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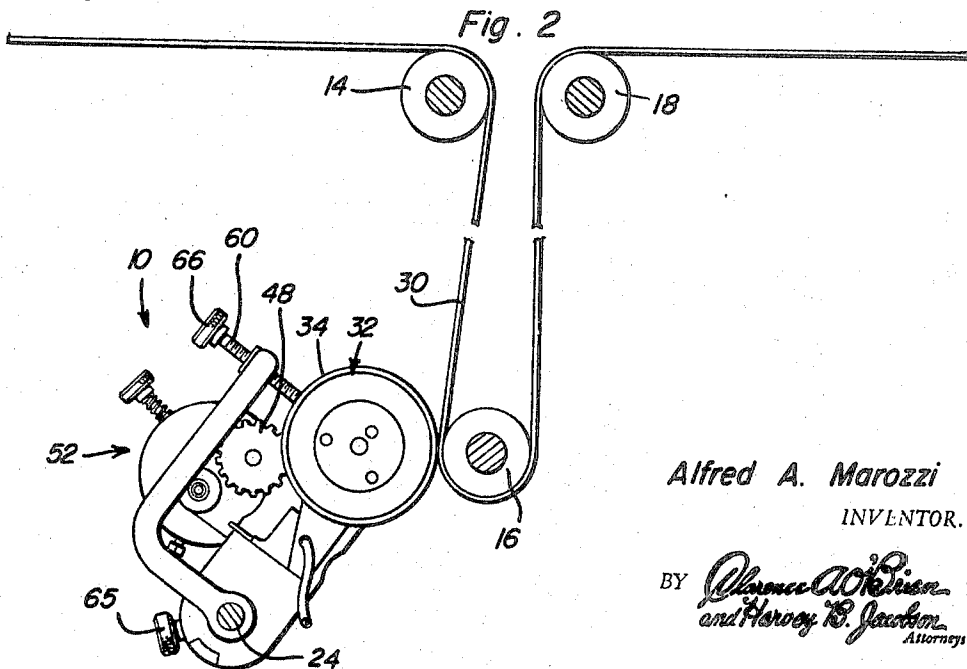
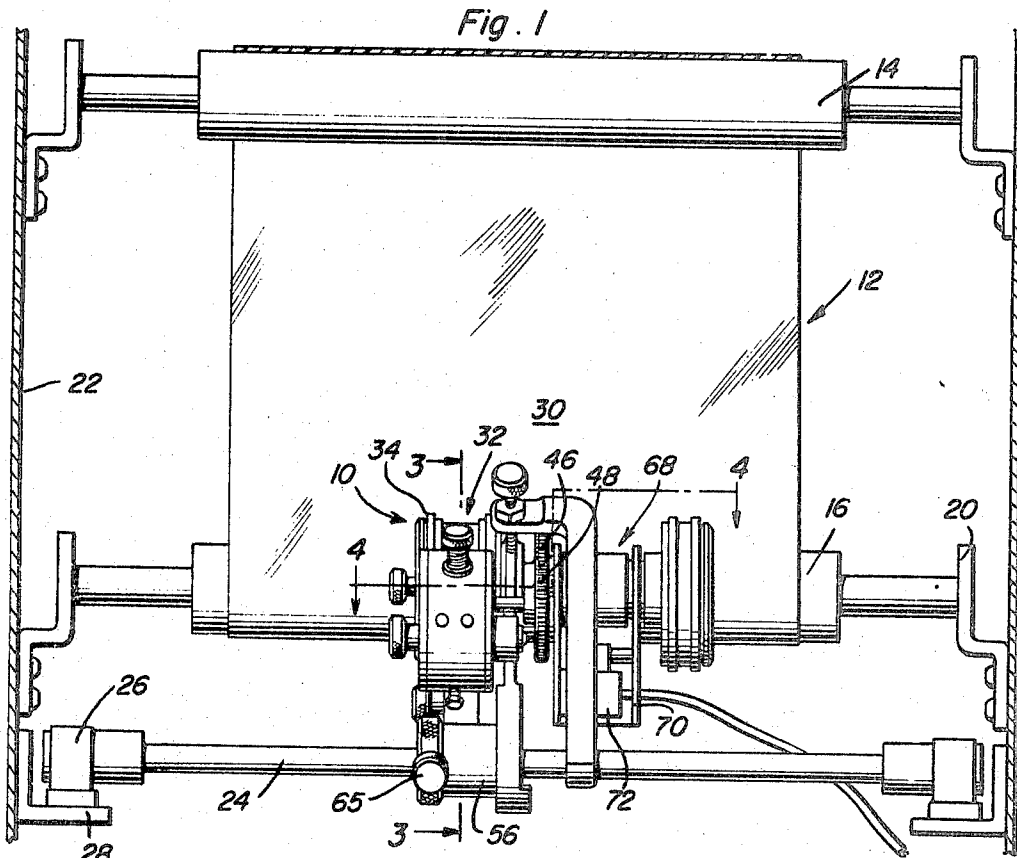
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OUTRIG DRIVE WHEEL ASSEMBLY FOR A ROTARY PRINTING WHEEL

Filed April 4, 1967

2 Sheets-Sheet 1



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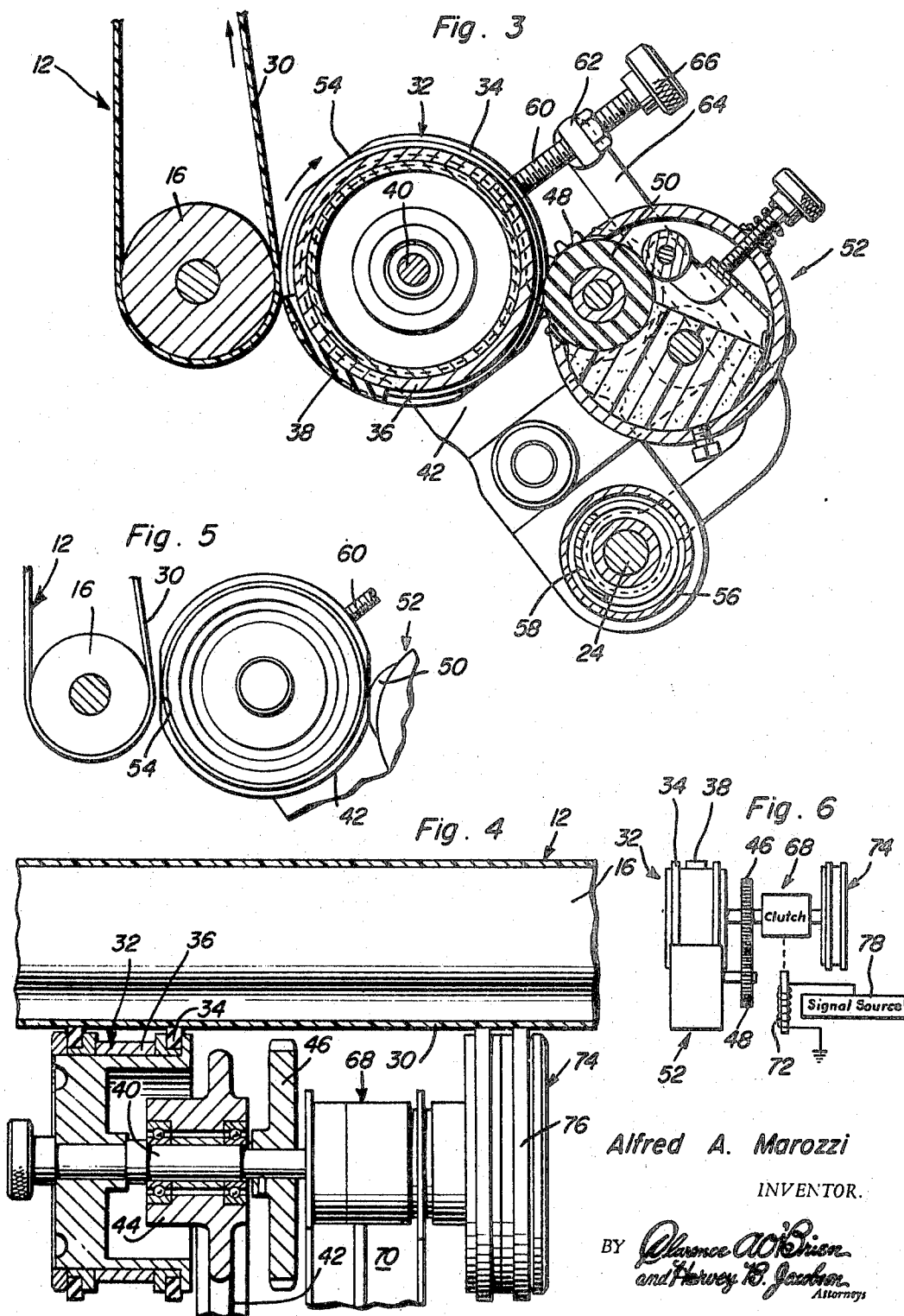
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2 Claims

ABSTRACT OF THE DISCLOSURE

A printer for intermittently marking packaging material as it is conveyed past a marking station in an automatic fashion utilizing the motion of the material itself to operate the printer without undue stress imposed on the material. Accurate transfer of surface motion from the material being marked to the printing wheel of the printer is intermittently effected through a solenoid actuated clutch and friction drive.

BACKGROUND OF THE INVENTION

This invention relates to the automatic operation of a printing or marking device of the self-inking type.

Printing or marking devices for code dating and/or price marking of moving material or articles are well known. In general, printing devices of this type are driven at a speed synchronized with the motion of the articles or material to be marked. In some instances, drive for the printing device is obtained directly from the moving surface being marked by direct frictional engagement of the printing wheel with the surface. A continuous stress is thereby imposed on the material. Because of the continuous rotation of the printing wheel, variation in the spacing between markings is limited.

The printing wheel may in some cases be driven by an indirectly powered drive mechanism to avoid stressing the material being marked, which of course involves a more costly installation. Further, in view of irregular elongation of the material being marked and the resulting variation in its linear surface speed, no accurate synchronization of the printing wheel speed is possible.

In connection with the use of a self-inking type of printed, i.e. one in which an ink transferring mechanism is rotated simultaneously with the printing wheel for transferring ink from a reservoir to the peripheral surface of the printing wheel, the problems aforementioned in connection with prior marking or printing devices is aggravated because of the increased load imposed on any drive arrangement utilized whether it be a continuous drive by direct frictional engagement or an indirect drive mechanism that is difficult to synchronize with the motion of the surface being marked. Thus, the present invention is addressed to the problem of providing synchronized drive for the printing wheel and ink transfer mechanism of a printing device, drive originating from the motion of the surfaces to be marked so as to obtain proper synchronization in a simple manner and yet provide for a wide variation in the spacing between markings as well as to avoid imposing any undue stress on the material being marked.

SUMMARY OF THE INVENTION

In accordance with the present invention, a self-inking type of printing or marking device is mounted at a print-

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ing station with its printing wheel adjustably held in proper contact with the moving surfaces to be marked, the printing wheel and the inking device being driven intermittently at the same surface speed as the surfaces being marked by an outrig drive assembly which is in continuous driving engagement with the surfaces being marked but loaded only during controllably spaced marking intervals.

An important feature of the present invention therefore is to provide a drive assembly for self-inking types of printing devices which utilizes a cycle control type-clutch mechanism that is engaged in response to an external signal derived in any suitable manner in order to control the spacing between marking intervals when the printing device is rendered operative to mark a moving surface. Clutch mechanisms of the aforementioned type when triggered into engagement, transfer rotational movement for one revolution or any fractional part thereof and stop the driven member at the same angular positions at the end of an operational cycle.

Another feature of the present invention in accordance with the foregoing, is to provide the frictional rims on the printing wheel with one or more flats corresponding to the positions at which rotation of the printing wheel is stopped upon disengagement of the one-revolution type clutch aforementioned. Thus, there will be no frictional engagement between the moving surfaces being marked and the printing wheel during idle periods, the moving surfaces being however continuously engaged with a frictional drive bearing wheel from which motion is accurately transferred by the clutch mechanism to the printing wheel during the marking intervals.

These together with other objects and advantages which will become subsequently apparent reside in the details of construction and operation as more fully hereinafter described and claimed, reference being had to the accompanying drawings forming a part hereof, wherein like numerals refer to like parts throughout.

BRIEF DESCRIPTION OF THE DRAWING FIGURES

FIGURE 1 is a top plan view of a printing device embodying the outrig drive assembly of the present invention installed in one typical installation.

FIGURE 2 is a side elevational view of the installation shown in FIGURE 1.

FIGURE 3 is an enlarged partial sectional view taken substantially through a plane indicated by section line 3—3 in FIGURE 1.

FIGURE 4 is an enlarged partial sectional view taken substantially through a plane indicated by section line 4—4 in FIGURE 1.

FIGURE 5 is a partial side elevational view of the printing device during an idle period.

FIGURE 6 is a simplified diagrammatic view of the printing device and drive assembly.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring now to the drawings in detail, and initially to FIGURES 1 and 2, it will be observed that the printing device generally referred to by reference numeral 10 is shown installed in operative relation to a moving web 12 entrained about the guide rollers 14, 16 and 18 which

are rotatably mounted between the roller brackets 20 secured to a frame 22. The printing device 10 is mounted in proper operative relation to the guide roller 16 by means of a mounting shaft 24 supported at opposite ends by the mounting brackets 26 secured to the frame extensions 28. Thus, the mounting shaft 24 is disposed in parallel spaced relation to the rotational axis of the roller 16 so that the moving surface 30 on the web may be marked by the printer at spaced locations along the direction of travel of the web. The web may be in the form of a film or packaging material associated with some packaging machine and is conveyed past the printing station by suitable drive mechanism (not shown) associated with the packaging machine. It should of course be appreciated, that the printing device may be mounted in other installation arrangements.

The printing device is of the self-inking type and includes a printing wheel 32 the outer diameter of which is formed by a pair of frictional engaging rims 34 which normally engage the surface to be marked, the rims being secured to a drum portion 36 on which printing type 38 is mounted as more clearly seen in FIGURE 3, the printing type 38 therefore being brought into contact with the surface 30 in response to rotation of the printing wheel. The printing wheel is rotatably mounted by means of shaft 40 adjacent one end of a mounting arm 42. The mounting arm is accordingly provided with a journal hub portion 44 having spaced bearings mounted therein for rotatably supporting the shaft 40 to which the printing wheel 32 is secured. Also secured to the shaft 40 for rotation with the printing wheel, is a gear member 46 in constant mesh with a gear member 48. The gear member 48 is in turn connected to the ink transfer wheel 50 associated with an adjustable ink supply device generally denoted by reference numeral 52 as more clearly seen in FIGURE 3. The ink supply device 52 is of a type specifically disclosed and claimed in my prior copending application, U.S. Ser. No. 610,589, filed Jan. 20, 1967. Thus, the ink supply device 52 is mounted on the arm 42 in proper position relative to the printing wheel and transfers ink thereto whenever the printing wheel is rotated.

It will be observed in FIGURE 3, that the frictional engaging rims 34 of the printing wheel are provided with flats 54, two of such flats being shown in the illustrated embodiment spaced 180° apart. It will be apparent therefore, that in two 180° spaced apart positions of the printing wheel, the frictional engaging rims 34 will not be in contact with the surface 30 as shown for example in FIGURE 5. Accordingly, during idle periods when there is no marking of the surface 30, the web 12 will not be stressed by any frictional engagement with the printing wheel as it is during a marking interval as shown in FIGURE 3. Further, the mounting arm 42 of the printing device may be adjusted primarily so as to obtain proper contact between the surface 30 and the type 38. Toward this end, the mounting arm is provided with a hub portion 56 through which the mounting shaft 24 extends for pivotally mounting the arm thereon and to enclose a spring device 58 through which the mounting arm is biased counter-clockwise as viewed in FIGURE 3 in order to bring the arm 42 into contact with an adjusting screw 60 threadedly mounted by the nut portion 62 on the end of bracket 64. The bracket 64 is secured by set-screw 66 to the mounting shaft 24. The adjusting screw 60 is therefore provided with an adjustment knob 68 by means of which the printing wheel 32 is held in proper spaced relationship to the roller 16 for contact of the surface 30 by the type 38.

The shaft 40 rotatably supported by the mounting arm 42, mounts thereon a clutch mechanism 68 from which a supporting bracket 70 extends so as to mount a clutch engaging solenoid device 72. The clutch mechanism 68 is also supported in laterally spaced relation to the printing wheel 32 by a frictional drive wheel 74 having axially spaced frictional rims 76 of the same diameter as the frictional engaging rims 34 of the printing wheel. The

drive wheel 74 is mounted for rotation about an axis aligned with the shaft 40 so as to frictionally engage and be continuously driven by the surface 30 so as to accurately transfer the instantaneously variable motion of surface 30 to the printing wheel during the marking intervals.

The clutch mechanism 68 is operative when triggered into engagement by pulsing of solenoid 72 to transmit rotation from the drive wheel 74 to the printing wheel 32 for a fractional part of one revolution. Upon completion of its operational cycle, the clutch mechanism disengages and stops rotation of the printing wheel at those positions wherein the flats 54 are spaced from the surface 30 as shown in FIGURE 5. Clutch mechanisms of this type are well known such as disclosed in Patent No. 2,475,432, issued July 5, 1959. Thus, as diagrammatically shown in FIGURE 6, the clutch mechanism 68 may be engaged by the solenoid device 72 when energized from some suitable signal source 78 in order to render the printing device operative to mark the surface 30 at spaced locations therealong during the marking intervals. The signal source may be some sensing device such as a photoelectric cell from which an impulse originates causing engagement of the clutch mechanism 68 in order to incrementally rotate the printing wheel by 180° and stop rotation of the printing wheel at the same angular positions to hold the printing wheel out of contact with the surface 30 during the idle periods.

It will be apparent from the foregoing description, that the drive assembly associated with the printing device of the present invention will avoid the use of any mechanical drive mechanism obtaining power from the parent machine through which the product to be printed is conveyed. Further, the drive assembly avoids continuous and unnecessary contact of the surface to be printed by the printing wheel and yet effects a positive and accurate transfer of an instantaneously variable surface speed to the printing wheel during its active marking periods. Also, once the printing wheel has marked the surface, it automatically resets and remains dormant until another signal triggers the clutch mechanism into operation. The spacing between the locations at which the moving surface is to be marked by the printing wheel, will depend upon the spacing of the signals that trigger the clutch mechanism into operation. Also the number of flats formed on the engaging rims of the printing wheel may be varied in accordance with the fractional part of a revolution transmitted through the clutch mechanism when engaged during a marking interval.

What is claimed as new is as follows:

1. In combination with a moving web, a marking device adapted to mark the web at spaced locations along the direction of travel thereof, including a fixed mounting shaft spaced from the web, a mounting arm pivotally mounted on the shaft, a printing wheel rotatably mounted on the arm having a circular marking surface, spring means biasing the mounting arm to displace the marking surface away from the web, adjustable means fixed to the shaft and engageable with the arm for holding the marking surface in contact with the web, said marking surface having at least one flat thereon closely spaced from the web in at least one angular position of the printing wheel, a friction drive wheel of a diameter equal to that of the printing wheel, means rotatably mounting the drive wheel on the arm in axially fixed alignment with the printing wheel and in constant frictional engagement with the web for continuous rotation, a cyclic clutch mechanism drivingly connecting the drive wheel to the printing wheel for incremental rotation thereof to and from said one position, and signal operated means for engaging said clutch mechanism to render the printing wheel operative to mark the web only at said spaced locations thereon during spaced marking intervals.

2. The combination of claim 1 including ink supply means operatively mounted on said arm in contact with

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the printing wheel and constant mesh gear means drivingly connecting the printing wheel to the ink supply means.

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