BUS DUCT

CONTENTS

1. SCOPE

1.1 This section contains some general approaches to the installing of dc bus duct. Since dc bus duct is a non-standard item (not approved by BTL and A.T. & T.), there are no standard drawings showing how the bus duct is to be installed. In most instances, the installer will be supplied by the Equipment Engineer with a "T" drawing showing the overall layout of the bus duct run. The remaining information showing the location of hangars, supports, etc. is usually shown on drawings supplied by the bus duct manufacturer.

1.2 There are various manufacturers of dc bus duct and there is a variety of sizes which can be provided. (Frank Adam and Westinghouse have been the usual supplier). This fact coupled with the variations in how the bus duct may be run in a building, requires that each job be custom engineered and consequently custom installed. Therefore, it is not possible to standardize a definite method of installation or specify definite tools to be used. This section gives the installer some ideas how dc bus ducts might be installed, along with specifying tools which may be used.

2. STANDARD TOOLS AND SUPPLIES

2.1 The following is a list of standard items required to install dc bus duct:

Kit 43	Erecting and Aligning Kit
Kit 3	General Power Kit
R-3257	Helmet, Plastic, Safety
(2) R-3847	Slings, Nylon
1 R-3760	Portable Elevator Hoist
1 R-3761	Hoist and Winch Unit
1 ITE-4740	Megger

2.2 A LIFTING JIG is necessary for lifting vertically hung sections of dc duct. This lifting jig is designed to fit a particular supplier's duct.

FRANK ADAM

(1) R-3778 Lifting Jig for FRANK ADAM DC Duct (Order only one of the following details)
Detail 1 for 5000 Amp duct
Detail 2 for 3000 or 4000 Amp duct
Detail 3 for 2000 or 2500 Amp duct

or

WESTINGHOUSE

(1) R-3625 Lifting Jig for Westinghouse DC Duct

CAUTION: Extreme care should be exercised against personal injury, damage to equipment and service interruptions in all phases of handling the bus duct. Installers should keep their fingers away from the bus bars when splicing two sections. A screwdriver or similar device should be used to guide the bus bars when necessary.

3. HOISTING METHODS

3.1 Figure 1 below shows the lifting of the duct off the shipping skid using two chain hoists and two R-3847 Nylon Slings. The triangles on the ends of the sling are removable. It will be necessary to remove one triangle to slide the sling under the duct. Reference should be made to Handbook 30 Section 19A2 for the erecting of hoisting centers.

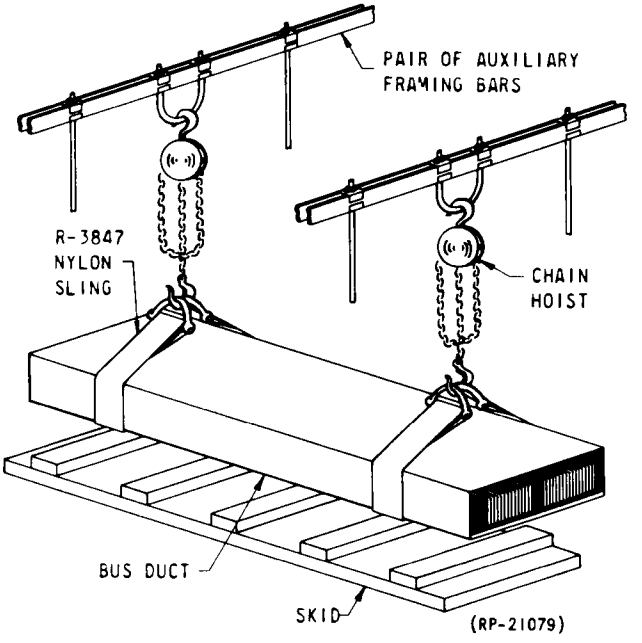

FIG. 1 LIFTING DUCT OFF SKID (Para. 3.1)

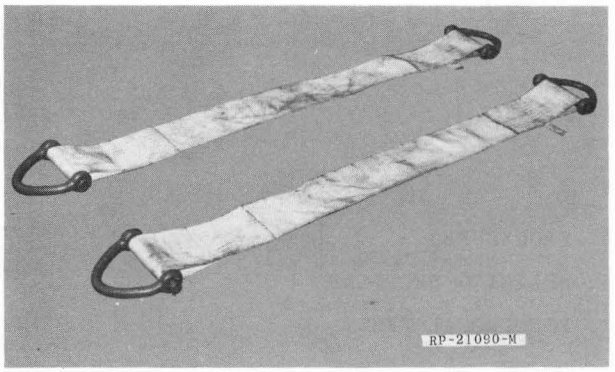

FIG. 2 R-3847 NYLON SLINGS (Para. 3.1)

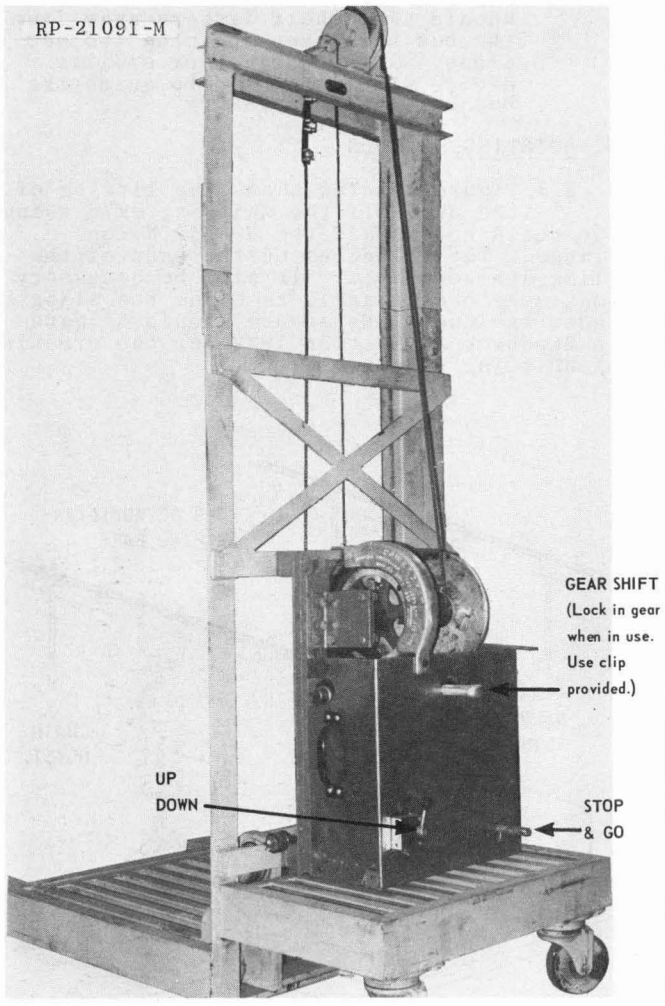

FIG. 3 R-3760 PORTABLE ELEVATOR HOIST (Para. 3.2 & 3.4)

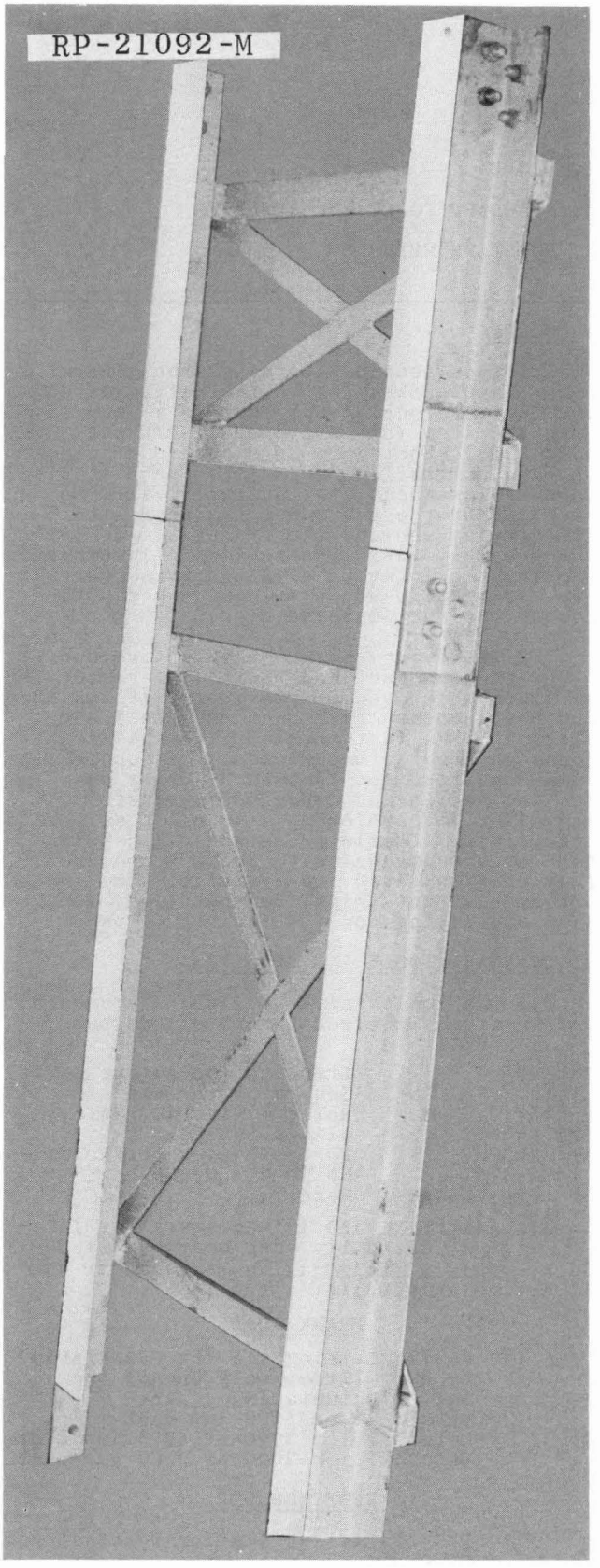

FIG. 4 CENTER SECTIONS (DETAIL 2&3) OF R-3760 ELEVATOR HOIST (Para. 3.21)

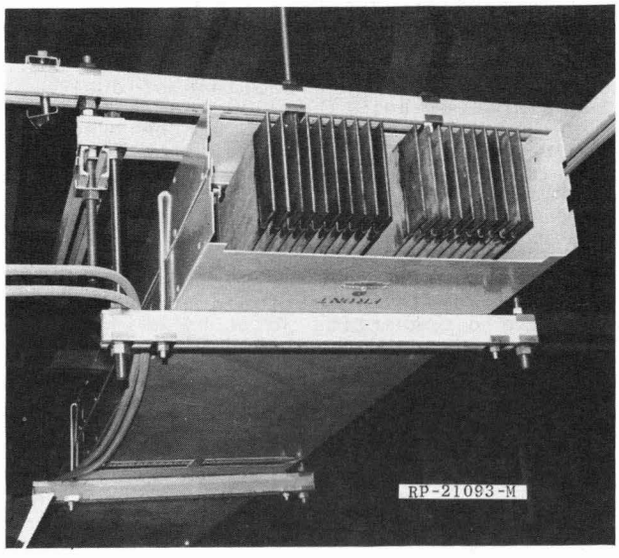

FIG. 5 HORIZONTAL SECTION OF DUCT MOUNTED IN PLACE

3.2 Horizontally Hung Duct

3.21 Figure 3 shows the R-3760 Portable Elevator Hoist. This hoist can be used to lift horizontally hung sections of duct. It is capable of lifting 1500 pounds to a height of 14 feet. Details 2 and 3 (a 4 foot and a 2 foot center section) Figure 4, will be used to attain the 14 foot height. The unit can be used in rooms with less overhead clearance by leaving off the center sections or by using only one center section.

3.22 The R-3760 Portable Elevator Hoist weighs approximately 900 pounds. The duct must be centered lengthwise on the hoist platform. Do not move the hoist with duct in the raised position. Any movement of the duct or hoist should be done with the platform lowered. For additional operating precautions see Paragraph 3.4 ←

3.23 If it is not possible to reach the desired height with the R-3760, a good alternate solution is to use long threaded rods. Raise the duct as high as possible using the R-3760. Then a trapeze hanger can be made under the duct. The duct can then be raised to the desired height by turning up the nuts on the tapeze hanger.

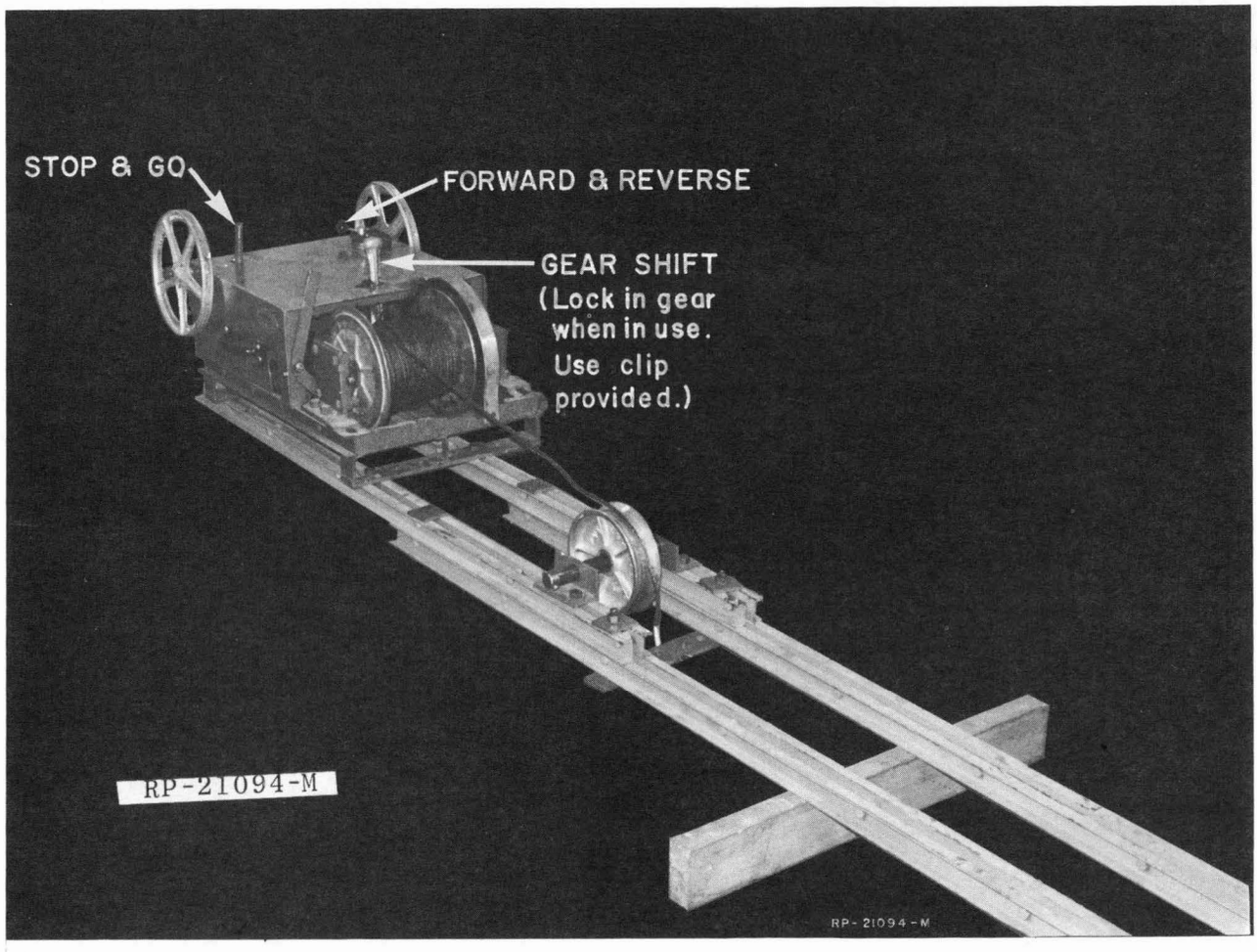

FIG. 6 R-3761 HOIST AND WINCH UNIT (Para. 3.3 & 3.4) ←

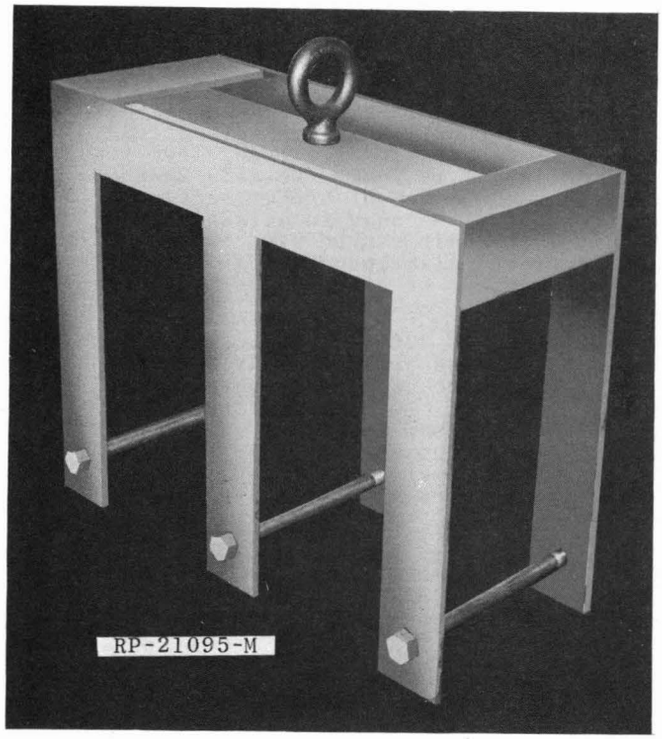

FIG. 7 R-3778 LIFTING JIG (Para. 3.33)

3.3 Vertically Hung Duct

3.31 The R-3761 Hoist and Winch Unit shown in Figure 6, can be used for hoisting vertically hung sections of duct. It is capable of hoisting 2000 lbs. This unit which weighs 125 pounds, can be wheeled around very readily. The boom with the pulley is laid across the duct hole and the unit is ready for use. It is furnished with 200 feet of steel cable. See Paragraph 3.4 for operating precautions.

3.32 The pulley of the R-3761 can be accurately positioned over the center of the connecting joint by using an R-1313 Fish Line and an R-1314 Plumb Bob. It is necessary that the pulley be centered so that the section of bus duct can be lowered accurately to mate with the preceding piece.

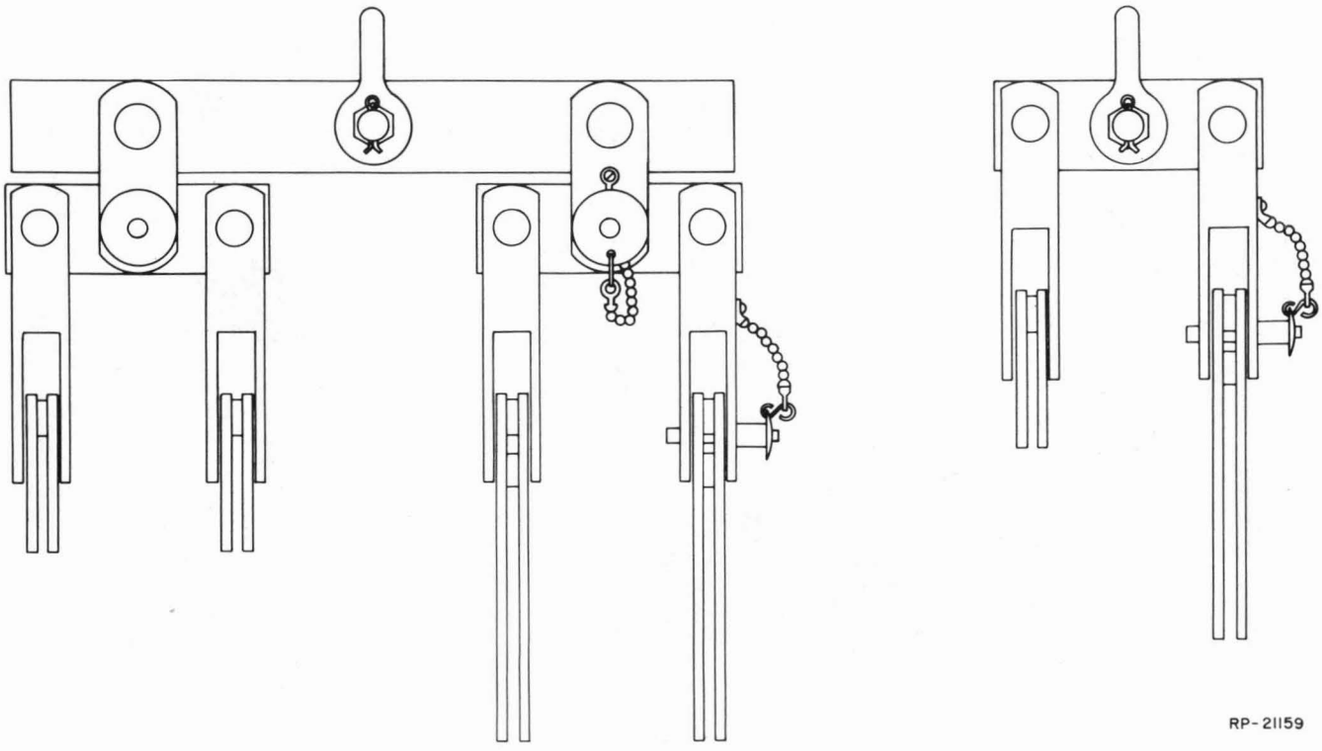

FIG. 8 COMBINATIONS OF THE R-3625 (Para. 3.34)

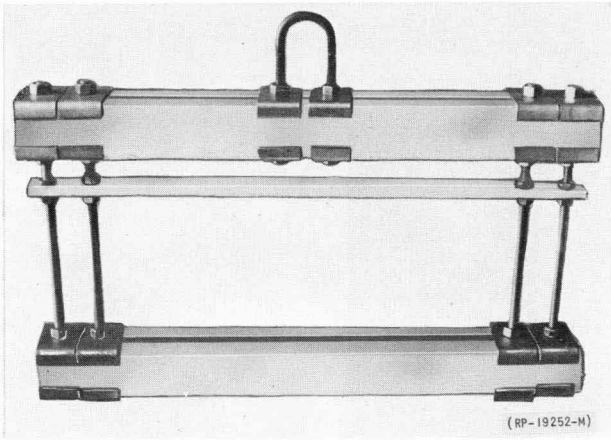

FIG. 9 UNIVERSAL JOB MADE JIG (Para. 3.5)

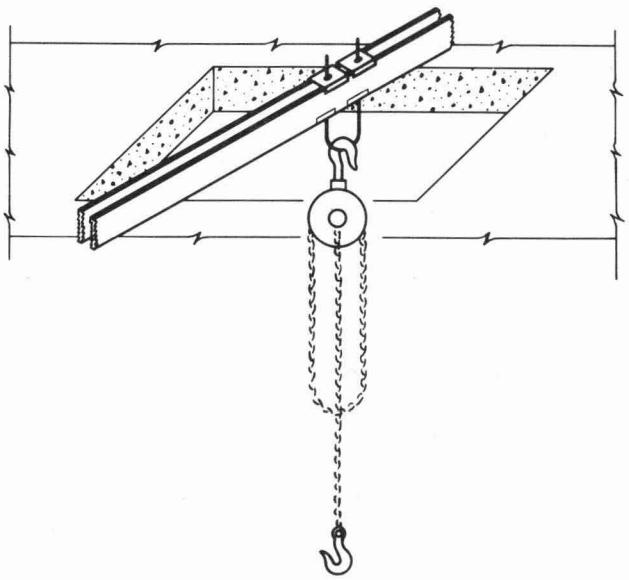

FIG. 10 JOB MADE HOISTING CENTER (Para. 3.6)

3.33 A lifting jig is necessary for hoisting vertically hung sections of duct. The R-3778, Lifting jig for Frank Adam Duct, (see Figure 7) slides on the end of the duct and is bolted thru the duct case using (3) 1/2" diameter steel support rods supplied by Frank Adam. These are the same bolts used to secure the support angles to the vertically hung duct. The duct supplier will provide holes in the duct case to accommodate the R-3778.

3.34 The R-3625 Lifting Jig for the Westinghouse duct slides onto the bus bars and bolts to the bar thru the splice holes in the bars. Use the steel splice bolts supplied by Westinghouse for securing the R-3625 to the bus bars. The installer can assemble the R-3625 in various combinations. These combinations will fit any size Westinghouse dc duct. See Figure 8.

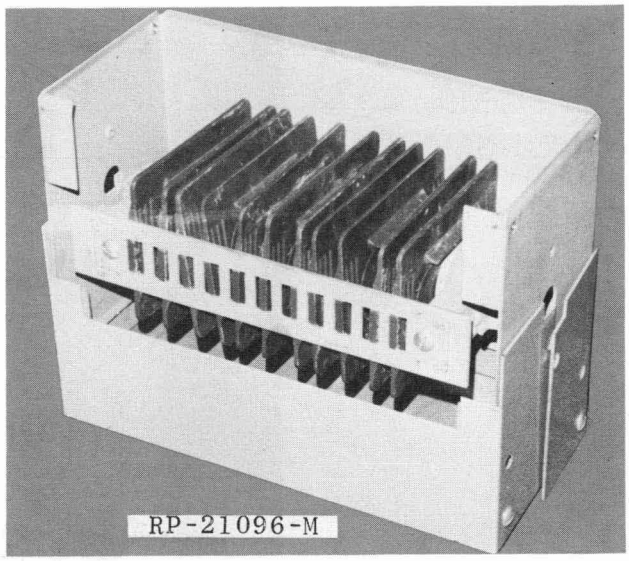

FIG. 11 FRANK ADAM COUPLING (Para. 5.2)

3.4 Operating Precautions

3.41 The power units on both the R-3760 Portable Elevator Hoist and the R-3761 Hoist and Winch are identical. The operator should be made aware of several important characteristics of the power unit as covered in the following paragraphs before attempting to use the unit.

3.42 The stop lever on the power unit is a combination of a spring loaded mechanical brake constantly on and a momentary contact switch which energizes the motor. When spring tension is released by pushing down on the stop lever, the brake disconnects from the motor and the contact switch energizes the motor. As soon as the operator releases the stop lever, the spring loaded brake locks and the motor is disconnected. A reversing switch is provided to change the direction of the motor.

3.421 The reversing switch is not to be operated when a load is in motion.

3.422 If the reversing switch is in the up position and the stop lever is moved to the go position too slowly, the motor will start in the opposite direction. That is to say, although the reversing switch is in the up direction the load will be traveling downward. The stop lever must be operated with rapid movements. The operator should be extremely cautious to avoid pulsing the stop lever too slowly when trying to inch a load.

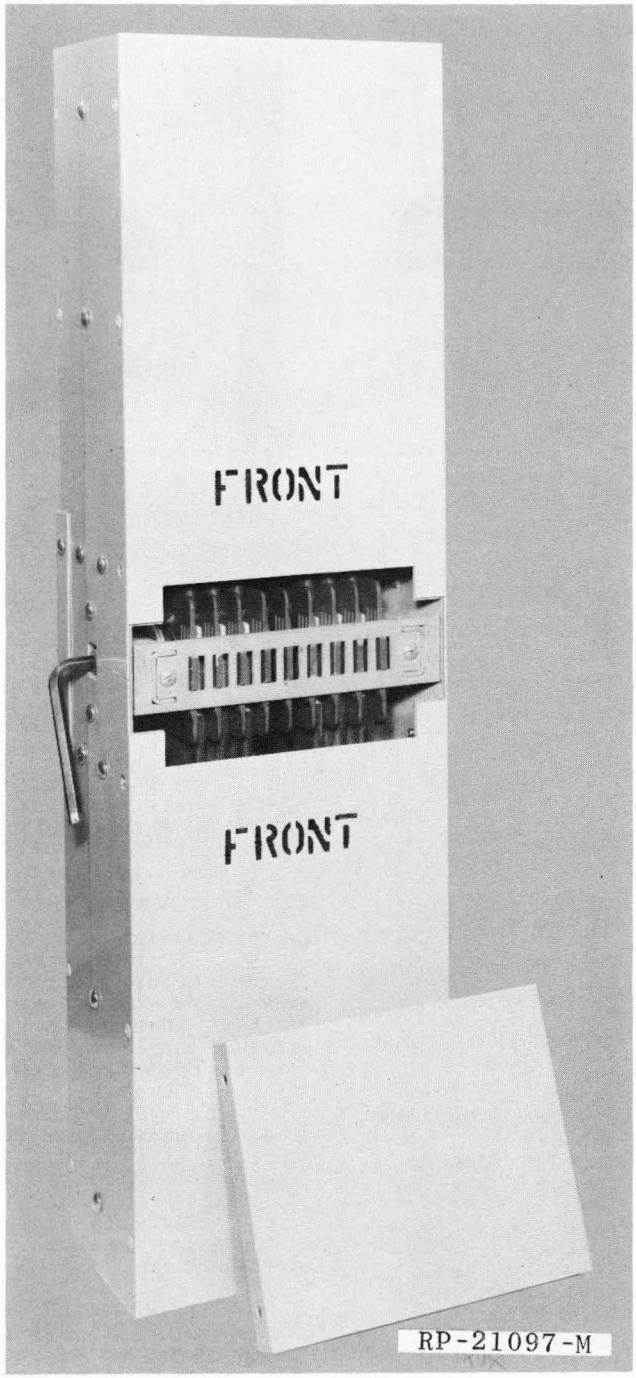

FIG. 12 FRANK ADAM DUCT SPLICE
(Para. 5.2)

3.423 Do not use a pipe for an extension handle on the stop lever. This could cause damage to the energizing switch and the brake mechanism.

3.424 The operator should make sure the cable winds smoothly and evenly onto the cable drum. He should avoid the build up of cable on one part of the drum. Otherwise the cable is liable to slip off a pile up and cause an unexpected drop of the load or the pull capacity of the unit will decrease causing the motor to overheat.

3.425 There is no automatic safety device to prevent a load from falling when ac power is lost to the power unit. The operator of the power unit must manually apply the brake by releasing the stop lever to stop the falling load. To prevent personnel injuries, men working in the vicinity of the falling load shall stand clear and give warning to the power unit operator. The operator should anticipate applying the brake when an unexpected pay off of cable is noticed.

3.5 Figure 9 is a universal type jig which can be made on the job using auxiliary framing bars and threaded rod. The installer might find it useful in some particular situations.

3.6 Another method of providing a hoisting center for raising vertically hung sections is shown in Figure 10. This consists of a hoist attached to an R-72068 "U" Bolt, supported by framing bars laid across the cable hole. The hoist center should be one floor above the location where the section of duct is to be placed. The hoist center can then be moved floor by floor as the job progresses.

4. PROCEDURES

4.1 The shipping crate and the duct case are stamped "FRONT" on one side. In installing the duct, the designation "FRONT" must be maintained on the same side throughout the run.

4.2 In the power room, the duct run should be started at the base of the vertical run.

5. SPLICING SECTIONS

5.1 Westinghouse duct sections are spliced together by bolting the bus bars together.

5.2 Frank Adam duct sections are spliced using a pressure type coupling shown in Figure 11. These joints are tightened with an allen head wrench supplied by Frank Adam. See Figure 12.

6. ELECTRICAL TEST

6.1 Before battery and ground is connected, the entire run should be checked for electrical continuity. The possibility of a resistance breakdown can be checked by using an ITE-4740 Megger.

→ Arrowed lines indicate new or changed information.

Manager, Product Engineering

Reason for Reissue:
To include operating precautions when using the R-3760 and R-3761 tools (Para. 3.4).

Replaces Section 10 dated 9-16-65.