combination a rotating disk knife, a chuck frame mounted to slide toward and from the plane of said knife, a shaft in the plane of travel of said chuck frame, a mutilated gear driving said shaft, a chuck geared to said shaft, means permitting reciprocation thereof with the chuck frame while maintaining engagement of said gear and a cam moving said chuck frame from a work receiving position to a position within the cutting range of said knife and then reciprocating it within such cutting range, the mutilation of the gearing and the throw of the cam being so timed that the chuck is not driven while at its work receiving position.

11. In a cork cutting machine, a rotary knife, a frame carrying rotary cork chucks, connections arranged to intermittently rotate the cork chucks and provide periods of rest therefor, a continuously rotating cam having steps arranged to give a plurality of motions of the chuck carrier to and from the knife during a single rotation of the chucks, said cam having a plain portion to hold the chucks stationary during insertion of the blank, a positioning device arranged to present the successive blanks to the chucks in the same angular relation to the knife, and connections arranged to start each period of rotation of the cork chucks in a predetermined relation to the beginning of the reciprocatory movement of the chuck carrier, whereby the corners of the cork are cut from the corners of the blank; substantially as described.

12. In a cork cutting machine, a rotary knife, a frame carrying rotary cork chucks, positive gear driving connections arranged to intermittently rotate the cork chucks and provide periods of rest therefor, a continuously rotating cam having steps arranged to give a plurality of motions of the chuck carrier to and from the knife during a single rotation of the chucks, said cam having a plain portion to hold the chucks stationary during the insertion of the blank, a positioning device arranged to present the successive blanks to the chucks in the same angular relation to the knife, and connections arranged to start each period of rotation of the cork chucks in a predetermined relation to the beginning of the reciprocatory movement of the chuck carrier, whereby the corners of the cork are cut from the corners of the blank; substantially as described.

In testimony whereof, I have hereunto set my hand.

HERMAN F. BUSCH.

Witnesses:
JOHN MILLER,
H. M. CORWIN.