3 Sheets Sheet 1.

Wombaugh & Abernethy,
Cork Machine.

No. 20,771. Patented July 6, 1858.

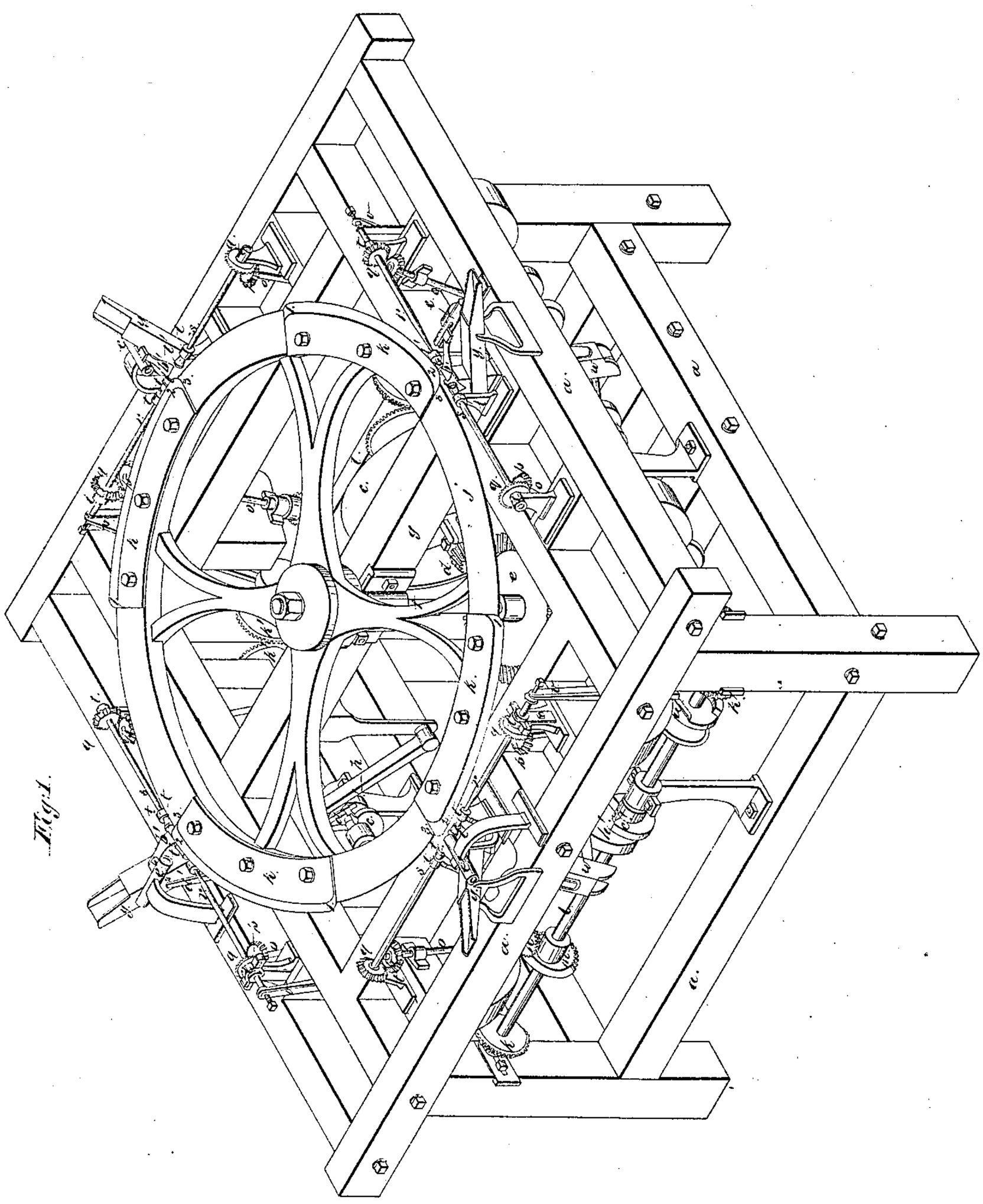


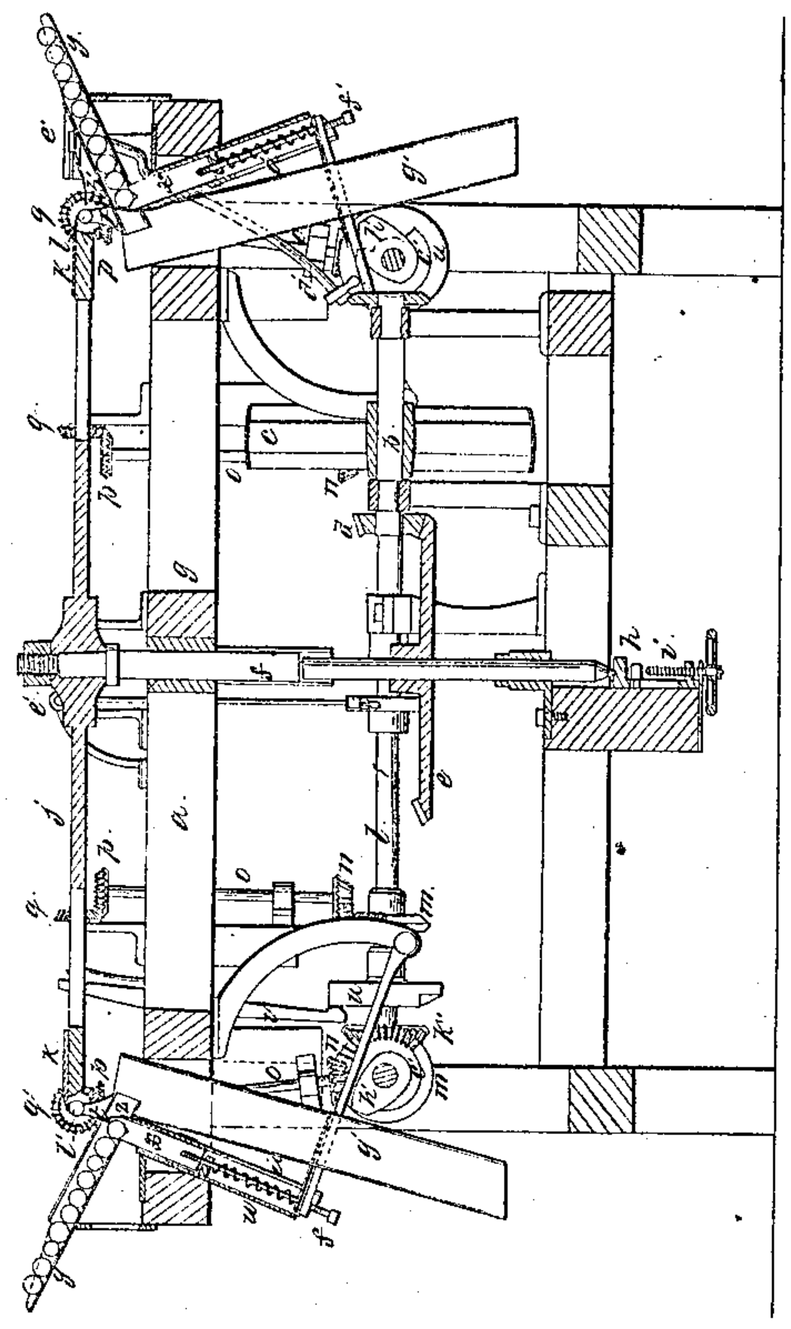
Fig. 1.

3. Sheets-Sheet 2.

Wombaugh & Abernethy,
Cork Machine.

No. 20,771. Patented July 6, 1858.

Fig: 2.



3 Sheets. Sheet. 3.

Wombaugh & Abernethy.
Cork Machine.

No. 20,771. Patented July. 6, 1858.

Fig: 5.

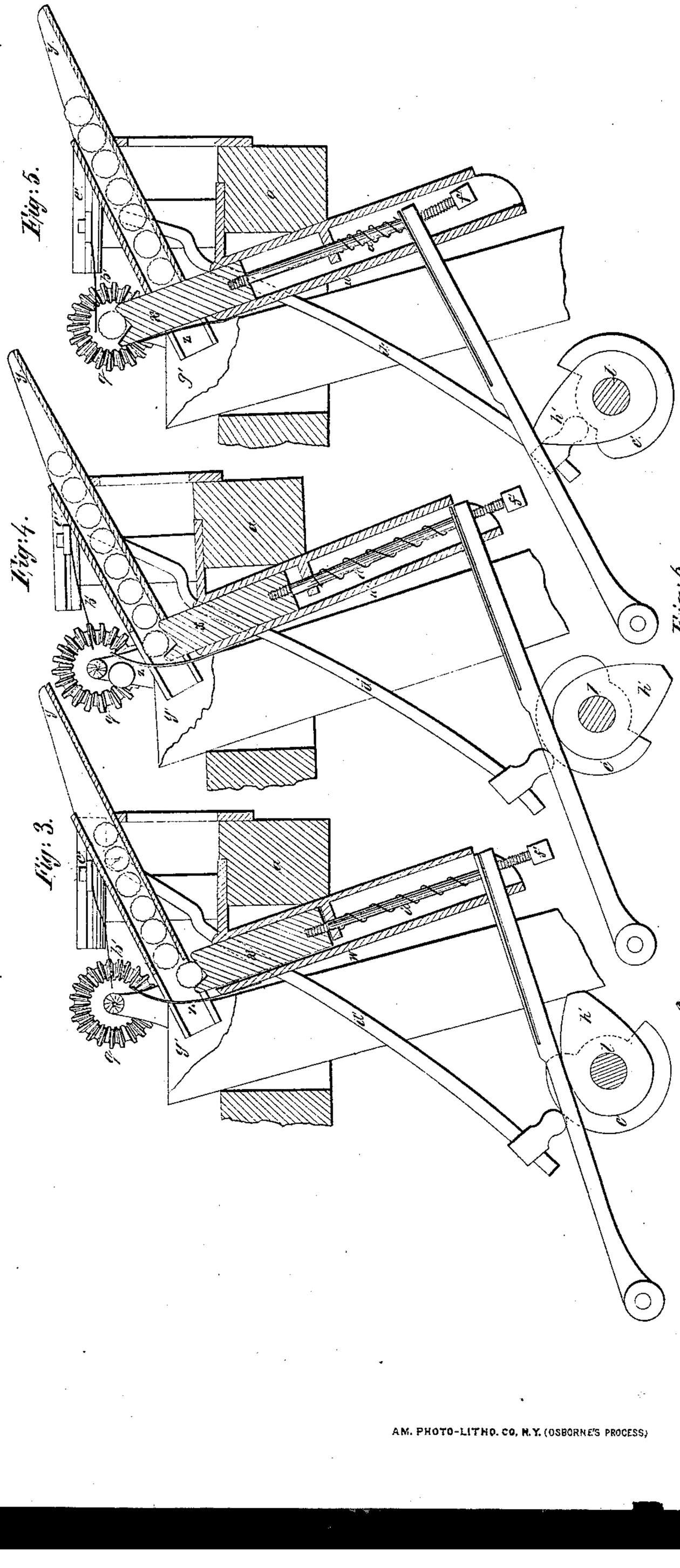
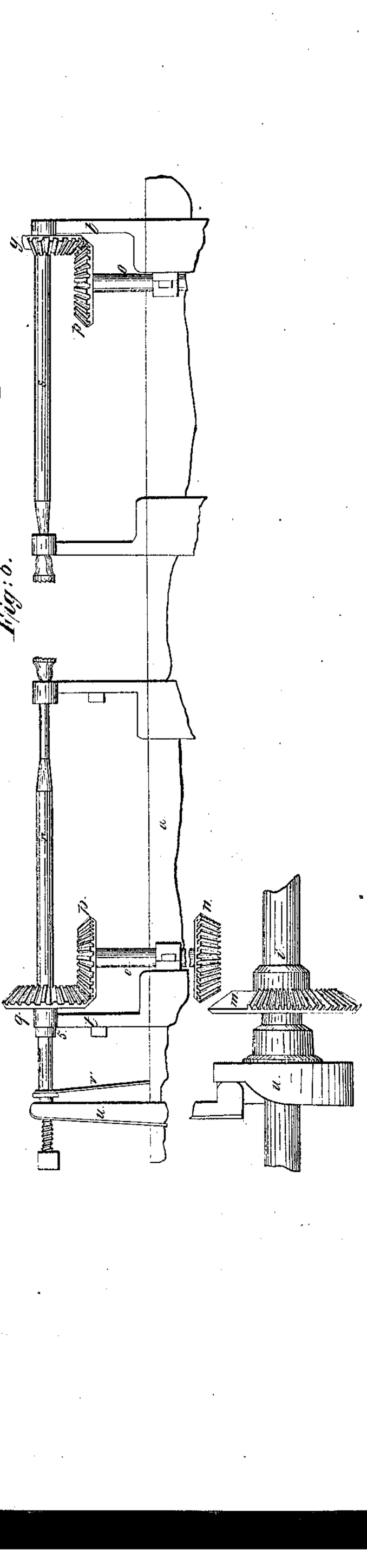


Fig: 4.

Fig: 3.

Fig: 6.



UNITED STATES PATENT OFFICE.

R. P. ABERNETHY AND M. M. WOMBAUGH, OF CINCINNATI, OHIO.

MACHINE FOR CUTTING CORKS.

Specification of Letters Patent No. 20,771, dated July 6, 1858.

To all whom it may concern:

Be it known that we, ROBERT P. ABERNETHY and MAHLON M. WOMBAUGH, of Cincinnati, Hamilton county, Ohio, have invented new and useful Improvements in Cork-Cutting Machinery; and we do hereby declare the following to be a clear, full, and exact description thereof, reference being had to the annexed drawings, making part of this specification.

The leading features of novelty in these improvements are as follows:—1st, a peculiar construction of cutter, which obviates the necessity of removing it from the mandrels, or vice versa, during the discharge of the finished cork, and reception of a new blank. 2nd, an automatic feed apparatus of novel construction. 3rd, an arrangement of cam movement, and gearing, to clamp the blank, and cause the intermittent rotation of the mandrels.

In the accompanying drawings Figure 1 is an isometric representation of our machine. Fig. 2 is an axial section taken at the plane x, x, x of Fig. 1. Figs. 3, 4, and 5 illustrate the successive movements of the feeding apparatus, and its accessories. Fig. 6 is a detached view of the sliding mandrel, and of its actuating mechanism.

a is a frame about five feet square, and about thirty inches high. Journaled at the center of this frame is a vertical shaft, f, which is supported and adjusted longitudinally, by a set screw, i. A horizontal shaft, b, carries the driving pulley c. This shaft communicates one fourth of its own velocity to the shaft f, by means of bevel gearing d, e. The central shaft, f, rises about six inches above the frame and is crowned by a large horizontal wheel, j, whose outer rim may consist either of a single ring, (as in the present illustration), or of several segments. To the flat, upper surface of the outer rim of this wheel, there are attached at opposite points four knives, k. These knives, when attached to the wheel, j, have their cutting edges, mostly coincident with a circle somewhat larger than the skirt of the wheel, j, that is to say the portion 1—2— of each cutting edge, forms an arc of about 45°—or $\frac{1}{8}$ of the circle—while the extreme front end 2, 3 for a distance, about equal to the length of a cork, is rounded inwardly. Thus the verge of the cutting edge is laid off in 8 nearly equal parts, formed by alternate knives and spaces; at these spaces there occurs such a cessation of the cutting action, as to afford time for the automatic feeding and clamping of the "blank" or rough cork, without interfering with the continuous rotation of the wheel.

The knives and the mandrels may be made adjustable, relatively to each other, so as to vary the depth of cut.

l are four countershafts, which receive motion from the main driving shaft, in such a way as to revolve four times, for each revolution of the cutter wheel. Each of these counter shafts, l, has two "half wheels," m,—that is to say bevel wheels, having cogs around only one half of their circuit. Placed so as to gear with each half wheel is a bevel pinion, n, of half the diameter of said wheel. This pinion is attached to the lower end of a nearly vertical shaft, o, surmounted by a small bevel wheel, p, which gears into a similar wheel, q, on the rear end of each cork mandrel, r, s. These mandrels are journaled horizontally, as represented within headstocks, t, similar to those of a lathe. One mandrel shaft, (r,) of each pair, is connected to its pinion by a feather, 5, so that it can be rotated by said pinion, while being itself slid longitudinally in its bearings. This longitudinal sliding of one mandrel of each pair, is to enable the chucks, or burs, t', at the proper instant, to grasp the blank, preparatory to the cutting action. The sliding of the mandrel is effected by a cam, u, on the counter shaft, operating through a lever, v.

w, w, are square tubes fixed obliquely to the frame, one at the midwidth of each side: within each tube w, there is fitted a piston, x, notched at its top, in the manner represented. The breadth and thickness of these tubes, correspond respectively, to the length and diameter of the blank.

y is a tubular hopper, down which the blanks being dropped sidewise, are, one by one as wanted, caught in the notch of the piston. z, is a small elastic strip of metal, which, on the descent of the piston, x, overlies it, and serves to conduct off the parings, and also the finished corks, when released by the retraction of the mandrel, r. The elevation of the piston x, does not take place all at once, or with a uniform rapidity, but,

rising slowly at first, stops for an instant at part of its height, and then more rapidly completes its ascent. A moment's inspection of the diagrams (3, 4, and 5,) will exhibit the necessity for this intermittent action: the necessarily inclined position of the hopper tube, *y*, causes the blank, immediately in the rear of the one to be elevated, to lean somewhat over its predecessor, so that the rapid elevation at once of the selected blank, is found to result in its becoming jammed with the next in succession, but by a gentle ascent at first, the rounded edge of the piston, easily pushes back the blanks contained in the hopper. A blank having been thus elevated by the piston, is held by it in such position as properly to present it to the grasp of the mandrels, the piston remaining quiescent, and still supporting the cork, until the paring knife has entered the length of the cork. The piston is then quickly retracted by a spiral spring, *a'*, inclosed within the tube, *w*. The cam by which this feeding movement is effected, is shown at *h'*.

b', is an elastic finger, which by means of a cam, *c'*, upon the counter shaft, and a lever, *d'*, is brought over the blank in the act of presentation and serves to hold it firmly within the notch of the piston until grasped by the mandrels. As the knife advances, this finger is retracted by a spring, in the guide box, *e'*, or otherwise. *f'*, *f'* are set screws by means of which, the range of the piston is adjusted so as to present the blank always exactly in line with the mandrels.

k', *k'* are beveled wheels, which communicate motion from one counter shaft to another.

The operation of the manufacture is as follows: The "blanks" or pieces to be converted into finished corks, are first got out in the rough, with an approximately cylindrical form by means of a tubular saw, and are then cut smoothly into the proper lengths, and one, or more of the feeding tubes having been charged with "blanks" the machine is set in motion. The various working parts, above described, are so arranged relatively to each other that during the passage of one of the intervals, or spaces of the cutting wheel, the piston commences action by picking up a blank, and elevating it to the clamping position by the described intermittent movement. Simultaneously with this action the finger *b'*, being advanced by its cam, holds the blank firmly within the notch, until grasped by the sliding mandrel. The finger *b'* then recedes, the blank being still held fast by both piston and mandrels, until the knife by advancing has entered the length of the cork. The paring being thus initiated and the knife still swiftly advancing, the piston suddenly drops back and at the same instant, the half wheels engaging with the gear of the mandrels, the latter promptly, but slowly, rotate the blank, while the knife, by a swift carving action, completes the paring, which being effected, the half wheels become disengaged, the mandrels cease to revolve, and the sliding mandrel being retracted by the spring *v'*, the finished cork is discharged through a spout *g'*. When the corks are to be formed tapering, the mandrel headstocks are so placed, as to present the mandrels at an inclination, corresponding to the desired taper. By means of the foot screw *i*, the cutters may be elevated or depressed, so as to cut a larger, or smaller cork.

The machine may be made either, to cut corks of equal dimensions at the different feeding places, or by suitable adjustment of the mandrels, and the feeding mechanism, a different size may be cut at each feeding place.

With a greater, or less circumference of wheel, and corresponding breadth of frame, a greater or less number of knives, and feeding places may be employed; for example eight knives, and as many feeders may be used, the wheel being of double the diameter, and the frame of corresponding breadth, and of octagonal shape.

The above plan of continuously revolving divided cutter may be easily adapted to cut corks from the square if desired. Great economy of time and power accompanies the use of such continuously revolving cutter wheel, with its sustained momentum—but these advantages can be made available only in combination with a feed and mandrel action, entirely automatic, because the rapid intermittent action of the knives far outstrips any possible manipulation.

The automatic feeding mechanism here described, enables a single attendant, who may be a child, to conduct the manufacture of many hundred gross of corks per day.

We claim as new, and of our invention herein—

1. The rotary cutter head, having alternate blades, and spaces—in combination with the automatic mandrels—to admit of the removal of the finished cork—and clamping the fresh blank, without removing either cutter, or mandrels.

2. In combination with the intermittent cutting disk and mandrels, substantially as described we claim, the described arrangement of half wheel cam movement, and their accessories for the purposes set forth.

3. We claim in this connection the feed apparatus, consisting of the hopper, notched piston, and cam movement with their accessories, substantially as described.

4. In the described connection with the feed piston and mandrels—we claim the

spring pressure plate, or finger, operated substantially, as, and for the purpose set forth.

5. In the described combination with the feed piston and mandrels, we claim the discharging spring, or strip, substantially as set forth.

In testimony of which invention we hereunto set our hands.

R. P. ABERNETHY.
M. M. WOMBAUGH.

Attest:

GEO. H. KNIGHT,
C. STEEMESS.