THE INTERNATIONAL GANG SUMMARY PUNCH

The International Gang Summary Punch combines the functions of the Standard Summary Punch and the speed and functions of the punching unit of the Automatic Reproducing Punch. It may be used either as a Summary Punch in connection with an Alphabetic Printer or separately as a High Speed Gang Punch. In both operations it is as flexible as the Standard Summary Punch and the punching unit of the Automatic Reproducing Punch.

The mechanical features and functions of this machine are similar to the Numerical Gang Summary Punch, Type 518, and all common information pertaining to these two machines is incorporated in T. M. Section 518.

GENERAL DESCRIPTION

The Gang Summary Punch is similar in appearance to the Automatic Reproducing Punch except that it is smaller in length, owing to the elimination of the reproducing feed unit. All relays are in the left front cabinet. An automatic plugboard is located to the right of the relay cabinet. All switches are located on the front of the machine.

The punch has a regular summary punch cable attached to it. The free end of the cable is equipped with a multiple contact plug unit. The tabulator to be used must be equipped with a stationary plugboard unit and receptacle into which the cable unit may be inserted when summary punching. There is also a holding receptacle on the right end of the punch to hold the cable unit when it is not attached to the tabulator. The cable unit and its receptacle are similar in construction to the automatic plugboard, but smaller in size.

Current Requirements

The relays in this machine operate on 40 volts D. C. and this current is supplied from the tabulator generator through the summary punch cable. The punch drive motor for the machine receives its required current—either 110 or 220 volts D. C.—through its separate wall plug.

NOTE: When using the machine for gang punching, the tabulator should not be operated at the same time, as it would be too great a load on the generator.

PLUGBOARD AND METHOD OF PLUGGING

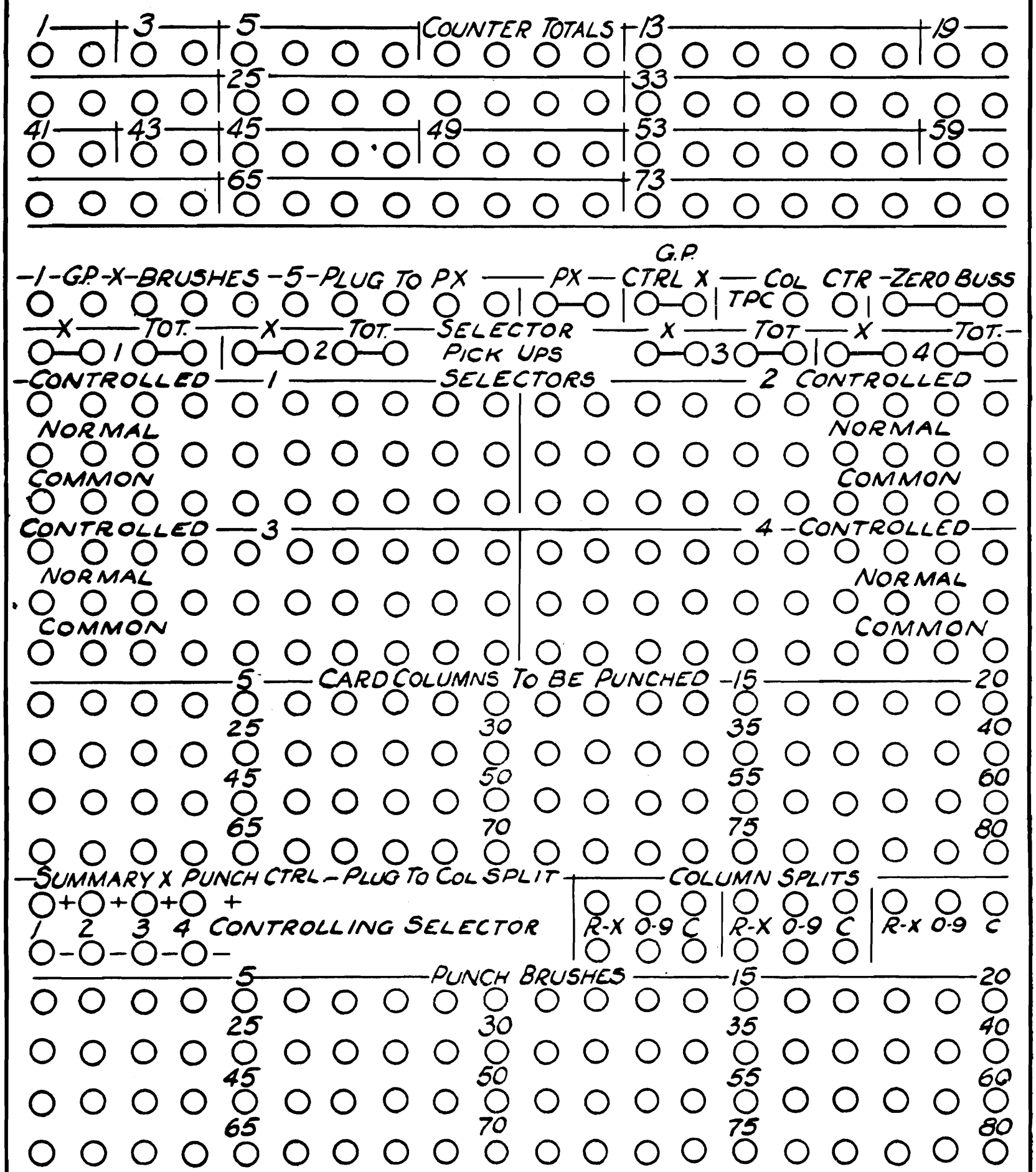
The plugboard (Fig. 1) is of the quick set-up type and is located on the front right end of the machine. All plughubs are clearly marked and in place of the reading hubs are eighty "Counter Total" hubs. These hubs are followed by the "G.P.X. Brushes" hubs, "PX" hubs, "G.P. Control X" hubs, "Zero Buss" hubs, "Selector Pick-up" hubs, four sets of Selectors (special equipment), hubs for the punch magnets, "Balance X Punching" hubs, "Column Split" hubs which are the same as "Punch 11 and 12" "Punch 0 to 9" hubs on the Automatic Reproducing Punch, and the "Punch Brush" hubs. It will also be noted that there are two hubs marked "T.P.C. col. and Counter," but they are not used on this machine.

Regular Summary Punching

The plugging of the plugboard for straight summary punching is the same as on the Standard Duplicator Summary Punch; namely plugging from "Counter Totals" hubs to "Card Columns to be punched" hubs. Any counter positions may be plugged to any desired columns to be punched.

Balance Selection Punching

When it is desired to use balance selection punching, it is necessary to use two printer counter groups in order to obtain the proper results in punching. One group of counters carries the debit total, and the other group the credit total. If a complement 9 is standing in the last position of the debit counter group, it actuates the balance selection relays and allows the punch to receive its punching circuit from the credit counter. The necessary plugging is as follows: Plug from the "Common" of the balance selection MCR hubs to the punch magnet or "Card columns to be punched" hubs.



PLUGBOARD FOR TYPE 517

Fig. 1

Plug the "Normal" hubs of the balance selector to the debit counter group hubs. Plug the "Controlled" hubs of the balance selector to the credit counter group hubs. Plug from the counter of the highest order of the debit group to the selector pick-up hub marked "Total."

Summary Punching of Balance X

If it is desired to punch an X into a particular column, the following plugging is necessary: When an X is to be punched over a column which is not to receive any summary punching. the "Bal. X Punching" hubs are wired from the plus or minus hub as desired, to the desired punch magnet hub. When the X is to be punched over a column which is also to be summary punched, the plus or minus hub is wired to the "R & 12" hubs, the counter hub is wired to "0 to 9" hubs, and the desired punch magnet is wired to the "Common" hub of the X-eliminator.

Summary Punching and Gang Punching

If while summary punching, it is desired to duplicate common information, a single master card is used for the entire run. It is necessary only to plug from the desired master card columns to the identical columns in the summary cards.

Gang Punching

For gang punching operations, the plugging and operation of the machine remains the same as for similar operations on the Automatic Reproducing Punch. The unit is capable of performing straight gang punching, class selection, off-set gang punching, X-elimination or X transfer, and "0" punching.

PURPOSE OF P CAMS

The purposes of the P cams listed in T. M. Section 518 hold true for both the alphabetic and numerical machines, with the exception of those cams listed below, which differ on the alphabetic machine.

P-2—This contact provides a holding circuit for only relay R-1 after the R-1 relay has been energized through the depression of the start key. R-5 relay is not needed on the alphabetic machine, owing to R-1 relay having an additional set of points.

P-3—This contact provides a holding circuit for R-10 relay through its 10-B points, and for holding the balance selection relays through their No. 12 contacts.

P-13 and P-14 are not used on the alphabetic machine.

RELAYS

All relays are located in the relay cabinet to the left of the plugboard. Listed below are the part numbers and positions in the cabinet of all the relays:

	Type of Points Looking at Armature End					Position
Part No.	A	B	AU	BU	CEN	Duo Relays
111354	M	M	—	—	—	11
111356	M	B	—	—	—	17
111372	T	M	—	—	—	15
111374	M	M	—	—	—	4
111376	M	B	—	—	—	6, 7
111378	—	—	—	—	M	8, 9
121877	T	M	—	—	—	10
122532	M	M	M	M	—	1, 2, 16
122797						Motor Relay
						Multi Contact Relays
123791						Balance and Class Selection (4 standard equipment)

All relay adjustments remain the same as the adjustments on the corresponding relays used on the ATFS printer and the Automatic Reproducing Punch. (See T. M. Section 405 and T. M. Section 512 for reference).

PURPOSE OF DUO CIRCUIT RELAY CONTACTS

R-1AU—This contact completes the pick-up circuit for the motor relay and R-9 when the start key is depressed. It prevents starting the machine by any means other than the start key except when using the machine for summary punching.

R-1AL—This contact, in conjunction with P-2, provides a holding circuit for R-1 relay after the depression of the start key until P-2 breaks. It also provides a holding circuit for R-1 through R-15A normally opened points, R-7B, R-2AU, R-4B, stacker contact and stop key, while gang punching. When using the machine for summary punching, this contact, in conjunction with R-15A normally closed points, R-7A, R-6B, R-4B, stacker contact and stop key, completes the holding circuit for R-1 relay allowing the machine to take its first two machine cycles after the depression of the start key.

R-1B—This contact, along with P-1, completes a circuit to the feed clutch whenever R-1 is energized, permitting the machine to feed cards. When open, this contact prevents the de-clutching of the feed unless R-1 is energized.

R-2AU—This contact permits the picking up of R-1 through the printer while summary punching, providing a card is between the die and stripper ready to be punched. It prevents the machine from auto. starting before a card is in position to be punched.

R-2AL—This contact is used to complete a circuit to the zero buss hubs when cards are feeding, and to break this circuit when cards fail to feed into the die and stripper station.

R-2BU—This contact completes a circuit to the punch X bar, when cards are feeding through the die and stripper, to complete the X circuit.

R-2BL—This contact, in conjunction with R-4A contacts, prevents an auto. start of the printer after summary punching, if no cards are feeding into the punch die and stripper station.

R-3—This relay is not used.

R-4A—This contact is in the same circuit as R-2BL and prevents a printer auto. start circuit, if there are no cards in the punch magazine.

R-4B—This contact stops the machine when cards run out of the punch magazine. It also prevents a punch auto start while summary punching, if there are no cards in the magazine.

R-5—This relay is not used.

R-6A—These points provide a holding circuit for R-6 as long as there are cards feeding through the die and stripper.

R-6B—When R-6 is energized on the second cycle after the depression of the start key while summary punching, this contact opens placing the holding circuit of R-1 under control of P-2.

R-7A—This relay is energized at all times while summary punching and the "A" points are in series with R-6B and R-15A normally closed points, providing a holding circuit for R-1 for the first two machine cycles. When gang punching, this contact remains open and prevents the machine from taking two cycles after the depression of the start key.

R-7B—When summary punching, this contact is open and allows the machine tc stop after punching a card. While gang punching, this contact provides a holding circuit for R-1 through R-15A normally open points.

R-8—When summary punching, this contact provides a punch auto. start circuit through the printer. When gang punching, it prevents an auto. start circuit being completed through the printer.

R-9—The purpose of this relay and its points is to prevent the motor relay being picked up when R-1 is not energized, if the continuous running cam contact makes again after opening the circuit. It also prevents starting the motor while turning the machine over by hand.

R-10A—This contact is used to prevent the master card from being punched when the preceding detail card passes through the punch brushes when gang punching. The normally closed points of this contact, in conjunction with the X master X detail switch, allow a circuit to be completed to the punch magnets as the No. X detail cards pass through the die and stripper, and allow this circuit to be broken as the X master card passes this station.

The normally open points, in conjunction with the X master X detail switch, allow a circuit to be completed to the punch magnets as the X detail cards pass through the die and stripper, and allow this circuit to be broken as the No. X master card passes this station.

R-10B—These points provide a holding circuit for R-10 through P-3 after R-10 has been picked up by an X punched card. It also provides for a pick-up circuit for R-11 through P-17.

R-11A—These points complete the holding circuit for R-11 after R-11 has been picked up through P-17, R-10B and P-3.

R-11B—This contact completes the class selector pick-up circuit when P-16 makes. This circuit is completed on the second cycle after the X impulse is sensed owing to the delayed action in the picking up of R-11.

R-12, 13 and 14 are not used.

R-15A—The normally closed side of these points is used to provide a hold circuit for R-1 during the first two punch cycles. The normally opened points when closed are to provide a holding circuit for R-1 when gang punching, and break this circuit in case cards fail to feed into the punch brush station.

R-15B—This contact is in series with the common brush of the punch brush contact roll and the circuit breakers. It completes the circuit to the punch brushes when cards are in the punch brush position and breaks the circuit when no cards are under the punch brushes.

R-16AU, AL, BU, and BL—These points are used in conjunction with balance selection on the alphabetic punch. With the balance selection hubs properly plugged, these contacts allow the balance selection multi-contact relays to be picked up, providing there is a nine in the counter position plugged. These relays hold through their 12 points.

R-17A—This contact completes the nine circuit for energizing the balance selection MCR when balance selecting.

R-17B—This contact delays the feed clutch magnet pick-up circuit until after the balance selection set-up has been completed in order to prevent punching the edge of the card owing to the punch magnets, plugged to counter positions with nines in them, tripping off.

CIRCUITS

Summary Punching.

No. 1. Main Line Feed—When summary punching, and the summary punch switch S-29 in its "On" position, the main line circuit is as follows:—From punch post No. 5 to interlock post I-1, through the summary punch cable, through R-13AU points in the printer, (these points remain closed during summary punching, providing summary punch switch S-29 is "On") to L-16. The other line circuit is from punch post No. 1 to interlock post I-10, through the summary punch cable to the printer, through 10 amp. fuse to F-24.

No. 2. Magazine Card Lever Contact Circuit. When cards are placed in the punch magazine, the card lever contact is closed, completing the following circuit, which holds until cards run out of the magazine: Fuse No. 2, coil of R-4, magazine card lever contact to post No. 5.

No. 3. R-7 Relay Pick-up and Holding Circuit. When the summary punch switch No. 29, located on the printer, is turned to its "ON" position, a circuit is completed to R-7 and holds this relay energized at all times while summary punching. The circuit is as follows: Fuse No. 2, coil of R-7, I-9 interlock posts, S.P. sw. No. 29, to L-11 on the printer.

No. 4. Punch Start Circuit. When the start key is depressed, after cards have been placed in the printer and the punch magazine, a circuit is completed which picks up R-1 relay. The circuit is: Fuse No. 4, coil of R-1, start key, stop key to post No. 6.

No. 5. Clutch Magnet Circuit. When R-1 is energized, a circuit is completed to the clutch magnet through R-1B points as follows: Fuse No. 1, coils of clutch magnet, R-17B points, R-1B points, P-1 to post No. 5.

No. 6. Motor Relay and R-9 Pick-up Circuit—When R-1 is energized, a circuit is also completed to the motor relay and R-9 through R-1AU points. This circuit is: Fuse No. 4, knockoff bar contact, coils of motor relay and R-9, R-1AU points to post No. 6.

No. 7. Motor Circuit—When the motor relay is energized, a circuit is completed to energize the drive motor. This circuit is as follows: Post No. 2, split plug, drive motor, split plug, post No. 3, points of motor relay, to post No. 4.

No. 8 & 9. Clutch and Motor Control Relay, R-1, Holding Circuit—When summary punching, this circuit holds for the first two cycles, but to better understand this circuit, it will be divided into the first and second cycles.

No. 8—This is the holding circuit for the clutch and motor control relay, R-1, during the first cycle: Fuse No. 4, R-1 coils and AL points, normally closed points of R-15A, R-7A points, R-6B points, R-4B points, stacker contact, stop key to post No. 6.

No. 9—When P-5 makes during the second cycle energizing R-6 and opening its "B" points, R-1 relay will be held through its own "AL" points until P-2 breaks. The circuit is as follows: Fuse No. 4, R-1 coil and "AL" points, P-2 to post No. 5.

No. 10. Motor Relay and R-9 Holding Circuit—As long as R-1 is energized, the motor relay and R-9 relay hold through R-1AU points as in circuit No. 6.

Whenever R-1 drops and the machine de-clutches, the drive gear continues to revolve until the index reaches approximately 9 in order to position the one tooth ratchet as near to the clutch dog as possible. The circuit for holding the motor relay during this additional drive gear cycle is as follows: Fuse No. 4, knock-off bar contact, motor relay and R-9 coils, R-9 points, continuous running cam contact, to post No. 6.

No. 11. Die Card Lever Contact—When cards feed into the die and stripper station, the following circuit is completed: Fuse No. 2, coil of R-2, die card lever contact, to post No. 5.

No. 12. R-1 Relay Holding Control Pick-up Circuit—When P-5 cam contact makes on the second cycle, the following circuit is completed: Fuse No. 2, R-6 coil, P-5 die card lever contact to post No. 5.

No. 13. R-1 Relay Holding Control Holding Circuit—This circuit holds through R-6A points as long as the die card lever is made. It is as follows: Fuse No. 2, R-6 coil and R-6A points, die card lever contact, to post No. 5.

No. 14. Punch Card Lever Circuit—As long as cards feed into the punch brush station, a circuit energizing R-15 will be completed. The circuit is as follows: Fuse No. 2, R-15 coil, punch card lever contact to post No. 5.

No. 15. R-8 Relay Circuit—On a control change when Mi 9 contact on printer closes, a circuit is completed, energizing R-8 relay coil. The circuit is as follows: Fuse No. 2, coil of R-8, interlock posts I-4, Mi 9, Maj. 6, Int. 6U, R-10AU, R-13AU, to L-16.

No. 16. Punch Auto-Start—After the first two punch feed cycles have been completed, the punch receives its start circuit through the printer at the end of each control change, and will feed one card cycle. The circuit is as follows: Fuse No. 4, coil of R-1, R-8 points, interlock posts 1-5, CF 32 in printer, interlock posts 1-6, R-2AU points, R-4B points, stacker contact, stop key to post No. 6.

No. 17. R-1 Holding Circuit for each Summary Card—As summary cards are feeding, R-1 holds for one cycle through its "AL" points and P-2 as in circuit No. 9.

No. 18. Regular Summary Punching Circuit—When the machine is plugged for straight summary punching, the following circuit is completed: Dummy fuse No. 5. X master X detail switch, normally closed R-10A points, common brush, punch magnet commutator, punch magnet brush, punch magnet, punch magnet plughub, plugwire, desired counter plughub, through summary punch cable, counter emitter, back through the summary punch cable to the punch emitter, emitter brush, circuit breaker contacts, to post No. 7.

No. 19 & 20. Summary Punching of X Control—There are two methods of punching X control; one is when the X is to be punched over a column which is not being summary punched, and the other is when the X is to be punched over a column which is to contain summary punched data. These two set-ups will be dealt with as two separate circuits.

No. 19—When the X is to be punched over a column which is not being used for summary punching, the circuit is as follows: Dummy fuse No. 5, X master X detail switch, R-10A normally closed points, common brush, punch magnet commutator, punch magnet brush, punch magnet, punch magnet hub, plug wire to plus or minus plughub (for example, plus X will be used), through the normally closed points of No. 11 contact of the Bal. MCR, X segment of the punch emitter, emitter brush, circuit breakers, to post No. 7.

No. 20—When the X is to be punched over a column which is to contain summary punched data, the following circuits are completed: (a) For the summary punched data: Dummy fuse No. 5, X master X detail switch, R-10A nor-

mally closed points, common brush, punch magnet commutator, punch magnet brush, punch magnet, punch magnet hub, plug wire to the row of plughubs of the X-eliminator marked "Common," through the cam contact, "0 to 9" plughub, plug wire to desired counter position plughub, summary punch cable, counter emitter, summary punch cable to segment of punch emitter, emitter brush, circuit breaker contact to post No. 7.

(b) For punching a plus X: Dummy fuse No. 5, X master X detail switch, R-10A normally closed points, common brush, punch magnet commutator, punch magnet brush, punch magnet, punch magnet hub, plug wire to the row of plughubs of the X-eliminator marked "Common," through the cam contact, "R & X" plughub, plug wire to balance X punching plus plughub, normally closed points of No. 11 contact of the balance MCR, X segment of the punch emitter, emitter brush, circuit breakers to post No. 7.

No. 21-23. Balance Selection Summary Punching—The following circuits are completed when it is desired to punch from either a debit or credit group of counters.

No. 21. R-16 and R-17 Relays Circuits—When there is a control change in the printer allowing the picking up of the minor, intermediate and major control circuits (for example, all three controls will be used at the same time in this circuit description). The following pick-up circuit for R-16 and R-17 will be completed when CF 33 makes at 250°: From fuse No. 2 in punch, R-16 and R-17 coils, punch interlock post I-3, printer interlock post I-3, CF 33, Mi-9, Maj. 6, Int. 6U, R-10AU, R-13AU, to L-16.

No. 22. Balance Selection MCR Pick-up Circuit—When R-16 and R-17 are energized and their points are closed, a circuit is completed picking up the desired balance selection MCR when a nine in the last counter of the debit counter group is sensed through the punch emitter in the following circuit: Punch fuse No.4, balance MCR, R-16AU points, balance selection plughub, plug wire to the hub of the counter of the highest order of the debit group, through the counter emitter No. 9 spot, punch buss post No. 9, punch emitter No. 9 spot, R-17A points, to post No. 7.

No. 23. Balance Selection MCR Holding Circuit—While punching balance selection data, the balance selection MCR is held up through its own No. 12 contact points and P-3. The circuit is as follows: Fuse No. 4, balance MCR coils, MCR No. 12 contact, P-3 to post No. 5.

No. 24. Gang Punching When Summary Punching—It might be desirable to duplicate common information into the summary card while summarizing, and this is accomplished by inserting a single master card at the beginning of the pack of cards. It is essential that gang punched information is in the exact same columns on both the master and summary cards. Only the gang punching circuits will be explained here, as reference may be made to circuits No. 17, 18 and 19 for the desired summary punching circuits.

The gang punching circuit is as follows: Dummy fuse No. 5, master side of X master X detail switch, normally closed R-10A points, common brush, punch magnet commutator, punch magnet brush, punch magnet, punch magnet hub. plug wire, punch brush hub, punch brush, contact roll, common brush, R-15B points, circuit breaker contacts to post No. 7.

No. 25 & 26. Printer Auto. Reset Circuit—After a card is summary punched and advances to the punch brush station, R-11 relay is energized in order to pick up relay R-12 to provide an auto. reset circuit to the printer.

No. 25—The circuit for energizing R-11 is as follows: Punch post No. 5, punch card lever contact, P-6, interlock posts No. 7, R-11 coil, to fuse No. 22. R-11 holds through the following circuit on the printer: L-11, CF-22, R-11A points, R-11 coil, to fuse No. 22.

No. 26—When R-11B points are closed, the following circuit on the printer is completed to energize R-12 relay: L-8, R-11B points, pick-up coil of R-12, CB-19 to fuse No. 18. The R-12B points close a circuit providing a circuit for the print clutch magnet and total switch plates after the punch cycle is completed. The circuits are as follows: Fuse No. 23, CB 21, R-12B, minor auto total switch, Mi 2 to print clutch magnet to L-14 and M-13, total switch plate magnets to L-16.

No. 27. Printer Auto. Start Circuit—After the printer makes a reset cycle, it receives an auto. start cycle through punch relay points R-2BL and R-4A providing there are cards in punch magazine and the punch die station. The circuit is as follows: L-17, stop key, stacker stop switch, Int. 1 normally closed points, interlock posts I-11, punch relay R-2BL points, punch relay R-4A points, interlock posts I-12, R-26B points, card feed clutch magnet, PM-1, auto. start switch, R-3AL, to 3 Amp. fuse No. 24.

Gang Punching Circuits

All circuits that are used in gang punching operations and that are similar to the corresponding circuits used while summary punching will not be repeated, but reference will be made to their previous numbers.

No. 28. Main Line Feed—When gang punching, the gang punch switch, S-28, on the printer is turned "On." This prevents running the printer while gang punching as the generator capacity is not sufficient to operate both machines at the same time, The main line circuit is as follows:—Punch post No. 5, interlock post I-1, through the summary punch cable to one side of R-13AU points, through the gang punch switch S-28 to L-19. The other line circuit is from punch post No. 1, interlock post I-10, through the summary punch cable to the printer, through 10 amp. fuse to F-24.

No. 29. Magazine Card Lever Contact. See Circuit No. 2.

No. 30. Punch Start Circuit—When the start key is depressed, after cards have been placed in the magazine, a circuit will be completed picking up R-1 relay, causing the machine to operate one cycle. See Circuit No. 4.

No. 31. Clutch Magnet Circuit. See Circuit No. 5.

No. 32. Motor Relay and R-9 Pick-up Circuit. See Circuit No. 6.

No. 33. Motor Circuit. See Circuit No. 7.

No. 34. Clutch and Motor Control Relay, R-1, Holding Circuit. After the start key is depressed, the machine will take only one cycle and R-1 will hold energized through the following circuit: Fuse No. 4, R-1 coil and R-1AL points, P-2 to post No. 5.

No. 35. Motor Relay and R-9 Holding Circuit. See Circuit No. 10.

No. 36. Die Card Lever Contact. See Circuit No. 11.

After the start key has been depressed for the second time, circuits Nos. 4, 5, 6 and 7 will be completed along with the following additional circuits.

No. 37. Punch Card Lever Contact—When the first card reaches the punch brush station, the following circuit is completed: Fuse No. 2, relay coil No. 15, punch card lever contact to post No. 5.

No. 38. Clutch and Motor Control Relay, R-1, Holding Circuit—After the depression of the start key for the beginning of the second cycle, the above relay picks up as in circuit No. 4 and holds through the following circuit until cards either run out of the magazine or fail to feed into the die and stripper or punch brush stations. The circuit is as follows: Fuse No. 4, R-I coil and "AL" points, R-15A normally open points, R-7B points, R-2AU points, R-4B points, stacker contact, stop key contact to post No. 6.

No. 39. P-X Brush Circuit—Whenever an X punched card passes the punch X brush station, a circuit will be completed to R-10 relay. This circuit is as follows: Fuse No. 3, R-10 pickup coils, P-X plughub, plug wire to desired X brush hub, X brush, common X bar, R2BU points, P-4 to post No. 5.

No. 40. R-10 Holding Circuit—This circuit prevents the punching of the master card from the last detail card as the master card passes through the die and stripper by opening common connection to punch magnets. The R-10A points work in conjunction with the X master X detail switch to accomplish this result. This circuit holds until P-3 breaks and is as follows: Fuse No. 3, holding coils of R-10, R-10B points, P-3 to post No. 5.

No. 41. Punch Magnet Circuit—The punch magnet circuit is the same as the gang punch circuit described in Circuit No. 24.

No. 42. Zero Buss Hub Circuit—When it is desired to punch zeros in certain columns of the card, a circuit to the desired punch magnet is completed when P-7 makes. The circuit is as follows: Dummy fuse No. 5, X master X detail switch, R-10A points, common brush, punch magnet commutator, punch magnet brush.

punch magnet, punch magnet plug hub, plug wire to zero buss hubs, R-2AL points, P-7, circuit breaker contacts to post No. 7.

No. 43. "R-X" Elimination or "0 to 9" Elimination—When it is desired to punch 0 to 9 and eliminate the R and X holes, the circuit is completed to one of the cam contacts P-8 to P-12. This circuit is as follows: Dummy fuse No. 5. X master X detail switch, R-10A points, common brush, punch magnet commutator, punch magnet brush, punch magnet, punch magnet plug hub, plug wire, eliminator hubs marked "0 to 9," P-8 to P-12, hubs marked "common," plug wire to punch brush, punch brush, contact roll, common brush, R-15B points, circuit breakers to post No. 7. When the R and X positions in the card pass the punch brushes, there will be no circuit through the P-8 to P-12 cam contacts and the card will not receive any punchings in these positions. When the card positions 0 to 9 pass the punch brushes, the P-8 to P-12 contacts will complete the circuit allowing the punching of these positions.

When it is desired to punch R and X and eliminate 0 to 9 information, the other set of points on P-8 to P-12 cam contacts are utilized. The same circuit is completed as when eliminating R and X but to obtain the proper results, it is necessary to plug from the punch magnets to "R and X" hubs instead of to "0 to 9" hubs as described above.

No. 44. "X" and "R" Transfer—When it is desired to transfer X and R punching and 0 to 9 punching into another column, it is necessary to plug through a class selector.

Class selector circuits will be handled as a whole in the following paragraphs:

No. 45-48 Class Selection Circuits—The machine is equipped with four MCR relays which may either be used for balance selection or class selection. For class selection, they operate the same as the MCR relays used for class selection purposes on the punch unit of the Automatic Reproducing Punch. They are controlled by predetermined X punching and their set-up is delayed an additional cycle to enable the X punched card to reach the punch brush station. The circuits in their proper order are as follows: Whenever an X punched card passes the X brushes, a circuit will be completed to R-10 relay. This circuit is the same as circuit No. 39. This circuit is held the same as in circuit No. 40.

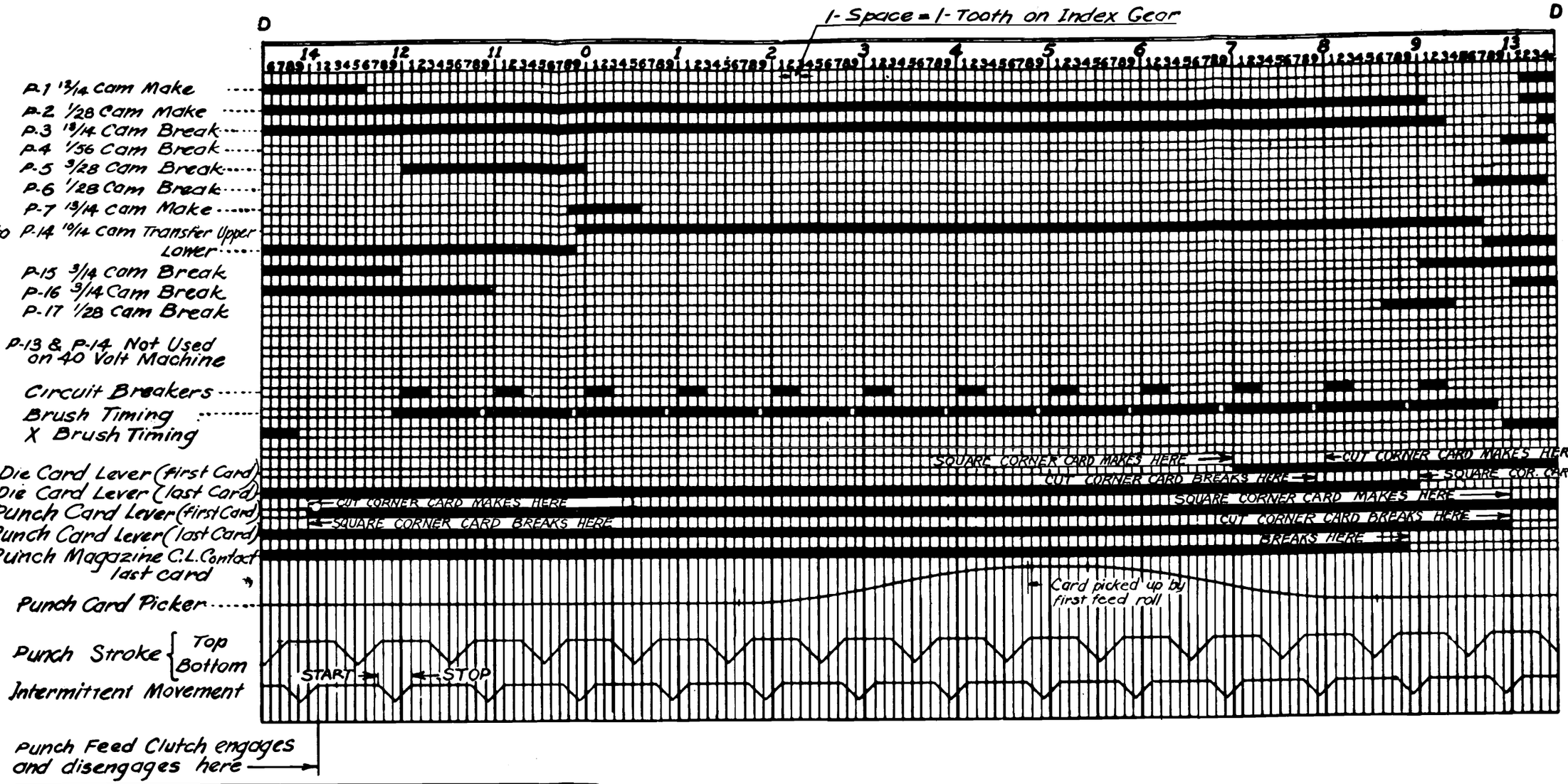
No. 45. R-11 Pick-up—When P-17 makes at 6 teeth past 8 during the first cycle after R-10 picks up, a circuit will be completed to R-11 in the following manner: Fuse No. 3, R-11 coil, P-17, R-10B points, P-3 to post No. 5.

No. 46. R-11 Holding Circuit—When R-11 is energized, a holding circuit is established through its own "A" points and P-15. This circuit is as follows:

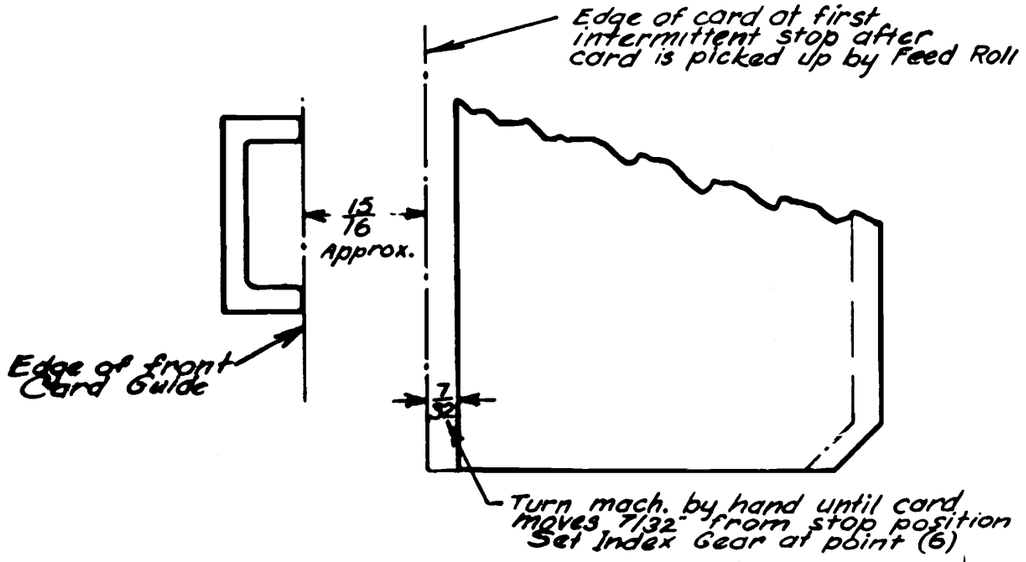
Fuse No. 3, R-11 coil and "A" points, P-15 to post No. 5.

No. 47. Class Selector MCR Pick-up Circuit—After R-11 is picked up and P-16 makes at 13 on the same cycle, there will be a circuit completed picking up the class selector MCR as follows: Fuse No. 4, class selector MCR, class selector plug hub, plug wire to "G.P. Class Set-up" hub, R-11B points, P-16 to post No. 5.

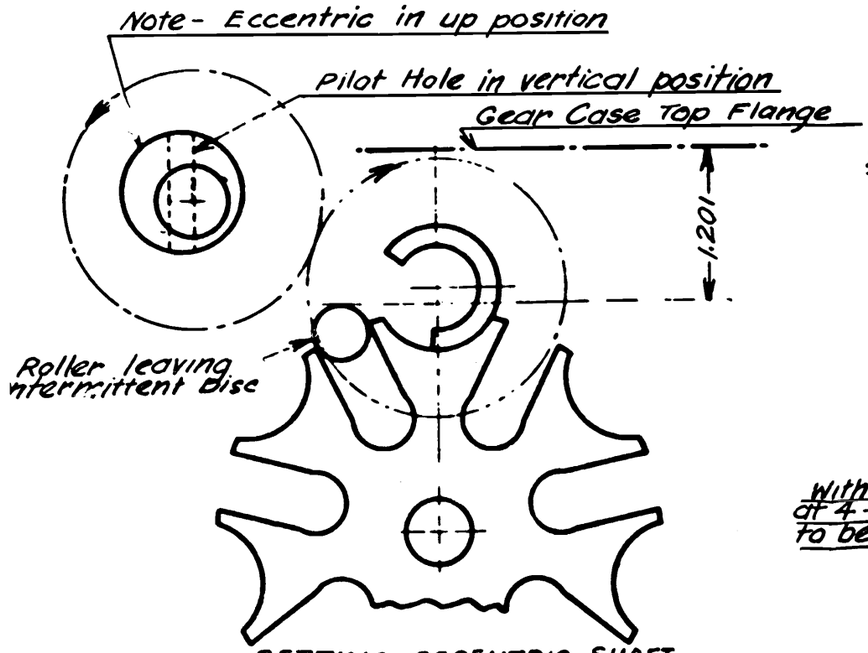
No. 48. Class Selector MCR Holding Circuit—When the class selector MCR picks up it closes its No. 12 contact points establishing a holding circuit for the second cycle until P-3 breaks at 3 teeth after 9. This circuit is as follows: Fuse No. 4, class selector MCR, and its No. 12 contact points, P-3 to post No. 5.



Continuous Running Cam - 8/14
Time to stop mach. at "9" on index (approx.) Cam should be timed when mach. loses stiffness and oil is warm. (Prevents much time loss for clutch pick-up)

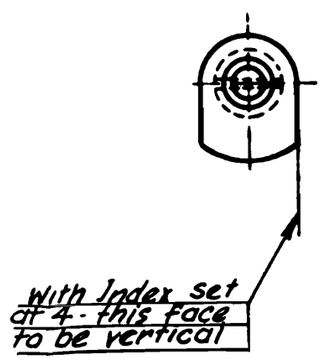


SETTING INDEX GEAR TO INTERMITTENT MOVEMENT



SETTING ECCENTRIC SHAFT TO INTERMITTENT DISC

SETTING OF STACKER FEED ROLL SHAFT



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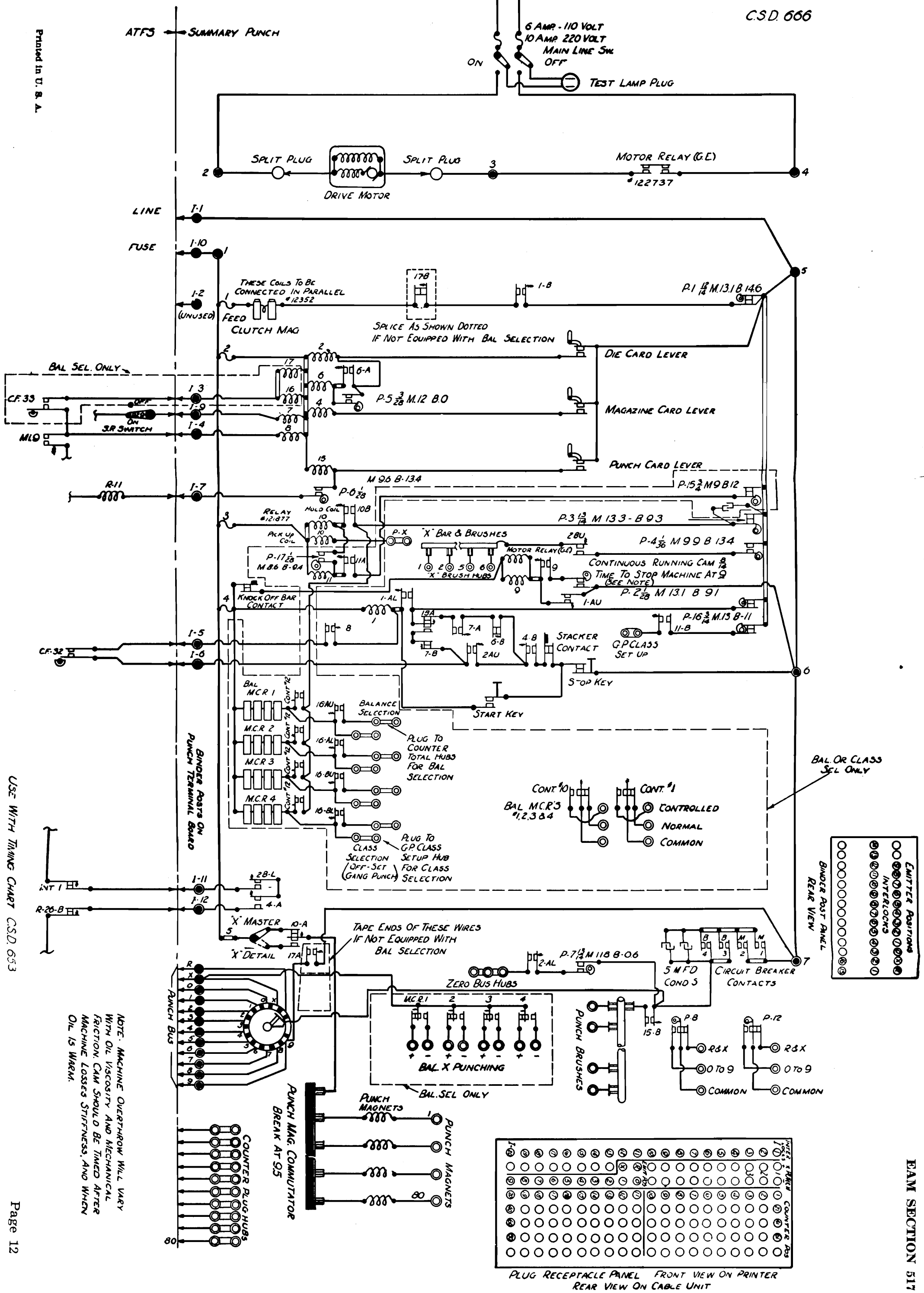

USE WITH TIMING CHART C.S.D. 653

NOTE. MACHINE OVERTHROW WILL VARY WITH OIL VISCOSITY AND MECHANICAL FRICTION. CAM SHOULD BE TIMED AFTER MACHINE LOSSES STIFFNESS, AND WHEN OIL IS WARM.