July 16, 1940. W. F. COUSINO 2,208,018

PERFORATING IN SUCCESSION

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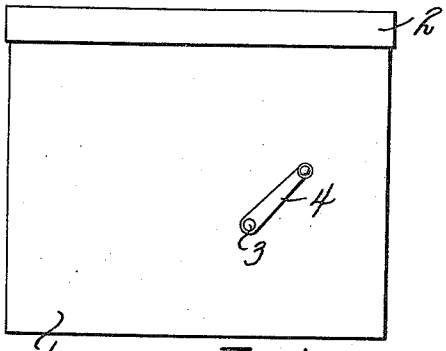


Fig. 1

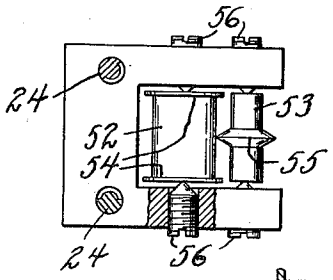


Fig. 3

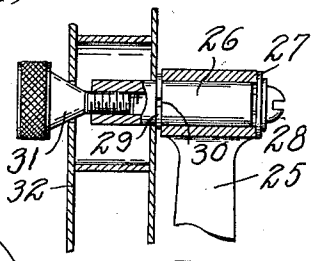


Fig. 4

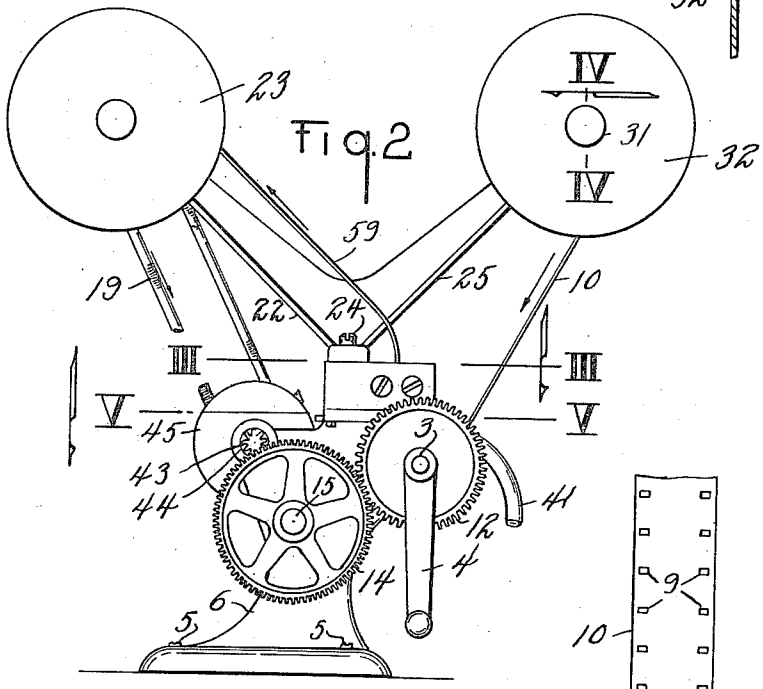


Fig. 2

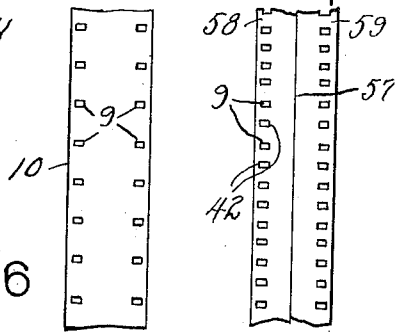


Fig. 6

Fig. 7

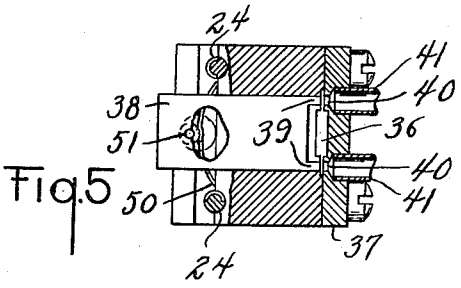


Fig. 5

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Fig. 8

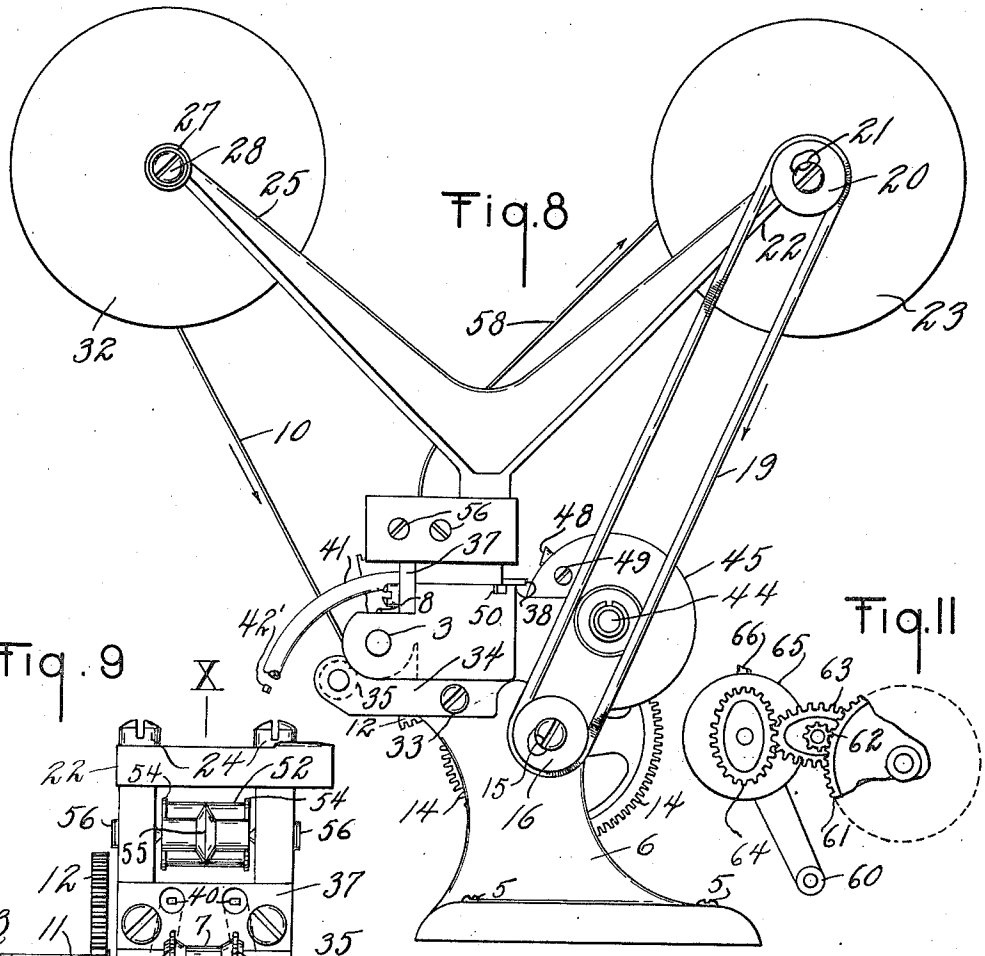


Fig. 9

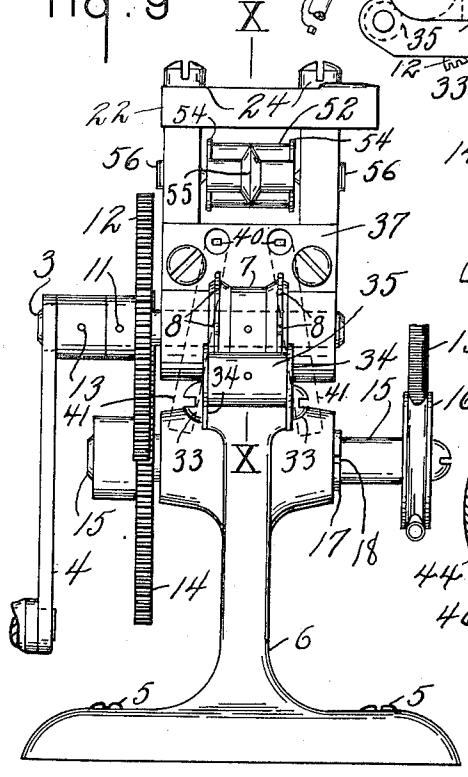
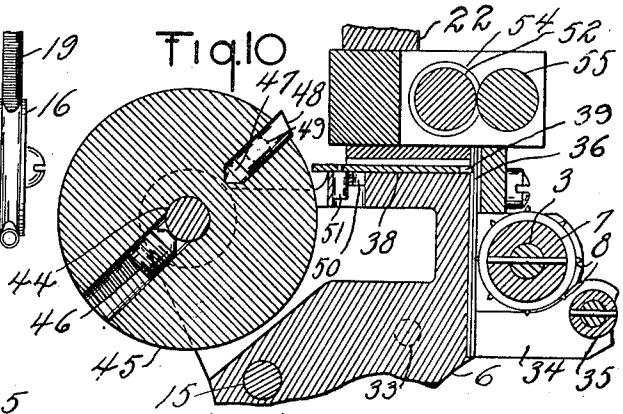


Fig. 11

Fig. 10



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UNITED STATES PATENT OFFICE

2,208,018

PERFORATING IN SUCCESSION

Walter F. Cousino, Toledo, Ohio

Application February 14, 1938, Serial No. 190,401

1 Claim. (Cl. 164—89)

This invention relates to rapid sequence of actions on stock, as perforating strips of material.

This invention has utility when incorporated in continuous feed drive of narrow sheet stock, whether metal or photographic film, and establishing a series of holes therein definitely spaced.

Referring to the drawings:

Fig. 1 is a side elevation of a dark chamber housing for the device as adapted to film which may be in the sensitive state;

Fig. 2 is a view of the operating parts, with the housing or dark chamber removed;

Fig. 3 is a view on the line III—III, Fig. 2, looking at the slitter for sub-dividing the strip lengthwise;

Fig. 4 is a section on the line IV—IV, Fig. 2, showing the supply reel for the strip stock as film;

Fig. 5 is a section on the line V—V, Fig. 2, showing the punch and cooperating die;

Fig. 6 is a view of a portion of the ribbon stock or strip as in the supply roll to the right of Fig. 2, say of sixteen millimeter photographic film;

Fig. 7 is a fragment of strip stock having the greater number of holes therein and the strips cut in two, thereby forming an eight millimeter strip as in the film range as supplied to the re-winding roll;

Fig. 8 is a view from the opposite side of the showing in Fig. 2, with parts broken away, showing the reel drive for re-winding;

Fig. 9 is a view from the left of Fig. 8, showing the feed and slitter features;

Fig. 10 is a section on the line X—X, Fig. 9, showing the details of this feed, punch and slitter; and

Fig. 11 is a view of the continuous uniform angular velocity tool drive with transmission therefrom of variable angular velocity drive for the stock.

Housing or dark room 1 has removable closure 2. Protruding from the housing or dark chamber 1 is shaft 3 having handle 4 as a manual drive. In this chamber or housing 1 and anchored therewith by screws 5 (Figs. 2, 8, 9) is frame 6 providing bearing for the shaft 3. This shaft 3, as extending through the frame 6, has thereon feed roller 7, in this instance having teeth 8 for entering openings 9 in sixteen millimeter film 10 (Fig. 6). Pin 11 anchors gear wheel 12 with the shaft 3 as does pin 13 anchor the crank 4. This gear wheel 12 is in mesh with gear 14 fixed with shaft 15, extending through the frame 5 parallel to the shaft 3. As projecting from the opposite side of this frame 5 the shaft 15 carries pulley 16. Split ring 17 in groove 18 anchors this shaft 15 against longitudinal shifting as to the bearing in frame 6 and thereby holds the gear wheels 12, 14, in proper mesh relation.

From this pulley 16 extends helical coil endless belt 19 about pulley 20, fixed with shaft 21 in bracket 22 and carrying re-winding reel 23 for the worked strip stock. This bracket 22 is anchored with the frame 6 by screws 24 and has extending oppositely from the arm 22 bracket arm 25 (Figs. 2, 4) having therein shaft 26 with friction washer 27 on one end thereof held by screw 28 to pull split ring 29 in groove 30 as a collar against the opposite side of the bearing of the bracket 25, thereby providing protruding shaft portion inward from cone screw 31 adapted to center and mount supply reel 32 on this protruding shaft to have frictional resistance adjusted therefor at the washer 27 for unwinding the strip stock 10 as pulled therefrom by the feed roller 7.

Screws 33 in the frame 6 (Fig. 8) mount guide brackets 34 on opposite sides to carry spacer roller 35 therebetween as a directing device to preclude the film 10 from whipping clear of the teeth 8 and thereby in positive continuous feed uniform travel position as to this feed shaft 3. This film from the feed roller 7 of the feed device passes upward by guide-way 36 past die or die block 37, opposing which is (Figs. 5, 10) punch 38 having cutting heads 39, reciprocable to register with openings 40 in the die block 37. From these openings 40 there is enlargement extending to tube 41 as a directing means or duct for conducting away from the machine the punchings from the film 10, say as for intermediate holes 42.

The gear 14 is in mesh with pinion 43 (Fig. 2) on shaft 44 in the frame 6, parallel with the shaft 3. This shaft 44 has thereon fly wheel or rotating weight mass 45 (Fig. 10) anchored in desired angular position relatively thereto by set screw 46. Additionally, this rotating fly weight has radial way 47 in which is located projecting adjustable bevel face or cam 48, the radial position of which is locked by set screw 49. In the continuous rotation of this drive shaft 3 for the feed, there is in this intermediate gearing a speed-up drive for this cam 48 at such effective speed that the action of this cam in striking impactor or punch 38 projects such into and through the stock for its recovery in a brief interval of time, herein even less than a sixtieth of the interval for the travel distance for such.

This recovery of the punch 38 is effected by leaf spring 50 acting on pin 51. This thrusting of the punch or perforator into the stock as equally spacing additional holes 42 between the

holes 9 at the regulated relationship as determined by the feed device, expels these perforations 42' to pass from the die or anvil by way of ducts 41. The stock, accordingly, with its additional set of perforations 42 ascends in the way 36 and herein passes between follower roll pair 52, 53. The roll 52 has marginal flanges 54 to hold the stock in alignment therewith, while the companion roll 53 has slitter rib or cutter 55, which in the adjusted position of these rolls as on point bearings 56 (Fig. 3) holds this position for slitting or cutting action in effecting severing line 57 in the strip 10 actuated therepast producing double strips or multiple strips 58, 59 (Fig. 7). However, these may be separately wound or continue as a unit, and in continuing as a unit may pass from this slitter roll pair about the hub of re-winding roll 23, to be rewound thereon as the strip stock or film for this completed operation in conversion from sixteen millimeter to eight millimeter film as in the instance herein disclosed.

The speed-up for the impactor action of the punch as to the feed device in the lineal rate of travel relation is effective in the continuous feeding drive with seemingly no disturbance for accuracy in registry of the punchings. However, having in mind possible heavier stock or occasion for somewhat slackened speed in the actual punch operation, with maintenance of a linear speed rate for the feed, there may be adopted crank 60 (Fig. 11). Drive gear 61 in mesh with pinion 62 fixed with elliptical gear 63 in mesh with complementary elliptical gear 64, at the crank 60, fixed with fly weight 65, carrying cam 66. This would mean there is variable speed-up as to the feed shaft directly driven from the gear 64 but with a relatively angularly retarded section when the punch action is effected by the cam 66.

The disclosure herein involves narrow strip stock, say even as initially punched, or control for certain sequence of markings with the multiplication of such operations effected with a degree of rapidity in a continuous feed, even as to punching operation with a degree of accuracy effective for a superior output in motion picture film, with the punching operation effected as rapidly as sixty feet per minute lineal travel of the strip film.

What is claimed and it is desired to secure by Letters Patent is:

A frame and a mechanism mounted thereby embodying a feed device, an impactor, a speed multiplying intermediate transmission gearing for the impactor from the continuous feed device, a common drive for the device and impactor effective through said gearing, said impactor embodying a fly wheel, a punch, said fly wheel having a continuous peripheral surface provided with a limited duration extent projection of contact for thrusting the punch, yieldable means holding said punch toward the fly wheel, an annular die opposing the punch, and a guide for strip stock between the die and punch, said die having fixed therewith and extending therefrom a receiver for punchings cut from the stock by the die as acted upon by the punch.

WALTER F. COUSINO.