

PREVENTIVE }
MAINTENANCE }

Electric Multiplier
Type 601

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PREVENTIVE MAINTENANCE

Electric Multiplier, Type 601

CARD FEED UNIT

I. Cleaning

The card feed unit requires frequent inspection to insure good performance. On every inspection the feed should be carefully cleaned of all dirt, excess oil, card dust, etc. Clean out all dirt and card dust from the feed knife slide guides and from the throat roller.

II. Inspection

1. Clutch for freedom of operation and for all adjustments.
2. Feed (see *General Section—Horizontal Feeds*)
 - (a) CLEANING
 - (b) FEED KNIFE ADJUSTMENTS
 - (c) FEED KNIFE GUIDE SLIDES. It is not necessary to turn the entire machine over by hand to check these for freedom of operation as suggested in the general section. They may be checked by removing a spring clip in the operating linkage.
 - (d) EVEN FEEDING OF CARDS
 - (e) HOPPER SIDE PLATES
 - (f) ROLLER THROAT
 - (g) FEED ROLL TENSION on the first, second and third set of rolls.
 - (h) AUXILIARY FEED ROLLS for even tension and for freedom of operation of the small rollers. To give proper tension, the set screws holding the auxiliary feed roll bracket should be in a vertical position.
 - (i) TIMING OF FEED KNIVES. This in conjunction with setting the brushes. Check with hopper from $\frac{1}{2}$ to $\frac{3}{4}$ full of cards for best results. Change by cam link adjusting rod.
 - (j) HOPPER POSTS
3. Brush Assembly (see *General Section*)
 - (a) CLEANING
 - (b) BRUSH SEPARATORS
 - (c) BRUSHES
 - (d) $\frac{1}{8}$ " PROJECTION
 - (e) BRUSH ALIGNMENT TO SCRIBED LINE
 - (f) BRUSHES EVENLY SPACED BETWEEN SEPARATORS
 - (g) BRUSH TRACKING. This can be changed by shifting the brush holder in the slide assembly.
 - (h) CONTACT ROLL for shake and dirt.
 - (i) BRUSH TIMING
4. "X" Brushes and Card Lever (see *General Section*). Punch a card with all the X's normally used by the customer. Check the registration and feed this card into position to check the alignment of the X brushes. As the card is fed in, check for proper timing of the X brushes. Any X brushes that are damaged should be replaced. While the card is being fed past the X brushes, check for proper rise of the X card lever contact.
5. FC Cams (see *General Section—Make and Break Cam Contacts*). Also, wipe an oil cloth across the tension straps to prevent red rust.

III. Lubrication

IBM 6

- (1) Roller throat.

IBM 9

- (1) Pressure shoe first feed roll.
- (2) FC cam shaft bearings.
- (3) Feed roll bearings.
- (4) Clutch pawl pivot.
- (5) Ball closing oil well on ratchet gear.
- (6) Pivot in cam link adjusting rod.

- (7) Feed knife shaft.
- (8) Feed knife guide slides.
- (9) Three oil tubes on each side casting.

IBM 17

- (1) Internal cam in CF index.
- (2) Very light film on CF cam surfaces.

PUNCH UNIT

THE PUNCH NEED not be removed from the machine on every inspection; all adjustments can be checked with the punch mounted on the base. To lubricate and check the mechanisms under the base, the motor drive unit can be removed with the punch mounted on the base.

I. Cleaning

As in the case of all other units, the punch should be carefully cleaned before oiling or adjusting. Carefully clean out all dirt, oil, etc., around the key stems to insure freedom of operation. Do not soak the keys with oil to overcome sluggish action. If the keys have become very sluggish, remove the key unit, completely disassemble, and wipe all parts with an oil-soaked cloth. The rack should also be thoroughly cleaned with a stiff brush and cleaning fluid.

II. Inspection (see 016-031 Section for Detail)

- (1) Linkage from motor plate to punch magnet armature.
- (2) Armature pivot shaft.
- (3) Bell crank pivot screw.
- (4) P.M. contact.
- (5) "Slipping By".
- (6) Motor plate linkage adjustments.
- (7) Punch travel.
- (8) Die.
- (9) Dog and escapement.
- (10) Rack.
- (11) Skip lifter.
- (12) Governor.
- (13) Punching registration.
- (14) Emitter fingers should be checked for wear and alignment with the emitter segments. Then wipe a thin film of IBM lubricant 17 over the surface of the emitter.
- (15) Duplicating armature levers for freedom of operation. Any binds result in slow punching. Lift each lever slightly and see that it drops to normal because of its own weight.

III. Lubrication

Lubrication is the same as that for punch unit under 016-031 with the two following additions:

- Use IBM 6 on duplicating magnet armature pivot points.
- Use IBM 17 on the emitter face (only a slight film).

COUNTERS

UNLESS A COUNTER has been giving trouble, it need not be removed from the base when inspected. Whenever a counter has to be removed from the base to replace a part, take advantage of the opportunity to lubricate all cams and followers accessible from the bottom of the counter.

I. Cleaning

Clean all old grease and dirt from the unit. If too much lubrication has been used in the past, oil and dirt sometimes accumulates between the add magnet cores and their armatures. This can be wiped off with a rag soaked in cleaning fluid when add magnets are removed for inspection of add magnet armature residuals.

II. Inspection

1. Lower Counter

- (a) **ADD WHEEL CLUTCH GEAR** for .008"- .012" clearance of teeth. If this is too close, it will indicate either a worn clutch lever or improper latch block adjustment.
- (b) **ADD MAGNET ARMATURES** for .003"- .005" to latch block when attracted. This can be checked by tripping the armature by hand, allowing the clutch lever to pivot and move the high portion of the latch block in front of the armature. Tapping the armature with a light screwdriver should result in a very slight wink of the armature. About once or twice a year the add magnet should be removed to check the armature residuals.
- (c) **CLUTCH TEETH OVERLAP.** Crank the machine to any index line from 9 through 1 and check each counter for $\frac{1}{32}$ " overlap of the clutch teeth at this point. Be sure the overthrow locks are seated. Any variations indicate partly sheared pins or twisted shafts.
- (d) **OVERTHROW LOCK ASSEMBLY** for loose overthrow lock screws which may have backed out part-way. Look at the inner right side plate for a broken spring on the adding wheel shaft bushing detent. This detent holds the adding wheels at 0 and prevents rotation of the shaft due to inertia at the end of a reset cycle. Consequently, a broken detent spring may result in overthrow of the adding wheels on reset. Also check both ends for wear on the bail and its operating cams.
- (e) **CARRY MAGNET** for loose rivets in the armature and then check the unlatching clearance. Also, check operation of carry contacts in RHA and LHA counters.

2. Top Counter Moulding

Reset all counters to 5 and seat overthrow locks. Check all top counter gears for proper timing. If any counters have shown signs of improper timing of top counter brushes by occasional failures, remove moulding assembly and check individual brushes for damage and proper projection. Replace needed brushes and wipe a film of IBM lubricant 17 on the inner surface of the mouldings before replacing; to prevent additional damage to brushes, be sure to set the counter to 9 before removing the top counter moulding and to 1 before replacing it.

Reset clutches for unlatching and relatching adjustments and for loose collars. The proper adjustment of the reset clutch may be checked by resetting a counter while cranking the machine by hand. All carry levers should unlatch and move about $\frac{1}{8}$ " to $\frac{3}{16}$ " before being relatched.

III. Lubrication

IBM 6

- (1) Adding clutch lever pivots.
- (2) Adding clutch gear pivots.
- (3) Add wheels.
- (4) Top counter shaft pivots.

IBM 9

- (1) Clutch disengaging lever bail pivots.
- (2) Overthrow lock pivots.
- (3) Carry lever bail pivots.
- (4) All bearings on both side plates.

IBM 17

- (1) Clutch grooves on adding wheel clutch gear.
- (2) Overthrow and carry lever bail cams.
- (3) All cam surfaces under counter. These should be re-lubricated every time the counter is removed.
- (4) Light film on the inside surface of the top counter mouldings any time they are removed.

MULTIPLYING AND COLUMN SHIFT PLATES

ALL THE MULTIPLYING and column shift plates should be removed *at least* once a year for lubrication unless usage requires more frequent inspection. While plates are removed, check for washers, screws, etc. in the plate housing assembly.

Before replacing plates in the unit, lubricate as directed. The adjustment of the individual bail eccentrics and knockoff screws will have to be checked after replacing the plates in the unit.

I. Cleaning

If contacts are dirty, wash with cleaning solution, using a *clean brush*. The contacts may be cleaned by folding a piece of Trimite Paper and inserting it between all contact points. Then drag the paper out with only the tension of the contacts holding them together. Do not hold the contact points together, as too much cutting action results.

II. Inspection

With plate out of machine:

- (1) BAILS, LATCHES AND ARMATURE for freedom of operation.
- (2) CONTACT POINTS. After cleaning, check for $\frac{1}{32}$ " clearance between points when the bail is latched.

With the plate in the machine:

- (3) ARMATURE UNLATCHING CLEARANCE. Turn the machine to $14\frac{1}{2}$ index time. This is the time when CC2 makes to energize the magnet. The armature should be free from pressure at this time. Check all nine plates, then run the machine under power and recheck this adjustment.
- (4) ARMATURE RELATCHING CLEARANCE. Turn the machine to the high point of the bail operating cam at 13 index time. Check to see that there is approximately $\frac{1}{32}$ " travel of the split latch past the armature latch point.
- (5) CONTACT POINTS with the contact bail unlatched all contacts should be positively closed. No rear strap should touch the insulating strip on the bail.

III. Lubrication

IBM 6

- (1) Armature pivot.
- (2) Split latch pivot.
- (3) Bail pivot shaft bearings.

IBM 17

- (1) Armature latching mechanism.
- (2) Very thin film on edge of linen dilecto bail.
- (3) Tip of bail operating lever foot.

BASE

I. Cleaning

The entire frame of the machine should be wiped down with a rag soaked in cleaning fluid. Clean all dirt and old grease from cams and cam followers.

The oil pans over the lower counters and the multiplying plate unit should be kept clean. The lower oil pan under the lower base collects oil leaking from the housing and will have to be cleaned out periodically to prevent soaking cables with oil. Also, an excessive amount of oil in the lower pan will overflow and soil the customer's floor.

II. Inspection

1. Index. Use the lower index for timing in all cases. Upper index on side of feed unit should be used only to time the feed unit to the base and to determine whether the feed cycle is in the first or second machine cycle.
2. Shafts and Cams for wear and partially sheared pins. Also check that all drive shaft bearings lubricated from oil cups are receiving oil.

3. Lower Drive Housing for wear and proper oil level. Remove the check plug in the lower housing and check for proper oil level. Oil should be within 1" of check plug. Also check oil flow up through the vertical shaft by removing upper housing plug and look for appearance of oil while machine is running. Add IBM 12 lubricant, if necessary.
4. CC Cams (see *General Section—Make and Break Type Cams*)
5. CB Cams (see *General Section—Circuit Breaker Cams*)
6. Emitters. The emitter brushes should be carefully checked for wear and damage. Replace brushes that show a noticeable bevel. Wipe any old grease off the emitter segments and common rings and check for cracked or missing segments. Apply a thin film of IBM lubricant 17. Then carefully check the emitter brush timing.
7. Motor Generators (see *General Section*)
8. Relays (see *General Section—Duo Relays*)
9. Control Panel (see *General Section*)

III. Lubrication

IBM 6

- (1) Duo relay armature pivots.
- (2) CB cam contact arm pivots.
- (3) Drive pulley ratchets.

IBM 9

- (1) Oil cups on the upper base casting. These lubricate counter drive shaft bearing on the upper base, emitter shaft bearings, CC cam shaft bearings, and CB cam shaft bearings.
- (2) Ball closing oil well in reset shaft gears.
- (3) All oil cups on reset shaft.
- (4) Oil cup on bearing casting to the right of the feed unit.
- (5) Motor and generator bearings (only a slight amount).
- (6) Two oil cups just back of lower gear housing.
- (7) Oil cup on lower reset shaft.
- (8) Oil cup on lower base casting. This lubricates counter drive shaft bearings on lower base.
- (9) Control panel pivot frame.

IBM 12

- (1) Drive housing. Fill from top plug if oil level is lower than 1" below check plug in lower gear housing.

IBM 17

- (1) MCR armature pivot points.
- (2) Reset clutch knockoff finger.
- (3) Reset clutch pawl disengaging roller.
- (4) Contact operating cam.
- (5) All reset clutches.
- (6) Light film on the following linen dilecto items:
 - (a) Emitter surface.
 - (b) CC and CB cam surfaces.
 - (c) CB cam rollers.
 - (d) Generator coupling.
- (7) Relatch bar operating stud and guide for multiplying plates.
- (8) Internal cut cams operating multiplying and column shift plates.

TESTING

THE TEST DECK should be punched with the reading fields in the same positions that the customer uses, wherever possible. The control panel should be set up to use full capacity of the counters.

The customer engineer should write or interpret the individual and progressive totals on the back of each card. This may readily be done with a Type 551 or 552 Interpreter by feeding the cards with a column 1 at the column 80 end of the hopper, 12 edge first, and wiring the control panel accordingly. As the multiplier is being tested, the figure in the LHC and summary

counters may be compared with the interpretations on the backs of the cards as they are stacked. If more time is needed for the visual comparison, it is only necessary to hold the ejector jaws by hand to prevent the card from being completely stacked, thus delaying the reset of the LH counter.

If a discrepancy is noted in these figures, it indicates a failure. The card on which the failure occurred may be run through the machine again, or it may be reproduced in quantity and run repeatedly to localize the point of failure. To stop the machine after the first multiplying cycle, it is only necessary to insulate the N/O A points of CS relay 1 with a piece of card. At this time the multiplier and multiplicand counters may be checked visually to determine that they have read the proper factors. If a piece of card is now placed between the N/O A points of CS relay 2 and the piece removed from CS relay 1 A points, the machine will take a second multiplying cycle. This may be continued until all eight multiplying cycles have been checked. If the RH and LH components totals are correct, the total in the LH components counter after the RH to LH transfer cycle will indicate whether the total was properly transferred.

MULTIPLICATION

Wire the control panel for individual multiplication, using fields of 8 columns. Refer to values shown in Figure 1 (Parts 1-3) as shown on the following pages.

CROSS FOOTING

If the machine has tested correctly for multiplication, the only additional items necessary to test for cross footing are the CA1, CA2 and Cross Footing Add-Subtract Relay Points. The CA1 and CA2 have 12 points on each and, therefore, 12 position read fields must be used.

The machine should be checked for $A + B = C$, and then for $A - B = C$. Wire as shown in Figure 2. The only difference between $A + B = C$ and $A - B = C$ is in the wiring of "R.H.C. to L.H.C.". Use the values shown in Figure 3 (Parts 1-3).

The dotted line shown in Figure 2 for the punching of the "C" field is to be included on only the $A - B = C$ test, and then only if the machine has additional cross footing. Punching of "C" has no effect on the test of $A - B = C$, but having this field punched into the card is necessary for a later test of additional cross footing.

ADDITIONAL CROSS FOOTING

If the test for cross footing is correct, the only items to check on additional cross footing are the 10 position CA3 relay and emitter number 3. This may be checked by using the previous deck with the "C" field punched into it. Wire the control panel as shown in Figure 4. The "Cross Foot to Summary #1" should not be plugged and the "Cross Foot to Summary #2" should be plugged *both* ON and OFF. This will allow the machine to run without resetting the summary counter. Since "C" is the same as $A - B$, the result of each calculation in the summary counter should be zero, and, therefore, the summary counter should come to zero for each card unless an error develops. In that case the summary counter will not come to zero again until the cards are removed and it is reset by hand. In case of errors the figures in the product counter may be checked against the "A - B in Products Counter" column in Figure 4.

MULTIPLIER TEST

Card No.	Multiplier	Multiplicand	Product Counter (Individual)		Summary Counter (Progressive)	
			B	A	Summary Counter Wired to Left Ten Positions of Product Counter	Summary Counter Wired to Right Ten Positions of Product Counter
1	111111111	111111111	01234567	87654321	123456787	6787654321
2	111111111	222222222	02469135	75308642	370370362	362962963
3	111111111	333333333	03703703	62962963	740740724	725925926
4	111111111	444444444	04938271	50617284	1234567874	7876543210
5	111111111	555555555	06172839	38271605	1851851812	1814814815
6	111111111	666666666	07407407	25925926	2592592537	2540740741
7	111111111	777777777	08641975	13580247	3456790050	54320988
8	111111111	888888888	09876543	01234568	4444444351	4355555556
9	111111111	999999999	11111110	88888889	5555555439	5444444445
10	222222222	111111111	02469135	75308642	5802469014	9019753087
11	222222222	222222222	04938271	50617284	6296296164	6170370371
12	222222222	333333333	07407407	25925926	7037036889	6896296297
13	222222222	444444444	09876543	01234568	8024691190	1197530865
14	222222222	555555555	12345678	76543210	9259259066	9074074075
15	222222223	666666666	14814814	51851852	740740517	525925927
16	222222222	777777777	17283950	27160494	2469135544	5553086421
17	222222222	888888888	19753086	02469136	4444444146	4155555557
18	222222222	999999999	22222221	77777778	6666666323	6333333335
19	333333333	111111111	03703703	62962963	7037036685	6696296298
20	333333333	222222222	07407407	25925926	7777777410	7422222224
21	333333333	333333333	11111110	88888889	8888888498	8511111113
22	333333333	444444444	14814814	51851852	370369949	9962962965
23	333333333	555555555	18518518	14814815	2222221763	1777777780
24	333333333	666666666	22222221	77777778	4444443940	3955555558
25	333333333	777777777	25925925	40740741	7037036480	6496296299
26	333333333	888888888	29629629	03703704	9999999383	9400000003
27	333333333	999999999	33333332	66666667	3333332649	2666666670

Figure 1. Part 1

28	44444444	11111111	04938271	50617284	3827159799	9817283954
29	44444444	22222222	09876543	01234568	4814814100	4118518522
30	44444444	33333333	14814814	51851852	6296295551	5570370374
31	44444444	44444444	19753086	02469136	8271604153	4172839510
32	44444444	55555555	24691357	53086420	740739906	9925925930
33	44444444	66666666	29629629	03703704	3703702809	2829629634
34	44444444	77777777	34567900	54320988	7160492863	2883950622
35	44444444	88888888	39506172	04938272	1111110067	888888894
36	44444444	99999999	44444443	55555556	5555554422	4444444450
37	55555555	11111111	06172839	38271605	6172838360	8382716055
38	55555555	22222222	12345678	76543210	7407406236	6259259265
39	55555555	33333333	18518518	14814815	9259258050	8074074080
40	55555555	44444444	24691357	53086420	1728393803	3827160500
41	55555555	55555555	30864196	91358025	4814813494	3518518525
42	55555555	66666666	37037036	29629630	8518517123	7148148155
43	55555555	77777777	43209875	67901235	2839504690	4716049390
44	55555555	88888888	49382715	06172840	7777776196	6222222230
45	55555555	99999999	55555554	44444445	3333331640	1666666675
46	66666666	11111111	07407407	25925926	4074072365	2392592601
47	66666666	22222222	14814814	51851852	5555553816	3844444453
48	66666666	33333333	22222221	77777778	7777775993	6022222231
49	66666666	44444444	29629629	03703704	740738896	8925925935
50	66666666	55555555	37037036	29629630	4444442525	2555555565
51	66666666	66666666	44444443	55555556	8888886880	6911111121
52	66666666	77777777	51851850	81481482	4074071961	1992592603
53	66666666	88888888	59259258	07407408	9999997768	7800000011
54	66666666	99999999	66666665	33333334	6666664301	4333333345
55	77777777	11111111	08641975	13580247	7530861814	1846913592
56	77777777	22222222	17283950	27160494	9259256841	6874074086
57	77777777	33333333	25925925	40740741	1851849381	9414814827
58	77777777	44444444	34567900	54320988	5308639435	9469135815
59	77777777	55555555	43209875	67901235	9629627002	7037037050
60	77777777	66666666	51851850	81481482	4814812083	2118518532
61	77777777	77777777	60493825	95061729	864194678	4713580261
62	77777777	88888888	69135801	08641976	7777774786	4822222237
63	77777777	99999999	77777776	22222223	5555552408	2444444460
64	88888888	11111111	09876543	01234568	6543206709	6745679028
65	88888888	22222222	19753086	02469136	8518515311	5348148164
66	88888888	33333333	29629629	03703704	1481478214	8251851868
67	88888888	44444444	39506172	04938272	5432095418	5456790140
68	88888888	55555555	49382715	06172840	370366924	6962962980
69	88888888	66666666	59259258	07407408	6296292731	2770370388
70	88888888	77777777	69135801	08641976	3209872839	2879012364
71	88888888	88888888	79012344	09876544	1111107248	7288888908
72	88888888	99999999	88888887	11111112	9999995959	6000000020

Figure 1. Part 2

73	99999999	11111111	11111110	88888889	1111107047	7088888909
74	99999999	22222222	22222221	77777778	3333329224	9266666687
75	99999999	33333333	33333332	66666667	6666662490	2533333354
76	99999999	44444444	44444443	55555556	1111106845	6888888910
77	99999999	55555555	55555554	44444445	6666662289	2333333355
78	99999999	66666666	66666665	33333334	3333328822	8866666689
79	99999999	77777777	77777776	22222223	1111106444	6488888912
80	99999999	88888888	88888887	11111112	9999995155	5200000024
81	99999999	99999999	99999998	00000001	9999994955	5000000025
82	12345678	12345678	01524157	65279684	152410720	765279709
83	23456789	23456789	05502209	50190521	702631670	1715470230
84	34567891	34567891	11949390	88187881	1897570758	803658111
85	45678912	45678912	20865630	01503744	3984133759	3805161855
86	56789123	56789123	32250044	91109129	7209138250	8296270984
87	67891234	67891234	46092196	54042756	1818357904	7950313740
88	78912345	78912345	62271581	93399025	8045516097	6143712765
89	89123456	89123456	79429904	09383936	5988506506	6553096701
90	91234567	91234567	83237462	15677489	4312252721	2768774190
91	01010101	01010101	00010203	04030201	4313273025	3072804391
92	02020202	02020202	00040812	16120804	4317354241	4288925195
93	03030303	03030303	00091827	36271809	4326536977	7025197004
94	04040404	04040404	00163248	64483216	4342861841	1889680220
95	05050505	05050505	00255076	00755025	4368369441	9490435245
96	06060606	06060606	00367309	45087236	4405100386	435522481
97	07070707	07070707	00499948	97479849	4455095283	5333002330
98	08080808	08080808	00652994	57932864	4520394740	4790935194
99	09090909	09090909	00826446	26446281	4603039366	9417381475
100	10101010	10101010	01020304	03020100	4705069769	9820401575
101	20202020	20202020	04081216	12080400	5113191381	1432481975
102	30303030	30303030	09182736	27180900	6031465006	5059662875
103	40404040	40404040	16324864	48321600	7663951456	1507984475
104	50505050	50505050	25507600	75502500	214711531	1583486975
105	60606060	60606060	36730945	08723600	3887806039	6092210575
106	70707070	70707070	49994897	47984900	8887295786	5840195475
107	80808080	80808080	65299457	93286400	5417241579	1633481875
108	90909090	90909090	82644626	44628100	3681704223	4278109975

Figure 1. Part 3

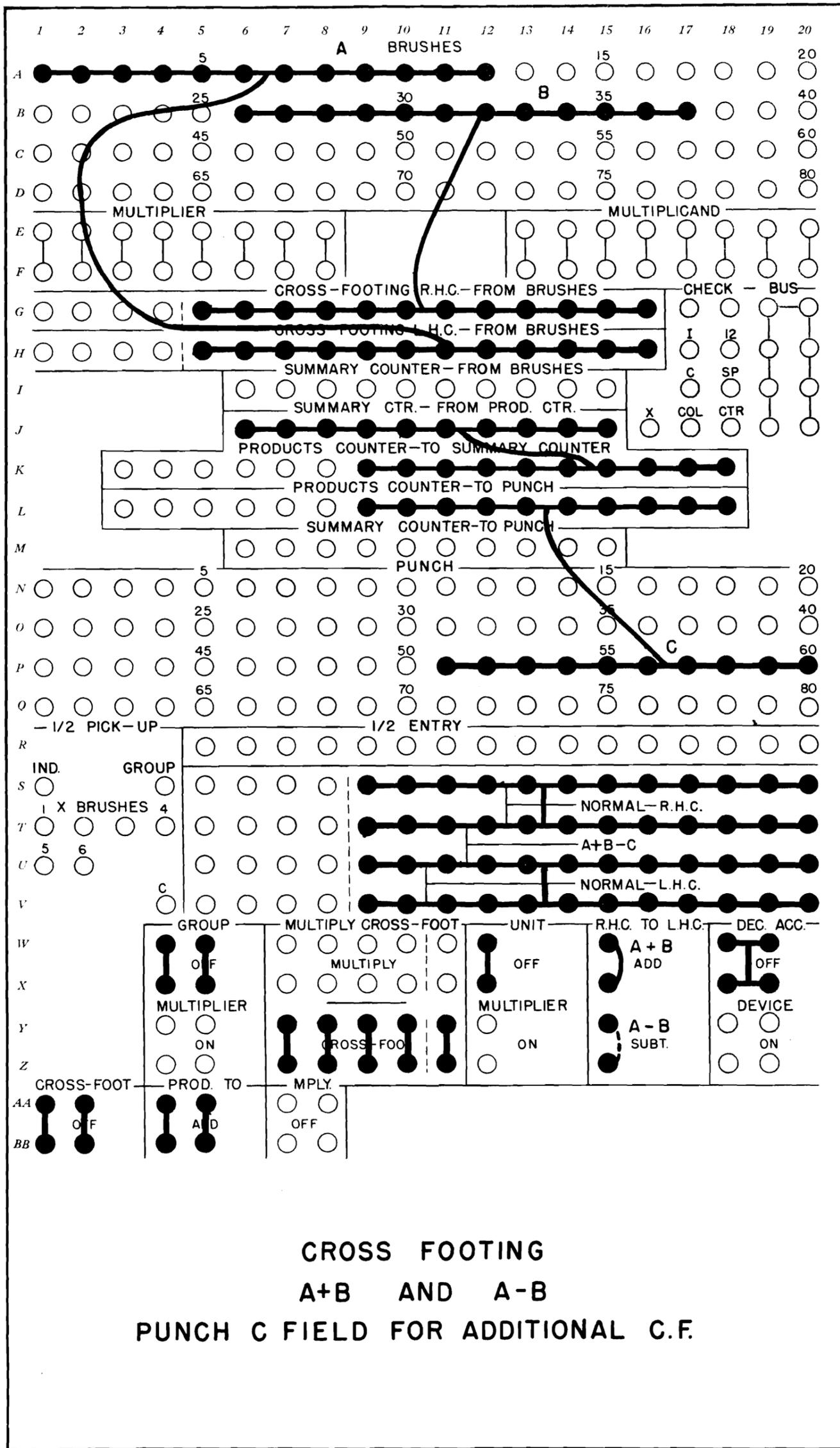


Figure 2

CARD NO.	"A" FIELD	"B" FIELD	A + B		A - B	
			IN PRODUCTS CTR. ("C" FIELD)	IN SUMMARY COUNTER	IN PRODUCTS COUNTER	IN SUMMARY COUNTER
1	1111111111111111	1111111111111111	22222222222222	22222222222222	88888888888889	8888888888889
2	1111111111111111	2222222222222222	33333333333333	55555555555555	77777777777778	6666666666667
3	1111111111111111	3333333333333333	44444444444444	99999999999999	66666666666667	3333333333334
4	1111111111111111	4444444444444444	55555555555555	55555555555554	55555555555556	8888888888890
5	1111111111111111	5555555555555555	66666666666666	22222222222220	44444444444445	3333333333335
6	1111111111111111	6666666666666666	77777777777777	9999999999997	3333333333334	6666666666669
7	1111111111111111	7777777777777777	88888888888888	8888888888885	2222222222223	8888888888892
8	1111111111111111	8888888888888888	99999999999999	8888888888884	11111111111112	4
9	1111111111111111	9999999999999999	1.11111111111110	9999999999994	11111111111111	1111111111115
10	2222222222222222	1111111111111111	33333333333333	333333333327	11111111111111	1111111111115
11	2222222222222222	2222222222222222	44444444444444	7777777777771	88888888888889	1111111111115
12	2222222222222222	3333333333333333	55555555555555	33333333326	7777777777778	777777777782
13	2222222222222222	4444444444444444	66666666666666	9999999999992	6666666666667	44444444449
14	2222222222222222	5555555555555555	77777777777777	77777777769	5555555555556	5
15	2222222222222222	6666666666666666	88888888888888	66666666657	4444444444445	44444444450
16	2222222222222222	7777777777777777	99999999999999	66666666656	3333333333334	77777777784
17	2222222222222222	8888888888888888	111111111111110	77777777766	2222222222223	7
18	2222222222222222	9999999999999999	12222222222221	99999999987	2222222222222	2222222229
19	3333333333333333	1111111111111111	44444444444444	44444444431	1111111111111	33333333340
20	3333333333333333	2222222222222222	55555555555555	99999999986	8888888888889	33333333340
21	3333333333333333	3333333333333333	66666666666666	66666666652	7777777777778	33333333340
22	3333333333333333	4444444444444444	77777777777777	44444444429	6666666666667	222222222229
23	3333333333333333	5555555555555555	88888888888888	33333333317	5555555555556	7
24	3333333333333333	6666666666666666	99999999999999	33333333316	4444444444445	66666666674
25	3333333333333333	7777777777777777	111111111111110	44444444426	3333333333334	22222222230
26	3333333333333333	8888888888888888	12222222222221	66666666647	2222222222222	66666666675
27	3333333333333333	9999999999999999	13333333333332	99999999979	1111111111111	9
28	4444444444444444	1111111111111111	55555555555555	55555555534	3333333333333	33333333342
29	4444444444444444	2222222222222222	66666666666666	22222222200	2222222222222	55555555564
30	4444444444444444	3333333333333333	77777777777777	99999999977	1111111111111	66666666675
31	4444444444444444	4444444444444444	88888888888888	88888888865	8888888888889	66666666675
32	4444444444444444	5555555555555555	99999999999999	88888888864	7777777777778	55555555564
33	4444444444444444	6666666666666666	111111111111110	99999999974	6666666666667	33333333342
34	4444444444444444	7777777777777777	12222222222221	22222222195	5555555555556	9
35	4444444444444444	8888888888888888	13333333333332	55555555527	4444444444445	55555555565
36	4444444444444444	9999999999999999	14444444444443	99999999970	4444444444444	10
37	5555555555555555	1111111111111111	66666666666666	66666666636	3333333333333	44444444454
38	5555555555555555	2222222222222222	77777777777777	44444444413	2222222222222	77777777787
39	5555555555555555	3333333333333333	88888888888888	33333333301	1111111111111	9
40	5555555555555555	4444444444444444	99999999999999	33333333300	1111111111111	11111111120

Figure 3. Part 1

CARD NO.	"A" FIELD	"B" FIELD	A + B		A - B	
			IN PRODUCTS CTR. ("C" FIELD)	IN SUMMARY COUNTER	IN PRODUCTS COUNTER	IN SUMMARY COUNTER
41	5555555555	5555555555	11111111110	4444444410		1111111120
42	5555555555	6666666666	12222222221	6666666631	8888888889	9
43	5555555555	7777777777	1333333332	9999999963	7777777778	7777777787
44	5555555555	8888888888	1444444443	4444444406	6666666667	4444444454
45	5555555555	9999999999	1555555554	9999999960	5555555556	10
46	6666666666	1111111111	7777777777	7777777737	5555555555	5555555565
47	6666666666	2222222222	8888888888	6666666625	4444444444	9
48	6666666666	3333333333	9999999999	6666666624	3333333333	3333333342
49	6666666666	4444444444	11111111110	7777777734	2222222222	5555555564
50	6666666666	5555555555	12222222221	9999999955	1111111111	6666666675
51	6666666666	6666666666	13333333332	3333333287		6666666675
52	6666666666	7777777777	1444444443	7777777730	8888888889	5555555564
53	6666666666	8888888888	1555555554	333333284	7777777778	3333333342
54	6666666666	9999999999	1666666665	9999999949	6666666667	9
55	7777777777	1111111111	8888888888	8888888837	6666666666	6666666675
56	7777777777	2222222222	9999999999	8888888836	5555555555	2222222230
57	7777777777	3333333333	11111111110	9999999946	4444444444	6666666674
58	7777777777	4444444444	12222222221	2222222167	3333333333	7
59	7777777777	5555555555	13333333332	5555555499	2222222222	2222222229
60	7777777777	6666666666	1444444443	9999999942	1111111111	3333333340
61	7777777777	7777777777	1555555554	5555555496		3333333340
62	7777777777	8888888888	1666666665	2222222161	8888888889	2222222229
63	7777777777	9999999999	1777777776	9999999937	7777777778	7
64	8888888888	1111111111	9999999999	9999999936	7777777777	7777777784
65	8888888888	2222222222	11111111110	11111111046	6666666666	4444444450
66	8888888888	3333333333	12222222221	3333333267	5555555555	5
67	8888888888	4444444444	13333333332	66666666599	4444444444	4444444449
68	8888888888	5555555555	1444444443	11111111042	3333333333	7777777782
69	8888888888	6666666666	1555555554	66666666596	2222222222	4
70	8888888888	7777777777	1666666665	3333333261	1111111111	1111111115
71	8888888888	8888888888	1777777776	11111111037		1111111115
72	8888888888	9999999999	1888888887	9999999924	8888888889	4
73	9999999999	1111111111	11111111110	11111111034	8888888888	8888888892
74	9999999999	2222222222	12222222221	3333333255	7777777777	6666666669
75	9999999999	3333333333	13333333332	66666666587	6666666666	3333333335
76	9999999999	4444444444	1444444443	11111111030	5555555555	8888888890
77	9999999999	5555555555	1555555554	66666666584	4444444444	3333333334
78	9999999999	6666666666	1666666665	3333333249	3333333333	6666666667
79	9999999999	7777777777	1777777776	11111111025	2222222222	8888888889
80	9999999999	8888888888	1888888887	9999999912	1111111111	

Figure 3. Part 2

CARD NO.	"A" FIELD	"B" FIELD	A + B		A - B	
			IN PRODUCTS CTR. ("C" FIELD)	IN SUMMARY COUNTER	IN PRODUCTS COUNTER	IN SUMMARY COUNTER
81	99999999999999	99999999999999	199999999999998	999999999910		
82	123456789123	123456789123	246913578246	6913578156		
83	234567891234	234567891234	469135782468	6049360624		
84	345678912345	345678912345	691357824690	7407185314		
85	456789123456	456789123456	913578246912	985432226		
86	567891234567	567891234567	1135782469134	6767901360		
87	678912345678	678912345678	1357824691356	4592592716		
88	789123456789	789123456789	1578246913578	2839506294		
89	891234567891	891234567891	1782469135782	5308642076		
90	912345678912	912345678912	1824691357824	9999999900		
91	1010101010101	1010101010101	2020202020202	202020102		
92	2020202020202	2020202020202	4040404040404	606060506		
93	3030303030303	3030303030303	6060606060606	1212121112		
94	4040404040404	4040404040404	8080808080808	2020201920		
95	5050505050505	5050505050505	10101010101010	3030302930		
96	6060606060606	6060606060606	12121212121212	4242424142		
97	7070707070707	7070707070707	14141414141414	5656565556		
98	8080808080808	8080808080808	16161616161616	7272727172		
99	9090909090909	9090909090909	18181818181818	9090908990		
100	10101010101010	10101010101010	20202020202020	1111111010		
101	20202020202020	20202020202020	40404040404040	5151515050		
102	30303030303030	30303030303030	60606060606060	1212121110		
103	40404040404040	40404040404040	80808080808080	9292929190		
104	50505050505050	50505050505050	101010101010100	9393939290		
105	60606060606060	60606060606060	121212121212120	1515151410		
106	70707070707070	70707070707070	141414141414140	5656565550		
107	80808080808080	80808080808080	161616161616160	1818181710		
108	90909090909090	90909090909090	181818181818180	9999999890		

Figure 3. Part 3

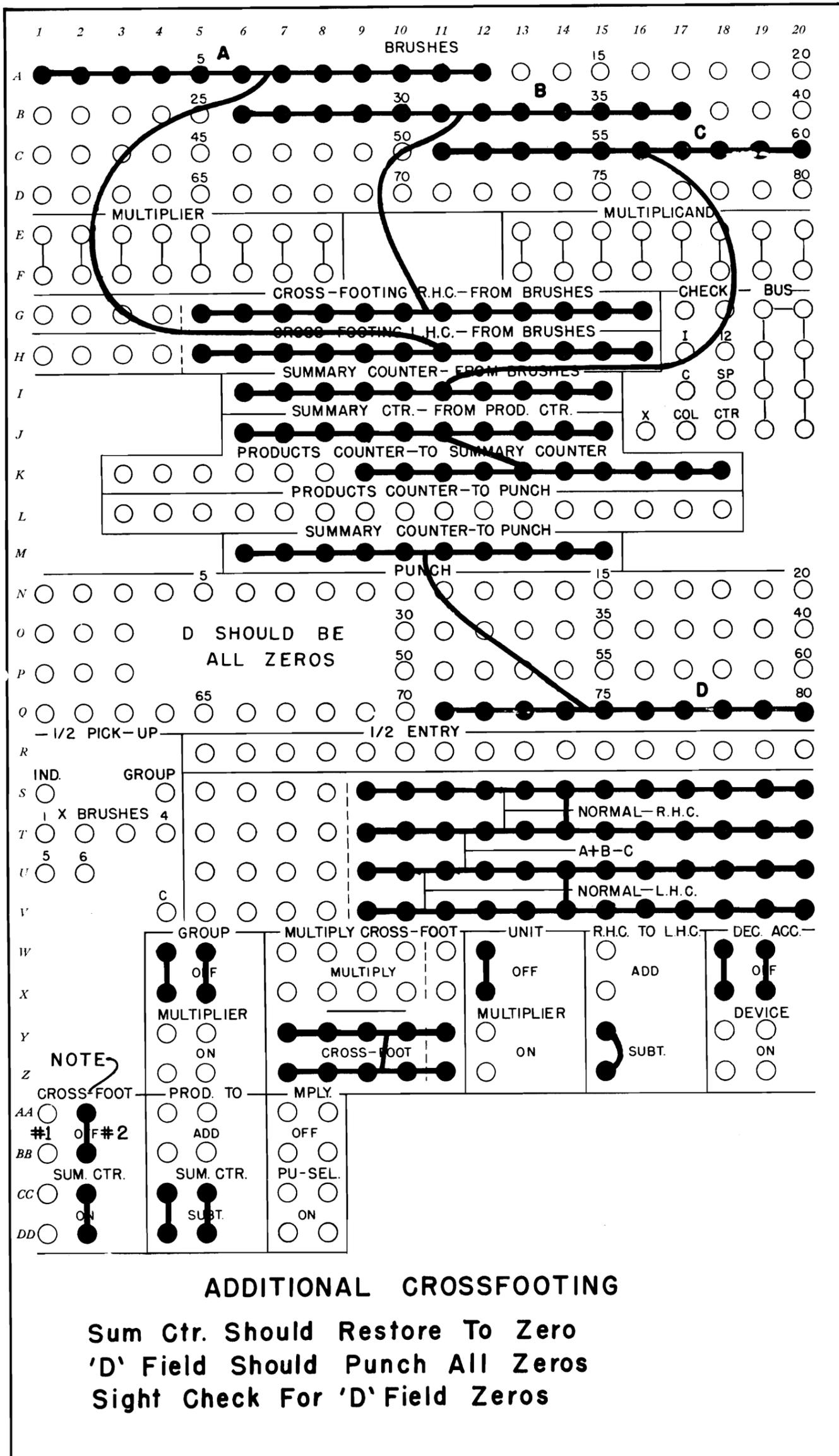


Figure 4