

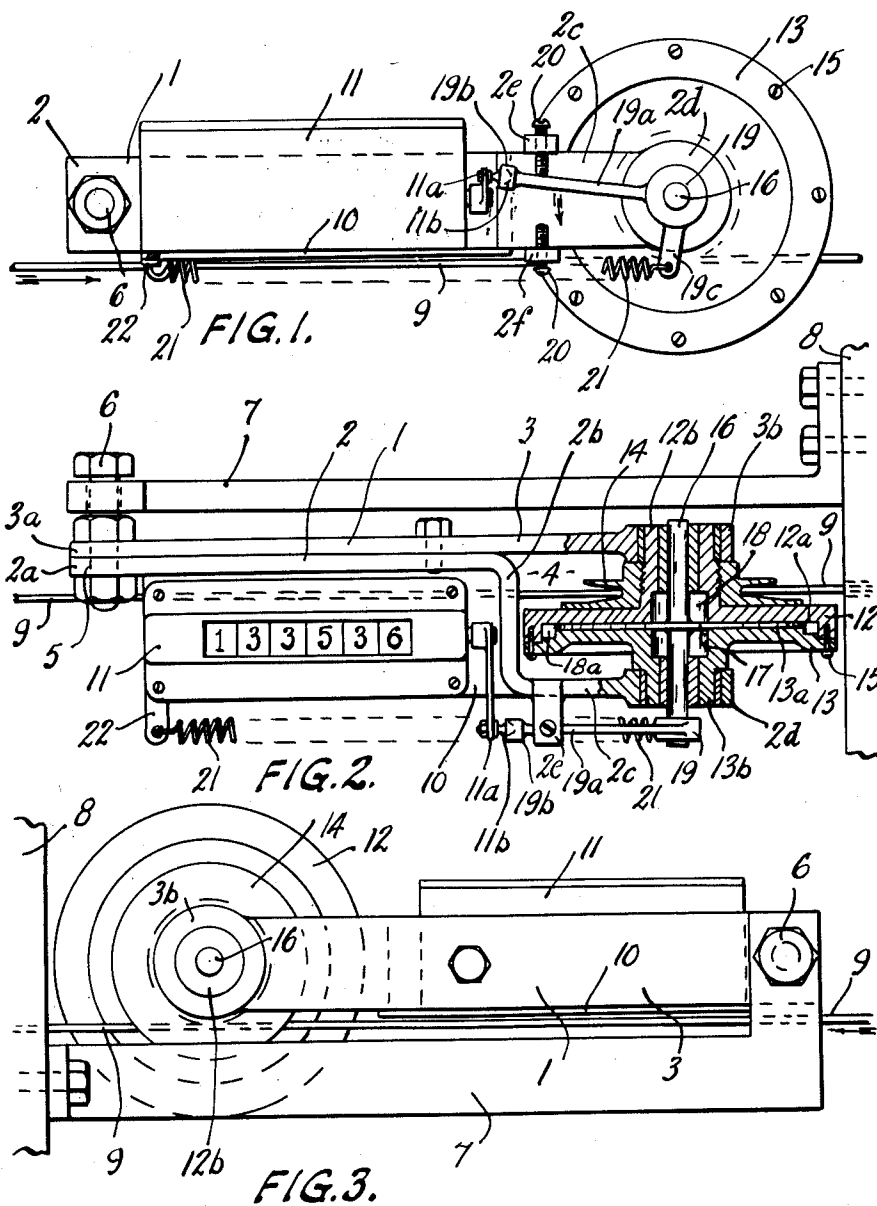
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COUNTING APPARATUS FOR COLD FORGING MACHINES AND THE LIKE

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BY

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COUNTING APPARATUS FOR COLD FORGING MACHINES AND THE LIKE

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This invention relates to cold forging machines and the like whereby rolls of wire are cold forged into blanks from which metal thread screws, wood screws, rivets and the like are made, or rolls of strip or other sectioned metals are made into nuts and other articles by a cold forging operation, the objects of the present invention being the provision of an improved counting apparatus for application to such cold forging machines which will accurately count the number of work pieces as produced by the machine.

It may seem that the application of a known form of mechanical counter to a forging machine would present no more problems than the application of such counter to other forms of machine which produce repetition work, but the fact is that the simple apparently obvious way of application of such counter to a cold forging machine can give no accurate indication as to the number of work pieces produced under the conditions as they actually apply.

It is firstly necessary to understand that these machines require fairly constant attention, with one man attending to quite a number of the automatic machines, but that due to some fault, while still being in motion, the machines may cease to produce the work pieces, as for instance due to some blockage or because of the roll of wire having come to an end, and not being noticed for some time with the result that the continued motion of the machine operates the counter and in a short period of time said counter can indicate hundreds of pieces of work as having been produced, which in actual fact have not been so produced.

In large countries where there may be a bonus system in operation on the production of the machines, this inaccuracy can cause difficulty and therefore my invention has been devised to give greater accuracy in the counting of the work pieces produced.

Broadly the invention comprises an improved counting apparatus for cold forging machines and the like wherein intermittent movements of the wire or like fed into the cold forging machine impart similar movements to rotary friction drum means, such friction drum means inducing similar movements to friction disc means contained within same, with means connected to the friction disc means whereby the impulses are imparted to a counter apparatus, means being provided whereby during the intervals of pause of the friction drum means between impulses, the friction disc means and parts connected thereto return to normal position.

In describing the invention, reference will be made to the accompanying drawings in which:

Figure 1 shows an elevation of the apparatus, but excluding the carrying bracket thereof,

Figure 2 is a partially sectioned plan view of Fig. 1, and

Figure 3 is an elevation of the opposite side of the apparatus to that shown in Fig. 1.

In the invention, there is a base or frame 1 composed of two flat bars 2 and 3 secured together in any suitable manner for a portion of their length extending from the

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outer ends 2a and 3a thereof, the bar 2 having a right angle outward set 2b and then a parallel portion 2c thereto which terminates in a bearing 2d, there being also a bearing 3b formed at the inner end of the bar 3 with a space 4 between said bearings 2d and 3d which are in line with each other and are disposed at the inner end of the apparatus.

Holes 5 drilled through the outer ends 2a and 3a of the bars 2 and 3 are adapted to receive a pivot bolt or like 6 which apart from holding the bars together, is rotatably engaged through the outer end of a carrying bracket 7 which is secured to a cold forging machine 8 at the position or end of same into which the wire or like 9 is fed-in, the base or frame 1 and parts mounted thereon being pivotally movable about such pivot bolt 6.

The bar 2 of the base 1 has a platform or plate 10 secured thereto as by welding and to this platform 10 is secured a known type of counter 11 which is such that reciprocating movements imparted to the lever arm 11a thereof effect numerical recording of each of such movements in known manner.

Rotatably mounted to the two bearings 2d and 3b and disposed within the space 4 between such bearings there is a friction drum 12 and a drum cover 13, the friction drum 12 being of circular flange like form and presenting an internal flat friction face 12a and having a boss 12b by which it is rotatable within the bearing 3b of the bar 3, a V pulley 14 being either attached to the friction drum 12 as by being screwed on to the boss 12b of same (as shown) so that different pulleys (if so desired) could be fitted to the one apparatus to suit various gauges of wire or like 9, or the pulley 14 could be integral with the friction drum 12.

The drum cover 13 also of circular flange like form is secured to the friction drum 12 as by setscrews 15 and this cover also has an internal flat friction face 13a and a boss 13b which is rotatable within the bearing 2d of the bar 2.

Rotatably passing through the bosses 12b and 13b of the friction drum 12 and cover 13 respectively there is a centrally located spindle or shaft 16 and secured to such spindle 16 there is a circular friction disc 17, such disc being disposed between the friction faces 12a and 13a of the friction drum 12 and cover 13 respectively with fine clearance, such disc 17 not actually making contact with the faces 12a and 13a but the clearance spaces being filled with a suitable oil which constitutes a frictional medium of connection between the friction disc 17 and the adjacent faces of the drum 12 and cover 13, oil holding pockets 18 being presented in the drum 12 and cover 13 within the bosses thereof and an annular oil holding space 18a provided outwardly from the periphery of the disc 17.

The spindle 16 has a short length of same projecting outward from the bearing 2d and secured to this end of the spindle 16 there is a bellcrank lever 19, the long arm 19a of such lever 19 passing substantially horizontally towards the lever arm 11a of the counter 11 with which it is engaged in any suitable manner as by having a socket like end 19b engaging a ball like crank 11b on the lever arm 11a. this lever arm 19 passing between upper and lower stops 2e and 2f which are secured to the bar 2 to project horizontally outward therefrom, with preferably adjustment screws 20 fitted thereto for contact by the lever arm 19a so that the extent of travel of the said lever arm 19a is no more than that required for effecting the actuation of the counter 11.

The short lever arm 19c of the bellcrank lever 19 extends downwardly and secured to its bottom end there is a tension spring 21, this passing along towards the outer end of the platform 10 to be secured to a lug 22 which is secured to extend from such platform 10, such

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tension spring 21 yieldingly holding the bellcrank lever 19 in normal position in which its long lever arm 19a bears against the adjustment screw 20 of the upper stop 2e.

In use or operation, the apparatus mounted on the bracket 7 extending from the cold forging machine 8, pivots on the pivot bolt 6 and is held in substantially horizontal position by its V pulley 14 bearing down on the wire 9 which is fed into said forging machine 8, so that but for the presence of such wire 9, the drum end of the apparatus would be unsupported and would swing down on the pivot bolt 6.

It is to be understood that the feed of the wire or like 9 into the cold forging machine 8 is intermittent and not steady, so that even with the machine 8 operating at a fairly high speed, there are regular periods of movement and of pause in the passage of the wire 9 into the forging machine 8, it being this intermittent movement of the wire 9 which is used to operate the counter 11 in that each intermittent movement of the wire 9 represents one work piece produced whether a screw blank, rivet or other article produced by the forging apparatus.

This intermittent movement of the wire 9 is in one direction only and such movement therefore transmits intermittent rotary impulses of the V pulley 14 in one direction only and the effect of such alternate impulses and periods of pause will now be considered.

The travel of the wire 9 causes the V pulley 14, the friction drum 12 and its cover 13 to effect a portion of a revolution and because of the faces of the friction disc 17 being only separated from the adjacent faces 12a and 13a of the drum 12 and its cover 13 by films of oil, the movement, which is a sharp movement induces the friction disc 17 to also make substantially similar degrees of rotary movement.

Accordingly, as the friction disc 17 has been partly rotated, this causes similar movement of the spindle 16 and the bellcrank lever 19 at an end of the latter.

Therefore the long lever arm 19a of this bellcrank lever 19 is moved between the adjustment screws 20 of the upper and lower stops 2e and 2f, whereby it causes the lever arm 11a of the counter 11 to be moved downwardly so that the said counter 11 registers the impulse which is equivalent to the work piece produced.

Now the movement of the spindle 16 has taken place against the resistance to such movement as imposed by the tension spring 21 which is connected to the short lever arm 19c of the bellcrank 19 of the spindle 16 and therefore in the interval of pause during which there is no travel of the wire or like 9 so that the friction drum 12 and its cover 13 are stationary, this pull of the tension spring 21 on the short lever arm 19c rotates the friction disc 17 back to the original position so that the long lever arm 19a again comes to bear against the adjustment screw 20 of the upper stop 2e and the lever arm 11a of the counter 11 is also returned to normal position ready to receive the next recording impulse.

It will therefore be obvious that the counting is effected by the impulses caused by the intermittent feed-in of the wire or like 9 to the cold forging machine 8, so that when the roll of wire 9 comes to an end so that no further work pieces are produced, the counter 11 comes to stop, ceasing to register even though the machine is still in motion.

Furthermore, in such cold forging machine 8, if there should be a fault or a blockage which substantially invariably results in stoppage of the feed-in of wire 9, the stoppage of such feed-in of the wire 9 results in the similar stoppage of rotation of the V pulley 14 and friction drum 12 and therefore the counter 11 ceases to record until the fault has been rectified to again give the required intermittent travel of the wire or like 9.

I claim:

1. An improved counting apparatus for cold forging machines comprising a base or frame having a pair of

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bearings with a space between at one of its ends, a pivot at the other end of the base by which same is pivotally mounted on a carrying bracket which is secured to the cold forging machine whereby the base or frame is disposed in line with the wire or like fed into said cold forging machine, a platform on the base or frame on which a counter apparatus is mounted, a friction drum and a cover secured to such friction drum disposed within the space between the bearings of the base or frame with bosses to the outer sides of said drum and cover whereby same are rotatably mounted in said bearings, a V pulley secured to the friction drum the groove of which is adapted to bear on the wire passing into the cold forging machine, adjacent friction faces with space between on the inner sides of the drum and its cover and a bore extending through said drum and cover, a shaft rotatable within said bore of the drum and cover and a friction disc secured to such shaft disposed within the space between the friction faces of the drum and cover with fine clearance, oil holding pockets within the drum and its cover, a bellcrank lever secured to an outer end of the shaft with the long arm of same extending towards a lever arm on the counter apparatus, a ball and socket connection between the long arm of the bellcrank and the lever arm of the counter apparatus, stops on the base or frame limiting movement of the long arm of the bellcrank lever and a tension spring secured between the short arm of the bellcrank lever and a lug on the base or frame.

2. A counting apparatus for cold forging machines and the like in which there are intermittent movements of wire or the like which are fed into the cold forging machine comprising rotary friction drum means responsive to the intermittent movements, friction disc means contained within said friction drum means, said friction drum means inducing impulses in said friction disc means, counter apparatus, first means connected to said friction disc means whereby the impulses are imparted to said counter apparatus and second means for returning the friction disc means to normal position during the intervals of pause of the friction drum means between impulses; said friction drum means comprising a drum of circular flange form having an internal flat friction face, a V pulley secured to said drum, a groove in said V pulley which is adapted to bear on the wire fed into the cold forging machine, a cover of circular flange form adapted to be secured to said drum, an internal flat friction face on said cover, said friction face being separated from the friction face of said drum by an enclosed narrow space adapted for containing a coupling medium, and outer bosses on said drum and said cover by which said drum and said cover are rotatably supported in bearings, said drum and said cover defining a bore there-through.

3. A counting apparatus for cold forging machines as claimed in claim 2 wherein said friction disc means comprise a shaft rotatable within the bore of said friction drum means, a friction disc secured to said shaft and located within the narrow space between said friction faces of said drum and said cover, and spaces between said friction disc and said friction faces containing oil.

4. A counting apparatus for cold forging machines as claimed in claim 3 wherein said second means comprise a bellcrank lever secured to said shaft, a long arm of said bellcrank lever passing to a lever arm of said counter apparatus, and third means for engaging the long arm of said bellcrank lever with the lever arm of said counter apparatus, and fourth means for limiting the extent of radial travel of the long arm of said bellcrank lever.

5. A counting apparatus for cold forging machines as claimed in claim 4 wherein said third means provided for engaging the long arm of said bellcrank lever with the lever arm of said counter apparatus comprise a socket-like end on the long arm of said bellcrank lever and a ball-like crank engaged by said socket-like end and secured to the lever arm of said counter apparatus.

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6. A counting apparatus for cold forging machines as claimed in claim 4 wherein said fourth means comprise a pair of spaced stops adapted to be engaged by the long arm of said bellcrank lever at the limits of its travel.

7. A counting apparatus for cold forging machines as claimed in claim 4 wherein the second means comprise a stop, a tension spring, a short arm of said bellcrank lever of the friction disc shaft, said tension spring being yieldingly connected to said short arm and tending to hold the long arm of said bellcrank lever against said stop. 10

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