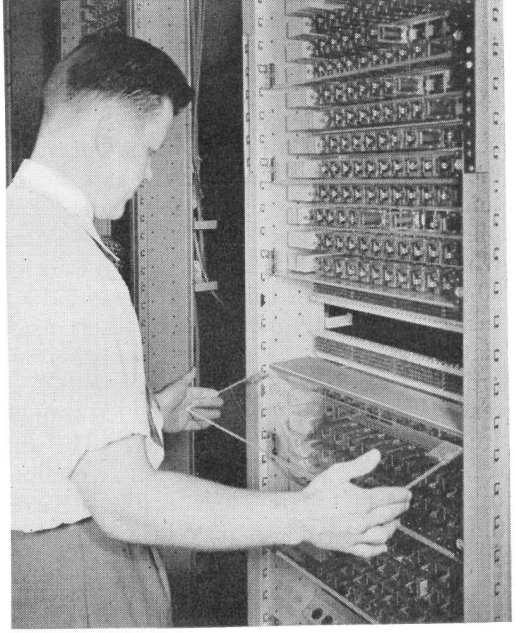
No. 5 crossbar frames

E. T. BALL
Switching Systems Development



Front view of translator and route relay frame showing method of removing front covers.

One of the many novel features of the No. 5 crossbar system is the design of the switch frame. Heretofore, switch frames for central offices have been designed primarily as supporting structures. The protecting covers and shields required for much of the apparatus have formed part of the equipment units mounted on the frame rather than of the frame itself. In general, these have taken the form of individual or strip type can covers or of cabinet type casings enclosing a group of apparatus. These types of covers impose restrictions in the arrangement of apparatus, particularly when functional

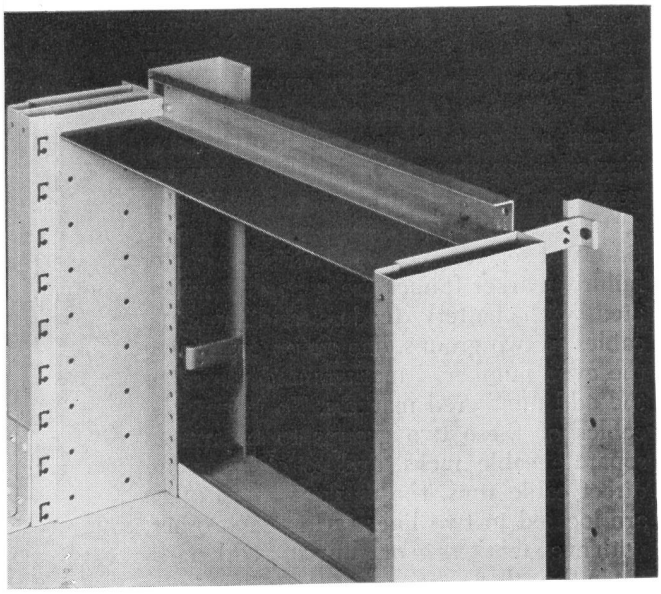


Fig. 1 (above)—Model showing some of the structural features of the No. 5 crossbar frame.

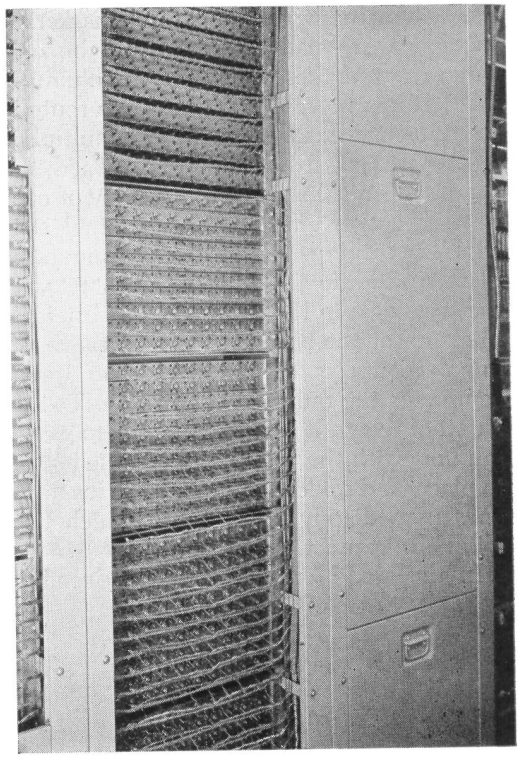


Fig. 2 (at right)—Rear of message register frame at Towson, Md., showing stile strip and covers.

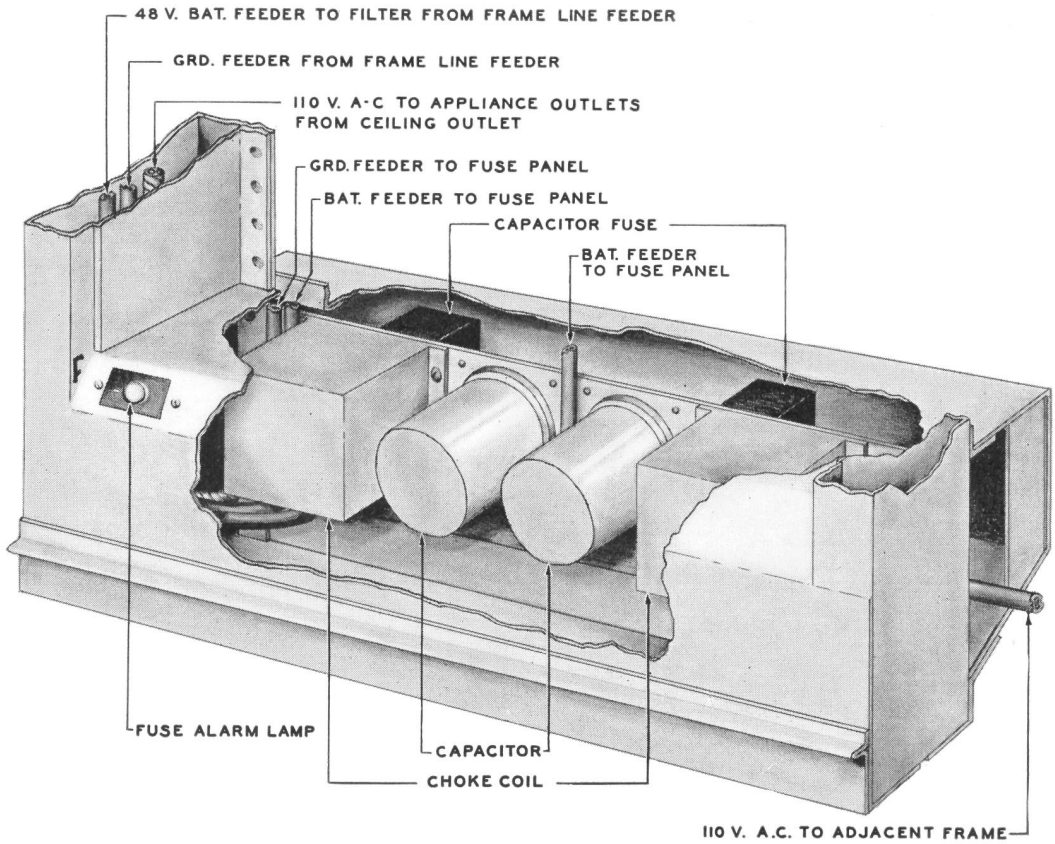


Fig. 3—Perspective drawing showing arrangement of base of the No. 5 crossbar frame.

units* are employed. To secure greater freedom in the use of functional units in the No. 5 crossbar system, covering and shielding provisions were made part of the basic frame itself. This permits a frame to be covered to the extent desired, and the covering may be readily modified at any time to accommodate changes in the arrangement of apparatus or in the amount of covering desired.

Another radical difference in the new frames is that the supporting uprights, instead of being solid steel sections, as were those for earlier types of local central-office frames, are hollow rectangular sections of sheet steel. They are deep enough to extend beyond the switches or other apparatus mounted on them, and thus permit the front covers to be simple panels hinged near the front edges of the uprights. Although the box type uprights of the new frames are only a little over half as heavy as the bulb type frame used in No. 1 crossbar, they are more than 60 per cent stiffer along both major and minor axes. In fact they are lighter and stiffer than any of the other previously used types of frames, as shown in Table I. Because of this increased stiffness of the new frames, cross bracing is not required even for the heaviest equipment. This freedom from cross bracing, together with the fact that there are no cabinets to divide up the mounting space, results in a frame that imposes no restrictions on the equipment arrangements, and has made practical the extensive unitization described in previous articles.

The shape of the box section of the new frames, and the methods of attaching the mounting plates to the uprights are shown in Figure 1: The front of the uprights are

* See page 17.

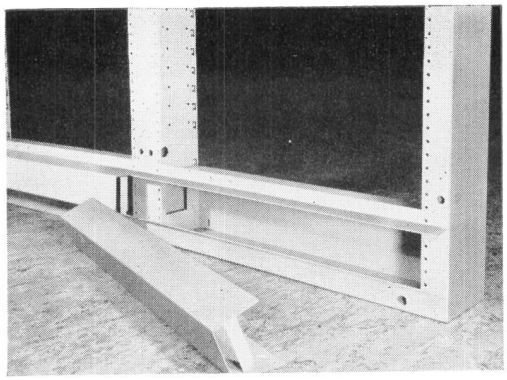
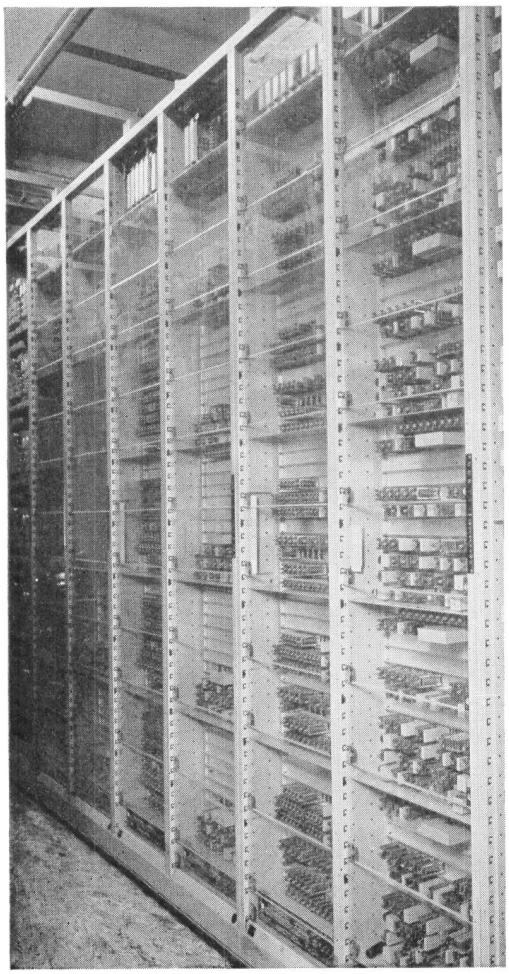


Fig. 4—Rear view of base of frame before equipment has been mounted.

TABLE I—WEIGHTS AND MOMENTS OF INERTIA OF VARIOUS TYPES OF FRAME STRUCTURES USED IN CENTRAL OFFICES

	Weight Per Ft.	Section Area	Moment of Inertia Major Axis	Moment of Inertia Minor Axis
I-Beam . . .	5.4	1.60	2.300	0.400
Channel . . .	4.1	1.19	1.600	0.200
Bulb	4.54	1.31	2.140	0.177
Cable Duct . .	3.53	1.01	1.070	0.181
Box Shape — No. 5 X-Bar	2.80	0.875	3.500	0.300

perforated and formed to support and seat the front covers. These are of transparent plastic, and are hung from the "F" slots as evident in the photograph at the head of this article. A series of round holes, also evident in the illustrations, is perforated in the inner face of each upright to accommodate slides into which may be inserted horizontal baffles or separators. These are on two-inch vertical centers so that a frame



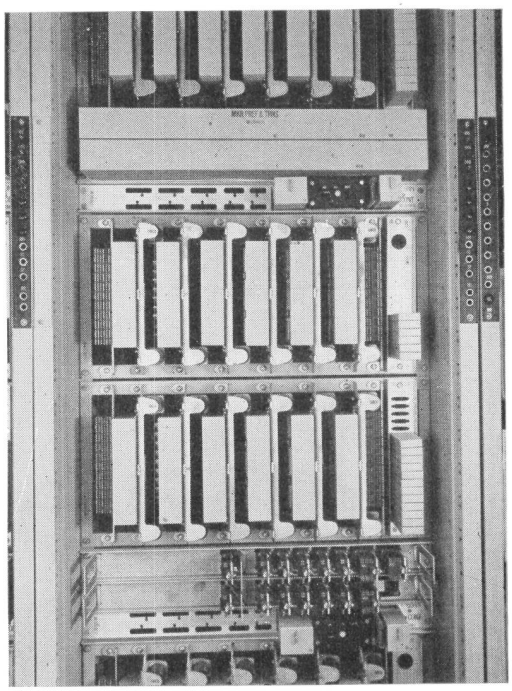


Fig. 5 (above)—On this line link connector frame, the jack strips in the face of the frame uprights are plainly evident.

Fig. 6 (at left)—A line-up of incoming register frames at the No. 5 crossbar office in Towson, Md. The transparent plastic covers may be seen in place on all frames.

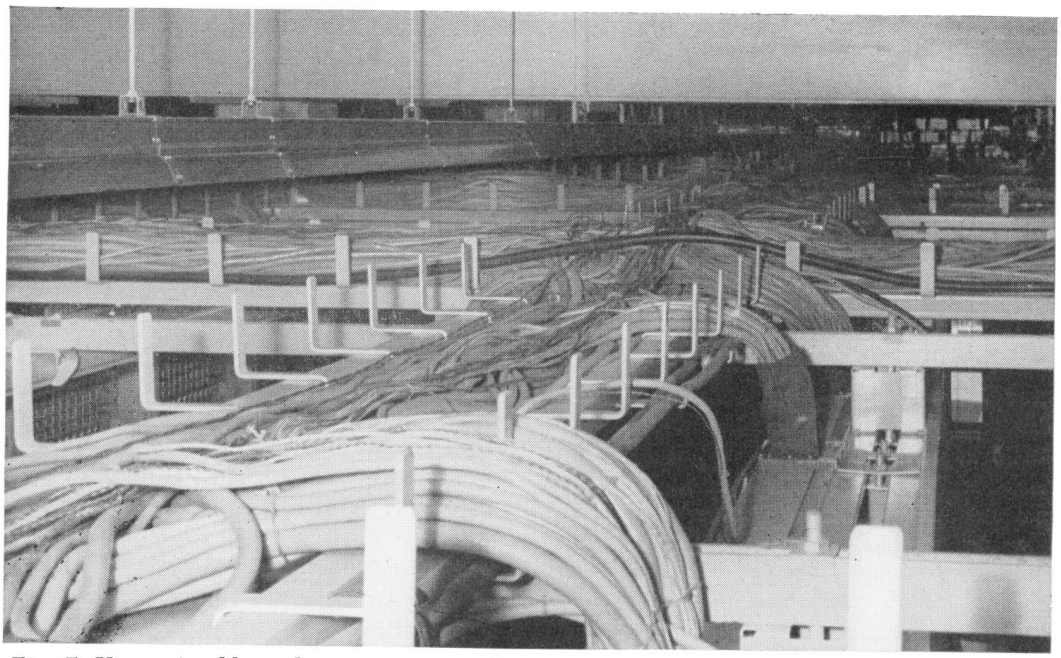


Fig. 7—View of cable racks over wiring aisle in a No. 5 crossbar office as seen from above.

may be divided up in any manner desired, each compartment accommodating a given number of two-inch mounting plates or their equivalent. In line with the front baffles but at the rear of the frame are corresponding baffles mounted by similar slides fastened to the cable brackets. Rear covers of the lift type, three per bay, are arranged to mount on fixed stiles that cover the cable ducts, as evident in Figure 2.

The frame provides for 62 two-inch mounting plates or the equivalent of other apparatus, with the bottom mounting plate 12 inches from the floor. In addition, battery filters and similar equipment requiring little maintenance may be mounted inside the base of the frame, where four additional inches of vertical mounting space is available. This arrangement is evident in Figure 6. Access to this equipment is obtained by removing the rear cover of the base, which forms the rear guard rail, as shown in Figure 3. In the front cover of the base, which is welded to the upright, are the fuse alarm

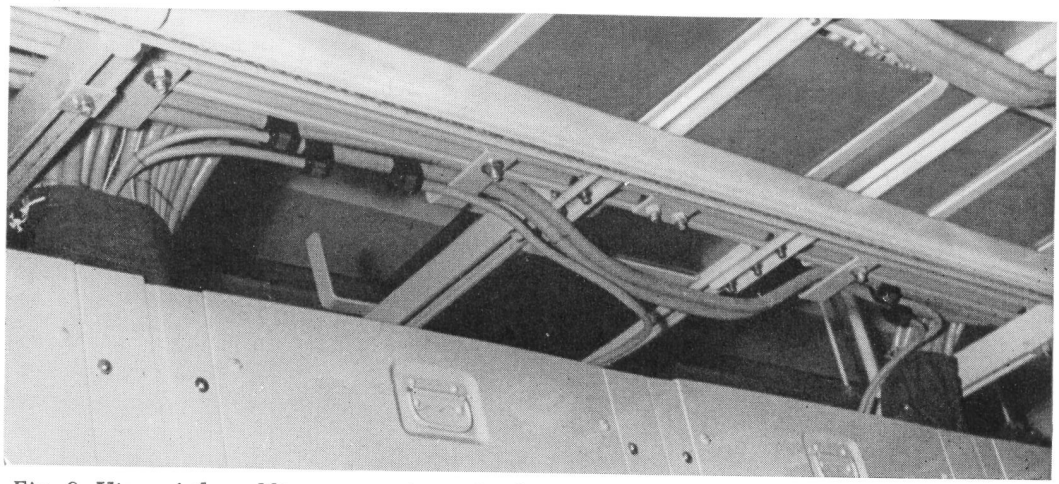


Fig. 8—View of the cabling as seen from the floor.

lamps and an appliance outlet. Both front and rear appliance outlets are connected with a common harness that is installed in the shop. It is provided with connecting leads to permit the installer to connect it quickly to the supply and to the outlet circuits of adjacent frames. The fuse panel alarm lamps are mounted in the bevel at the front of the base, where they are easily visible along the aisle. The fuse panel itself is mounted immediately above the base closely adjacent to both the alarm lamp and the filter, as may be seen in Figure 5. Advantage is taken of the hollow upright to build in accommodations for miscellaneous jacks and keys, as is evident in Figure 4. Battery and commercial power feeders are also run in the uprights.

The associated overhead cable racks are so designed that sewing and clipping of cables and much of the planning is avoided. The rack is placed over the rear or wiring aisle, and feeds two adjacent rows of frames. The rack structure consists of a pair of stringers, shown in Figure 7, to which are welded cable straps formed to provide cable space both between and above the stringers. The ends of the straps point upward to form a series of horns around which cables are broken out of the run. The cables are thrown loosely into the rack with a minimum of dressing. To conceal this and to prevent dust from slipping through the cable pileup, thin sheets of aluminum are laid in the bottom of the rack prior to cabling. In spite of this lack of dressing, the cabling presents a good appearance from the floor as evident in Figure 8.