Two (or more) for the price of One

ALAN PARTRIDGE DESCRIBES DRIVE-SPLITTING ARRANGEMENTS FOR USE IN CLOCKS

"If there are two winding holes in the dial, it will be a striking clock .... but if there is only one hole, it will be a simple timekeeper."

So said a guide to old clocks. Being an awkward cuss, my mental response was: "Does it have to be so?", followed (with — you'll never guess — differential gears in mind) by: "No, it doesn't!"

A line to the Meccano Clock expert, Pat Briggs, elicited a lot of information, including confirmation that differential gears have occasionally been used as drive splitters in non-Meccano clocks. He should not however, be held responsible for any of the details of the following Pat-Pourri or Hotch-Partridge!

There are four reasons why a drive shaft in a clock should be wanted to turn:

a] to drive the timekeeping movement. A falling weight is better than a spring because it exerts a uniform force. In clocks with hands exposed out-of-doors, which have to drive against wind, ice, and pigeons, the amount of energy required is more than one could conceivably store in clock springs.

b] to drive striking gear: at each hour, a number of strokes equal to the hour.

c] to drive chiming gear: a musical tune is played at every hour before the strike, and possibly increasing fractions of the tune at successive quarter hours.

d] to rewind any of the above. If this is done between the hours (and quarters) there is no interference with the function of the striking and chiming gear; but for the timekeeping movement, *any* interruption is undesirable. In Meccano Clock Kits, the weights can be raised by hand in a few seconds, and the interruption is not serious, but many long-case clocks take ¼ to ½ a minute to wind by a handle, and architectural clocks much longer. In these it is desirable to include a 'maintaining gear', in which the driving force is maintained even while the weight is being raised. A maintaining gear also prevents the tendency to drive the escapement in reverse whilst rewinding: this may jam or even permanently damage the escapement.

Examples of maintaining gear are given in a note by Noel Ta'Bois in *MM* 1952 October p465; in Bert Love's Grandfather Clock *MMQ* 1973 October Supplement p3; and in Pat Briggs' Astronomical Clock, *GMM Supermodel* Nº 6. In each case, the winding drum is part of the cage of an epicyclic gear.

Before this line is further persued, it should be mentioned that a single falling weight can power two drives (timekeeping and auxiliary) by a continuous cord or chain — see Fig.1. A cord needs to be wrapped more than one turn, as in the Clock Kits, so chain is better.

If the auxiliary drive passes through a ratchet wheel, the same shaft can be used for winding. Provided winding is completed between the hours (or quarters), there is no interference with either drive — this is then also a 'maintaining gear'. If two separate drive shafts are wanted for striking and chiming, the auxiliary drive must be split with a differential: there is no way of getting more than two drives from one falling weight by cords and pulleys alone without an inordinate waste of height.

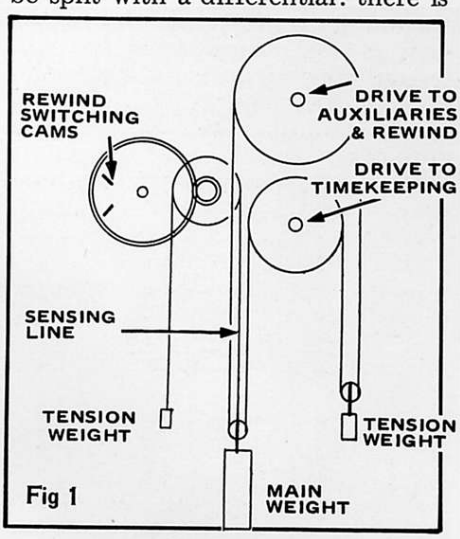


Fig 1

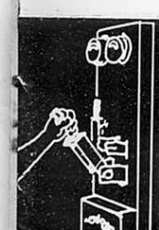
Back then to the epicyclic gear. This is, in these cases, practically the same as the spur-gear differential , and in Fig.2 the details of the differentials have been left blank — it doesn't matter whether you think of them as spur or bevel geared.

Fig.2 shows how the drive from one weight can be split, first between timekeeping and auxiliaries, then between two auxiliaries, and yet again to provide rewind which does not need a ratchet, and which can be operated even during the striking and chiming sequences.

Fig.3 shows a design to replace the epicyclic winding drum — it is a spur-gear differential using the largest available gears, the 1"Gear [Part 31], to reduce friction, and a Gear Ring [Part 180] bolted to the cage, driving a ½"Pinion [Part 26] as the beginning of the timekeeping drive.

The penalty for combining the drives is that the single weight has to be as heavy as the sum of the separate weights, or have a fall as long as the sum of their separate falls. Anyone who has had to wind an 8-day long-case clock, or a church clock, will know that transferring the handle from one winding shaft to another provides a welcome breather. An electric motor however, does not need a tea-break! The real advantage of a combination drive is found when the rewind is electrified, for then only a single motor and a single set of contacts are needed.

The only remaining question is where to put the contacts. these must complete the circuit for the winding motor when the weight is nearly down, and open the circuit when the weight is up. If the striking and chiming sequences lower the weight faster than the rewind raises it, the rewind must start at a point where there is →



STOP PRESS

THE MECCANOMAN'S JOURNAL

A MESSAGE FROM GEOFF WRIGHT

Although a fresh start with the Journal was made using offset lithography, circulation was small, and new contributions few; so a decision was made to amalgamate with the new Meccano Magazine.

I was however, most grateful to those who did send in material, which will be passed on for possible publication in MM, and thus be read by thousands, rather than hundreds, of readers.

I hope personally to contribute articles, and, to maintain continuity, shall in future sign myself:

'Meccanoman'

IRISH MECCANO CLUB NEWS

Dear Ed.

The Harvest meeting of the Irish Meccano Club was not held, as too many of the members had previous commitments. The next meeting will be held in the Lake County Hotel, Mullingar, on Saturday March 26th 1977 at about 2pm, and anyone is welcome, provided they are interested in, or curious about, Meccano.

I hope that you can include this appeal, we have only 7 members yet, so any increase will be very welcome.

Terry McCabe.

enough drop remaining to run the difference through the 12-o'clock sequence. Trip levers can be placed where the weight itself will strike them, but more elegant solutions are possible.

If a step-down drive is taken from the winding drum to a shaft which revolves less than one whole turn in a full descent of the weight, this shaft can do the switching. This could be by a Flat Commutator [Part 551] and three Wiper Arms, but as the movement is extremely slow, this may not work well. It is better to use a snap switch, as in Noel Ta'Bois' mechanism, opened and closed by two cams.

If a continuous chain drive as shown in Fig.1 is to be fitted with an automatic rewind, modifications are required at two points.

Firstly, as there is no winding drum to drive a contact shaft, either the weight must trigger the rewind motor directly, or a sensing line can be put on the weight, as shown. Such a line must always be chain, otherwise errors will eventually creep in.

Secondly, the drive to auxiliaries must not be merely through a ratchet, but through a differential with the rewind as the third shaft, as in Fig.2. Since the worm and pinion will not back drive, the pinion shaft is immobilized except when the motor is running.

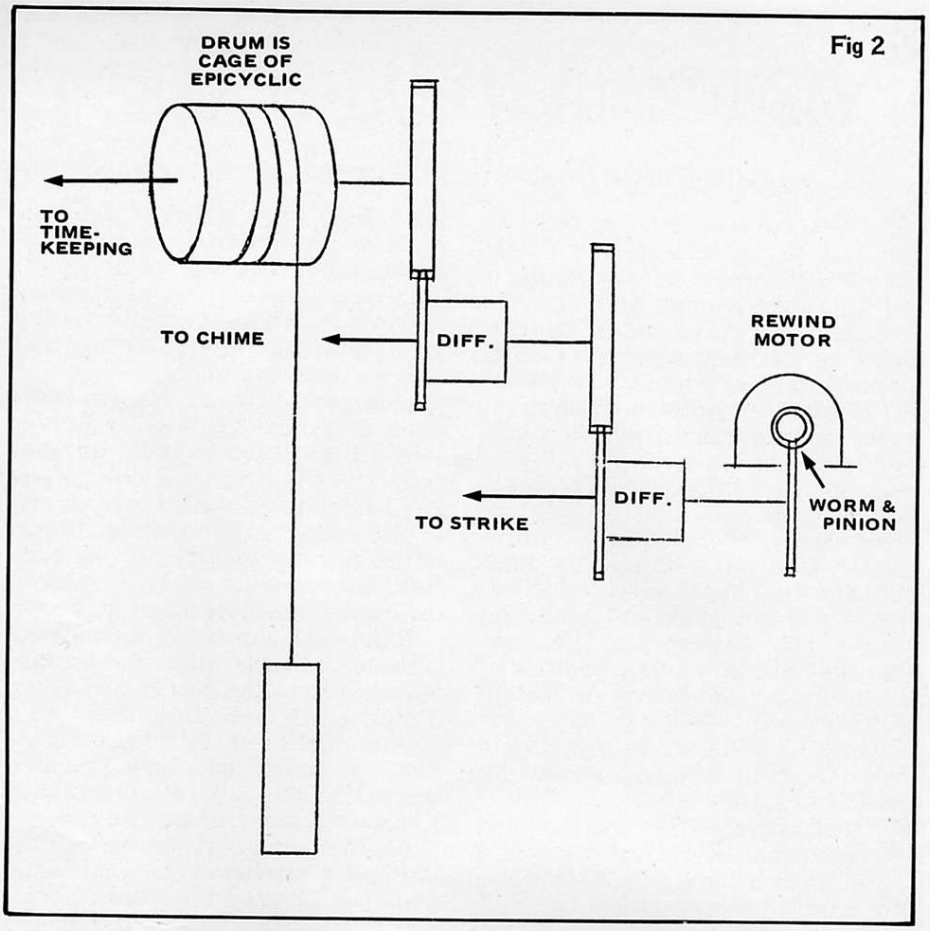


Fig 2

A NOTE ON SPRING DRIVES

If you de-function the winding ratchet of a Meccano Clockwork Motor, you can use the ordinary drive for timekeeping, and the winding shaft to drive auxiliaries. A ratchet [Part 147 + 148] must be put in the auxiliary train to allow rewinding. But NB — before starting to dismantle a Clockwork Motor, wind it just enough to lift the spring off the frame stops (or next spindle) and wrap two separate loops of strong wire around it. If you are thinking of releasing the spring from these wires to clean and lubricate it:

a] Think again! — Or:

b] Be prepared for a tedious re-wind, reefing in on wires as you go, before it will fit back in the Motor.

c] Do the whole thing in a shed, wearing a motorcycle helmet with the visor down, or with eyes closed *and* head turned away — a spring breaking loose can do a lot of damage to ornaments, wallpaper, nervous pets, or your eyes!

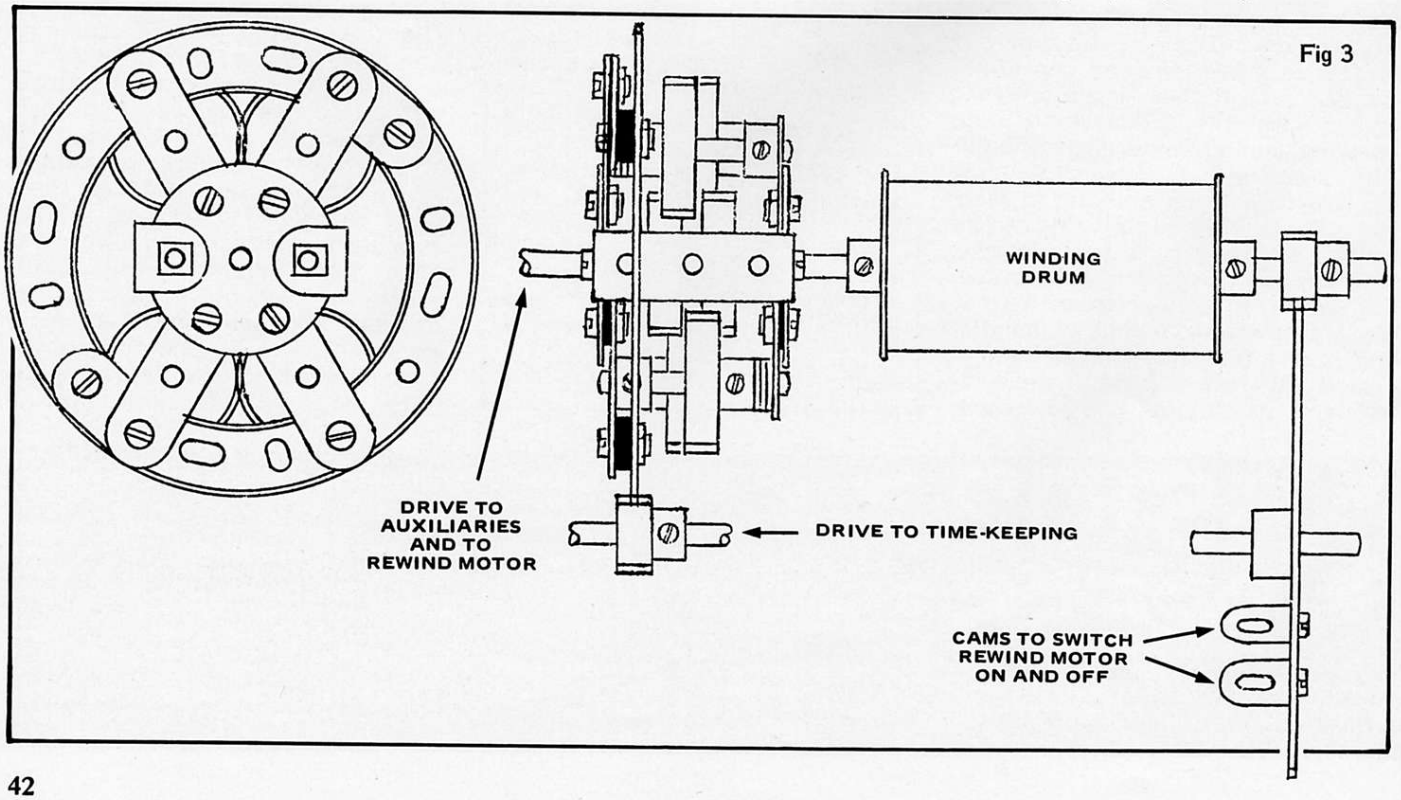


Fig 3