No. 683,226. Patented Sept. 24, 1901.

W. E. SAUNDERS.

CUTTING-OFF MECHANISM FOR PLASTIC MATERIAL.

(Application filed Jan. 8, 1901.)

(No Model.) 2 Sheets—Sheet 1.

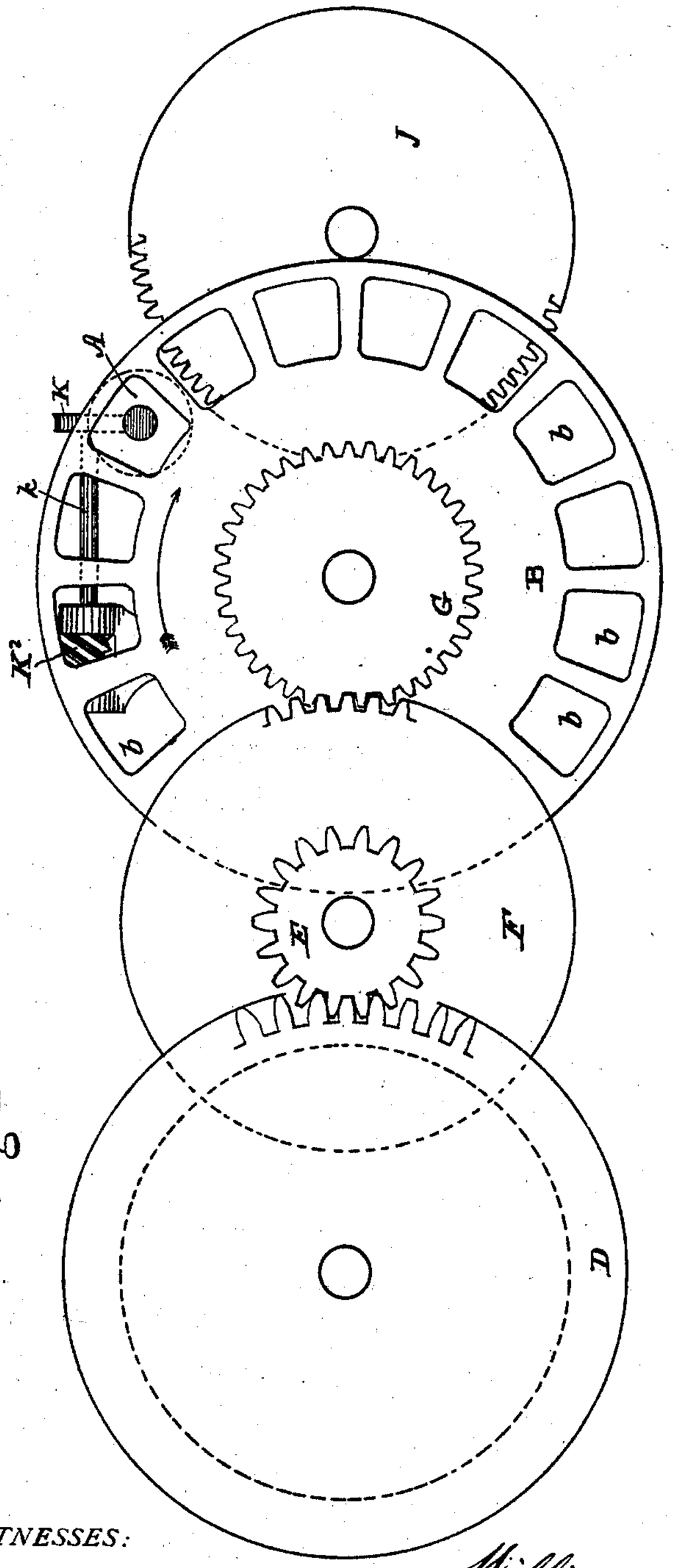

Fig. 1

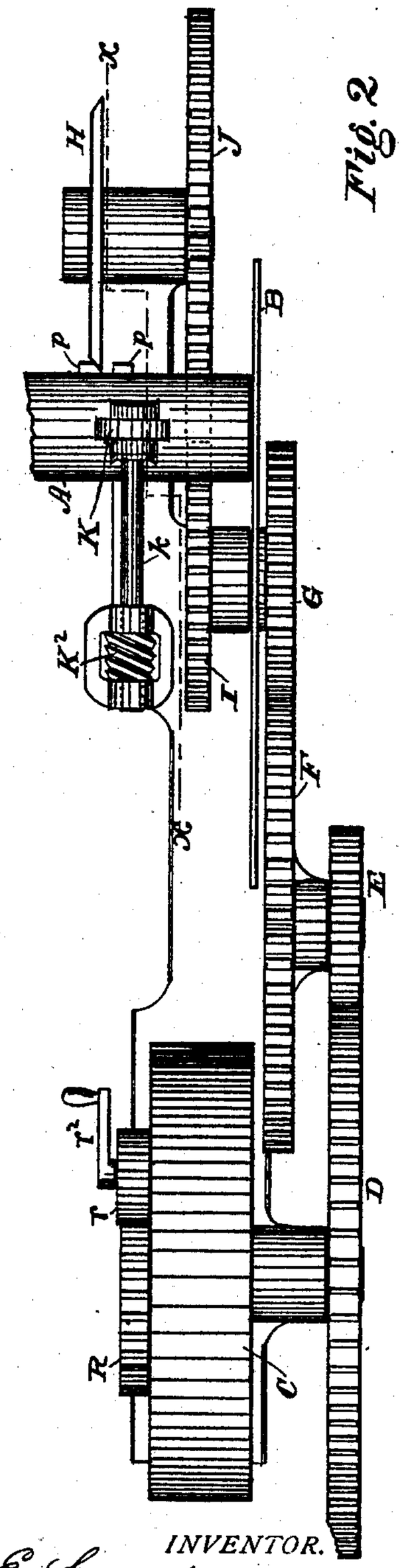

Fig. 2

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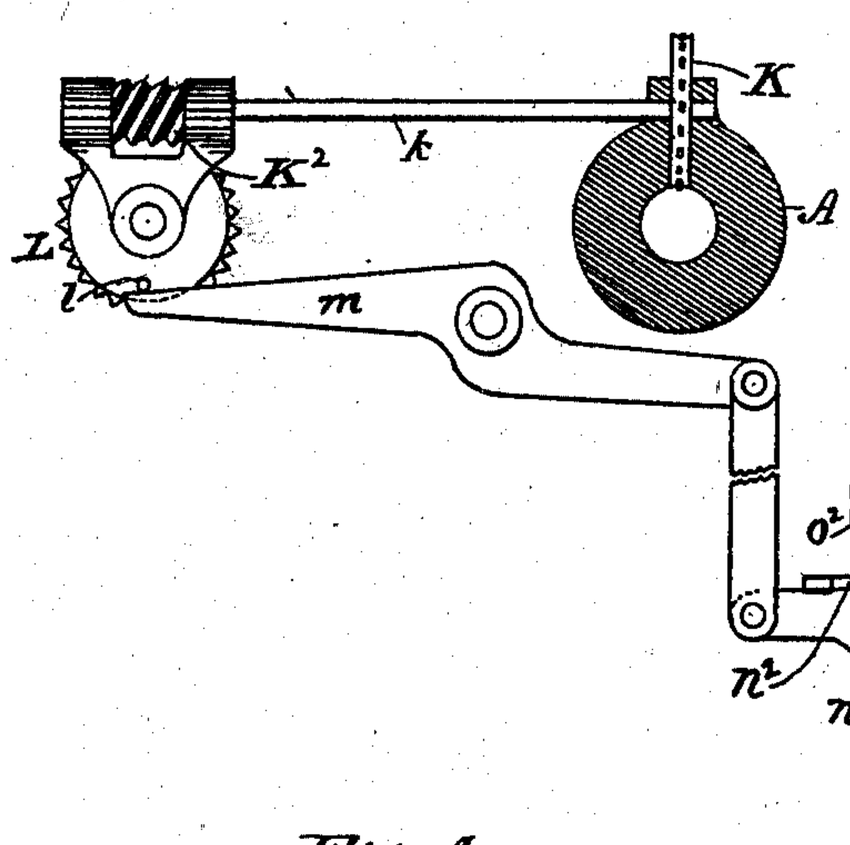

Fig. 3

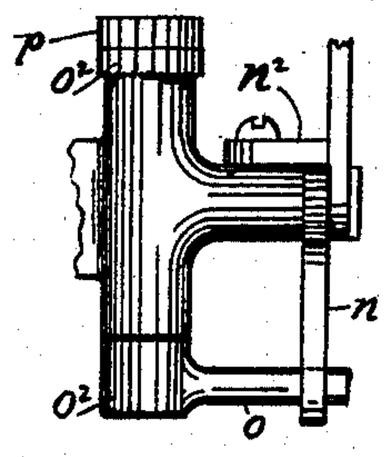

Fig. 4

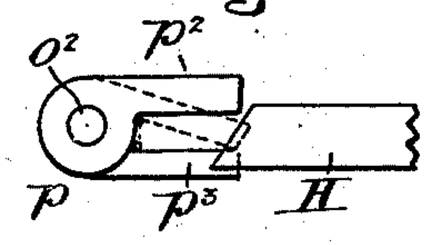

Fig. 6.

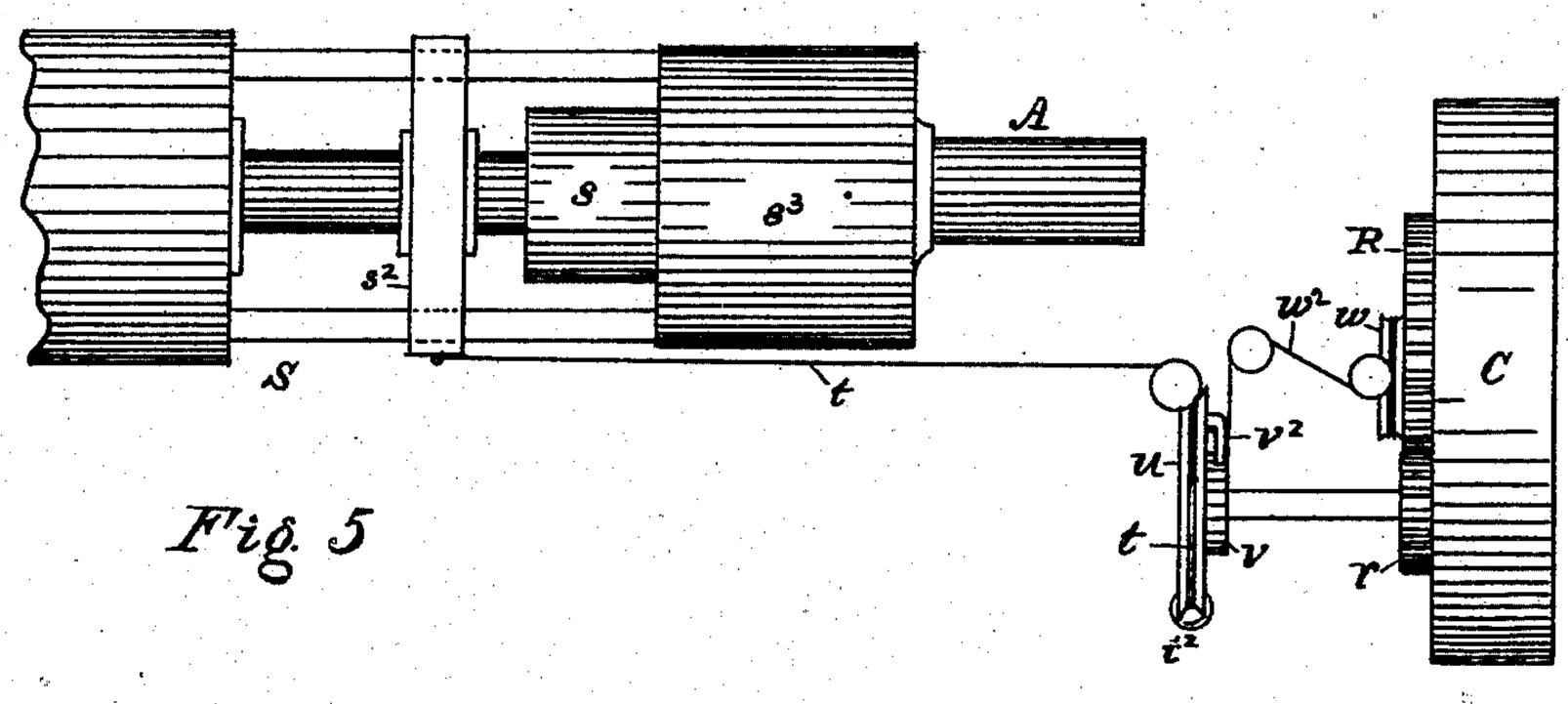

Fig. 5

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UNITED STATES PATENT OFFICE.

WILLIAM EDWARD SAUNDERS, OF CLEVELAND, OHIO.

CUTTING-OFF MECHANISM FOR PLASTIC MATERIAL.

SPECIFICATION forming part of Letters Patent No. 683,226, dated September 24, 1901.

Application filed January 8, 1901. Serial No. 42,511. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM EDWARD SAUNDERS, a citizen of the United States, residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented certain new and useful Improvements in Cutting-Off Mechanism for Plastic Material; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to apparatus for cutting off plastic material which is forced through dies, as in the common method of manufacturing tile, brick, and other plastic materials.

The objects of the invention are to increase the efficiency of the apparatus used for that purpose, to secure economy in the operation, and simplify the apparatus employed; and the invention consists in the construction, arrangement, and combination of parts to accomplish such purposes, all as hereinafter fully described, and specifically set forth in the claims.

Figure 1 represents in front elevation the cutting-off mechanism adjusted to the die of the press, only the die being shown. Fig. 2 represents in plan view the mechanism shown in Fig. 1. Fig. 3 represents, partly in elevation and partly in section along an irregular line marked *x x* on Fig. 2, the escapement mechanism, the wheel K being shown in elevation for better illustration. Fig. 4 is a detail in elevation, showing more clearly the lever *n*, arm *o*, and their connections. Fig. 5 is a plan view of the mechanism by which the spring is rewound automatically by the action of the press. Fig. 6 is a detail showing the action of the escapement-fork.

In the drawings, A represents the die through which the plastic material is forced, and which die of course corresponds in shape to the desired contour of the article to be produced, the material being forced through the die by pressure in the usual way and by any suitable form of press.

B represents a wheel or disk having apertures *b* circumferentially arranged near its edge and separated by as narrow portions of the solid material of the disk as will suffice to give sufficient stiffness and rigidity to the disk and prevent its distortion in the operation of cutting. A wheel composed of a hub and rim joined by tightly-stretched radial rods or wires may obviously be used in place of the preferred disk, but is not regarded as so desirable a construction as the latter. Motion is imparted to the disk B by means of a spring C or equivalent, which actuates the gears D E F G, the latter of which is rigid with the shaft upon which the disk B is secured. The gears D, F, and J are completely toothed, as shown in Fig. 2, for convenience a portion only of the teeth being shown in Fig. 1. The necessary intermittent action of the disk B is effected by means of an escapement comprising the ratchet-disk H, actuated by the gears I J, the latter of which is rigid with the shaft of the ratchet-disk H. The escapement is actuated in the following manner: A disk or wheel K, rigid with the shaft *k*, is seated in a slot in the die A and is provided on its perimeter with slightly-projecting points, figures, or other minute projections which project in the cavity of the die and are engaged by the plastic material passing therethrough, thus causing a positive rotation of the wheel K and imparting a much greater rotative force thereto than would be imparted by friction alone. At the opposite extremity of the shaft *k* is a worm K^2, which engages with a gear L, which bears upon one of its faces a pin or pins *l*. A lever *m* is arranged with one end projecting within the path traversed by the pins *l* and has its opposite end connected to a right-angle lever *n*, whose free arm engages an arm *o*, projecting from a rock-shaft o^2, to which is secured the escapement-fork *p*, which is similar to a typewriter escapement-fork, having its two arms movable with relation to each other and engaging the teeth of the ratchet-disk H. The spring C of course exerts a constant force upon the gears D, E, and G, tending to rotate the disk B in the direction of the arrow; but this tendency to rotate is restrained by the engagement of the disk H with the fork *p*. When, however, the rotation of the gear L brings one of the pins *l* against the lever *m*, the movement of the latter causes the lever *n* and the rock-shaft o^2 to slightly move the escapement-fork *p*, the first effect of the rotation of shaft o^2 being to move the first or fixed

arm p^2 of the fork toward the second movable arm p^3, upon which the ratchet H rests and whose pressure prevents the arm p^3 from moving under the action of the light spring which tends to keep the arms p^2 and p^3 apart in the position shown in full lines in Fig. 6 and allow the arm p^2 to be brought into engagement with the ratchet H before arm p^3 begins to move, as indicated in dotted lines in Fig. 6. The further rotation of shaft o^2, then, when arm p^2 has reached the limit of its motion relatively to arm p^3 moves the two arms until arm p^3 is disengaged from the ratchet and resumes its position parallel to arm p^2, which then holds the ratchet H; but when the pin l passes off the lever m the spring n^2 causes the instantaneous throw of the levers m and n and rock-shaft o^2 in the opposite direction, causing arm p^2 to disengage from the ratchet an instant before arm p^3 reaches it, whereupon the ratchet moves before arm p^3 reaches the next tooth, thus causing the escapement-fork p to permit the rotation of the disk H the distance of one tooth, when it is caught again by the second arm p^3 of the fork p, which retains the disk H in position and prevents further rotation until the lever m is again moved by one of the pins l, when the same operation is repeated. The movement of the disk H through the space of one tooth permits the disk B to be rotated by the gears D E F G to an extent corresponding with the distance between the centers of the openings b, and consequently cuts off the material by the passage of the web between the two consecutive openings b b, leaving the succeeded opening registering with the orifice of the die A and permitting the plastic material to pass from the die through the opening B unobstructed until the disk B is again rotated in the manner above described.

By the above construction the partial rotation of the disk B is so rapid and the positive stopping of the rotation by the escapement is so certain and effective that no perceptible interference with the continuous movement of the plastic material from the die is caused, and the cutting off is effected squarely and without the breaking away of material, which is a common defect in most cutting-off mechanisms designed for application to this class of work.

The spring C as it unwinds and runs down in operating the cut-off wheel may be rewound in any preferred manner — for instance, by the gear R, connected to the spring and actuated by the pinion r, provided with the crank r^2 upon its shaft. I prefer, however, to effect the rewinding of the spring automatically by the action of the press itself, and to effect this the mechanism shown in Fig. 5 or other equivalent mechanism may be used, whereby the retraction of the press-plunger after having emptied the press-cylinder may be caused to rewind the spring C. In the arrangement shown in Fig. 5, S represents the press, whose plunger s is attached to a cross-head s^2, and the rewinding is effected by attaching a cord t or equivalent to the cross-head s^2, (or, if preferred, to the plunger itself,) which cord is wound upon a pulley u upon the shaft of the gear r. A weight t^2, attached to the free end of the cord t, takes up the slack of the cord as the plunger s is forced forward into the press-cylinder s^3 to force the plastic material through the die A, and upon the retraction of the plunger after the cylinder s^3 has been emptied the rotation of the pulley u thereby caused rotates the pinion r and the gear R, thus rewinding the spring ready for operation when the piston is again forced forward. To prevent the overwinding of the spring by such action of the press, the pulley u is preferably mounted loosely upon the shaft of pinion r and a ratchet v, rigid with said shaft, is placed adjoining the pulley u, and a dog v^2, attached to the pulley u, engages the ratchet v, thus causing the rotation of the pinion r when the pulley u is rotated by the action of the press. The dog of course rides upon the ratchet without actuating the same when the pulley u is turned in the reverse direction during the forward movement of the press-plunger. A barrel w, rigid with the gear R, has attached to and wound upon it a cord w^2, which is attached to the dog v^2, and this cord is so adjusted as to length that it will lift the dog v^2 out of engagement with the ratchet v as soon as the spring C has been completely wound up, so that the further rotation of the pulley u will produce no further effect upon the spring C. In this manner the spring C is automatically kept wound up and at sufficiently full tension without requiring any attention for that purpose.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. In mechanism for cutting plastics the combination of a cutting-off wheel located in the path of the moving mass of plastic material, a constantly-acting power tending to rotate said wheel, an escapement restraining the rotation of said wheel, and a wheel in contact with the plastic material and rotated by the movement thereof and causing the release of the escapement at defined intervals, substantially as described.

2. In mechanism for cutting plastics the combination with the die of a cutting-off wheel located in the path of the moving mass of plastic material, a constantly-acting power tending to rotate said wheel, an escapement restraining the rotation of said wheel, and a wheel seated in the die in contact with the plastic material and rotated by the movement thereof and causing the release of the escapement at defined intervals, substantially as described.

3. In mechanism for cutting plastics the combination with the die of a cutting-off wheel located in the path of the moving mass of plastic material, a spring tending to rotate said wheel, an escapement restraining the ro-

tation of said wheel, and a wheel in contact with the plastic material and rotated by the movement thereof and causing the release of the escapement at defined intervals, substantially as described.

4. In cutting-off mechanism of the class described the combination with the die of a cutting-off wheel located in the path of the moving mass of plastic material, a spring-actuated train of gears normally acting to rotate the cutting-off wheel, an escapement restraining the rotation of said wheel, and a wheel in contact with the plastic material and rotated by the movement thereof and operating to cause the release of the escapement at defined intervals, substantially as described.

5. In cutting-off mechanism of the class described the combination with the die of a cutting-off wheel located in the path of the moving mass of plastic material, a spring-actuated train of gears normally acting to rotate the cutting-off wheel, an escapement restraining the rotation of said wheel, and a wheel in contact with the plastic material and rotated by the movement thereof and operating a lever to cause the release of the escapement at defined intervals, substantially as described.

6. In cutting-off mechanism of the class described the combination with the die of a cutting-off wheel located in the path of the moving mass of plastic material, a spring-actuated train of gears normally acting to rotate the cutting-off wheel, an escapement restraining the rotation of said wheel, and a wheel in contact with the plastic material and rotated by the movement thereof and operating a series of levers to cause the release of the escapement at defined intervals, substantially as described.

7. In cutting-off mechanism of the class described the combination with the die of a cutting-off wheel located in the path of the moving mass of plastic material, a spring-actuated train of gears normally acting to rotate the cutting-off wheel, an escapement restraining the rotation of said wheel, a wheel in contact with the plastic material and rotated by the movement thereof, a disk rotated by said wheel and having a projecting pin, and a lever adapted to operate the escapement and having one end projecting in the path traversed by said pin, whereby said lever is intermittently moved by said pin to operate the escapement, substantially as described.

8. In cutting-off mechanism of the class described the combination with the die of a cutting-off wheel located in the path of the moving mass of plastic material, a spring-actuated train of gears normally acting to rotate the cutting-off wheel, a forked escapement restraining the rotation of said wheel, a wheel seated in the die in contact with the plastic material and rotated by the movement thereof, a worm rigid with said wheel, a toothed disk engaging said worm and having a projecting pin, and a lever projecting in the path of said pin and acting to throw the escapement-fork when engaged by said pin, substantially as described.

9. In cutting-off mechanism of the class described the combination with the die of a cutting-off wheel located in the path of the moving mass of plastic material, a spring-actuated train of gears normally acting to rotate the cutting-off wheel, a forked escapement restraining the rotation of said wheel, a wheel seated in the die in contact with the plastic material and rotated by the movement thereof, a worm rigid with said wheel, a toothed disk engaging said worm and having a projecting pin, a rock-shaft carrying the escapement-fork, and a lever projecting in the path of said pin and acting to throw the escapement-fork when engaged by said pin, substantially as described.

10. In cutting-off mechanism of the class described the combination with the die of a disk having circumferentially-arranged openings located in the path of the moving mass of plastic material, a spring-actuated train of gears normally acting to rotate said cutting-off disk, an escapement restraining the rotation of said disk, and a wheel seated in the die in contact with the plastic material and rotated by the movement thereof and operating by such rotation to cause the release of the escapement at defined intervals, substantially as described.

11. The combination, with the die, of the wheel K seated therein and in contact with the material forced through the die, the worm K^2, the disk L having pin l, the levers m, n, rock-shaft o^2 bearing fork p, the ratchet-disk H geared to the cutting-off disk B, and the spring C also geared to said cutting-off disk, substantially as and for the purposes described.

12. The combination with a press for molding plastic material of a cutting-off mechanism operated by a spring and a connection from said spring to a moving part of the press, whereby the spring is automatically rewound by the action of the press substantially as described.

13. The combination with a press for molding plastic material of a cutting-off mechanism operated by a spring and a connection from said spring to a moving part of the press, whereby the retraction of the plunger from the cylinder of the press rewinds the spring, substantially as described.

14. The combination with a press for molding plastic material and a cutting-off mechanism operated by a spring, of a pulley connected to the spring and a cord wound upon said pulley and attached to a moving part of the press, whereby the spring is automatically rewound by the action of the press; substantially as described.

15. The combination with a press for molding plastic material and a cutting-off mechanism operated by a spring, of a pulley connected to the spring a cord wound upon said pulley and attached to a moving part of the press, and means, substantially such as described,

for disconnecting the pulley from the spring to prevent the overwinding of the spring.

16. The combination with a press for molding plastic material of a cutting-off mechanism operated by a spring, a gear connected to the spring for winding the same, a ratchet operating when rotated to turn said gear and wind the spring, a pulley carrying a dog which engages said ratchet, a cord wound upon said pulley and attached to a moving part of the press, and a cord attached to said dog and wound up by the rotation of said gear, whereby the pulley is automatically disconnected from said gear when the spring is fully wound up, substantially as described.

In testimony whereof I hereto affix my signature in presence of two witnesses.

WILLIAM EDWARD SAUNDERS.

Witnesses:
M. S. HUGHES,
HATTIE STEVENSON.