Impossible Developments IV. A Sorting Machine

Our problem is to sort various sets of stecker punched on cards so that two cards are brought together if they have on them sets of non-contradictory stecker. If we have on the cards 26 columns to represent the letters A - Z and in each column punch the letter which is the stecker of the letter represented by the column, our problem is to find two cards so that in each column both cards are punched the same way, or at least one card is not punched. If we modify our procedure so as to punch every hole in a column corresponding to a letter for which no stecker is given the two cards agree if and only if they have at least one common letter punched in every column i.e. if in every column there are two common holes, one in one of the top 3 rows the other in one of the lower 9. A machine for pairing off cards with this property might easily be devised. We give here an outline of the things it might be expected to do and a suggested method of doing it.

The principle of the machine is that a card is placed in a fixed position and a pack of cards run over it one at a time as rapidly as possible, all the cards agreeing with the fixed card to be noted or thrown out in some special way. It is easy enough to suggest a method of spotting links between the fixed card and a card tried above it. Suppose under each column of the fixed card we have two metal strips, one under the top three rows and the other under the other 9. Then any letter punched on the card in a column gives a hole above each strip.

Consider first the A column, and let us call these strips respectively the A' and the A plates. Suppose that above plate A' there are three contacts called the A' contacts and 9 contacts called the A contacts above the plate A, and that the contacts attempt to touch the corresponding plates through any holes in the two cards giving access to the plates. The same arrangement will of course occur in all the other columns. Suppose also that all the A contacts are wired together, and so the A' contacts and similarly with the other columns. Then let us wire this up as follows:

Plates	A - B	C - D		Y - Z	
	A' - B'	C' - D'		Y' - Z'	
Contacts	B - C	D - E	F - G		X - Y
	B' - C'	D' - E'	F' - G'		X' - Y'

and let us also wire together the Z and Z' plates. Then if we connect one pole of a battery to the A contacts and the other through a relay to the A' contacts, current will flow through the relay if and only if the two cards click (i.e. have non-contradictory stecker). When this happens it could be arranged either that the card which clicks with the fixed one is thrown out in some special way, or else the machine might be made to stop.

An obvious complication now suggests itself. Suppose we have machine. with a number (say, 20) of places for fixed cards and the moving cards pass into the machine, over the fixed cards in turn, and then out at the other end of the machine.

The suggested method of using the machine is as follows. Suppose that on a given w.o. we run menus I, II, etc. (as suggested in the earlier notes) giving packs I, II, etc. of stecker cards. Suppose we have just run Menus I and II. We place the cards of pack II in the fixed positions and run pack I over them. We expect to be using 40-200 cards per pack so that in the case of 200 cards in pack II we would have to run pack I

10 times through the machine. This should not take an excess in time as we should hope to be able to run cards through the machine at the rate of 60 - 100 cards per minute. If we haven't obtained a solution from packs I and II we then put them together and run them over pack III and so on. This should eventually provide a solution in what would be (given our machine) and extremely practicable manner. We should in fact be able to keep up with the w.o. as the results come off the Mammoth.

[One obvious point is to make the machine to deal with punching of stecker in alternate columns of a card. This would be simpler technically and there is no need to use neighbouring columns as we should in any case not use all the 80 columns provided. There are a number of other points when there might be obvious possibilities of a simplification, but to go into them at this stage would obscure the essential simplicity of the idea.