

UNION SPECIAL

Industrial Sewing Machines

INSTRUCTIONS
FOR
INSTALLING AND OPERATING
FEED-OFF-THE-ARM-MACHINES
WITH THROW-OUT LOOPERS

STYLES

35700 G	35800 C
35700 H	35800 D
35700 J	35800 V
35700 K	35800 W
35700 S	35800 X

Catalog No. 79

UNION SPECIAL MACHINE COMPANY
CHICAGO

USE GENUINE NEEDLES AND REPAIR PARTS

Success in the operation of these machines can be secured only by the use of genuine Union Special Needles and Repair Parts as furnished by the Union Special Machine Company, its subsidiaries and authorized distributors. Obviously, it is to our interest to maintain the reputation of Union Specials by furnishing the very best goods obtainable. They are designed according to the most approved scientific principles, and are made with the utmost precision. The maximum efficiency and durability are assured.

Genuine needles are put up in packages marked at the top "Trade 'UNION SPECIAL' mark". Needles put up in packages marked "For U. S. Machines" are not furnished by us.

Genuine repair parts are stamped with a reproduction of the well known two padlocks with a link connecting the shackles.



Both trade marks are symbolic of superlative excellence. All other needles and parts are bogus.

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Union Special Machine Company
Chicago, U.S.A.

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FOREWORD

The one dominating idea back of "Union Special" is to build the best industrial sewing machines in the world. Research in materials and scientific methods of manufacturing play an all important part in their construction. Our new line of high speed-feed-off-the-arm machines with throw out looper mechanism and many other refinements mark an epoch in the sewing machine industry.

All parts are made to gauges with exceedingly close limits. The machines are provided with an automatic capillary oiling system for all main bearings.

It is our constant aim to furnish carefully prepared information that will enable the customer to secure all possible economies and advantages from the use of Union Specials. On the pages which follow will be found instructions for installing and operating Styles 35700 G, 35700 H, 35700 J, 35700 K, 35700 S, 35800 C, 35800 D, 35800 V, 35800 W, and 35800 X.

Additional catalogs, containing information relative to these machines, and which will be furnished on request, are listed below:

Catalog No. 79 L Illustrations and descriptions of the parts for the styles enumerated above.

Catalog No. 29 List of Transmitter Parts.

Catalog No. 45 List and Description of Needles.

Catalog No. 45 A Price List of Needles.

Form 357 Engineering Department Adjusting Instructions. Specify the style of machine for which the adjusting instructions are required.

In all manufacturing centers will be found Union Special representatives, who will cooperate with those who desire in planning and estimating their requirements.

UNION SPECIAL MACHINE COMPANY

Engineering Department

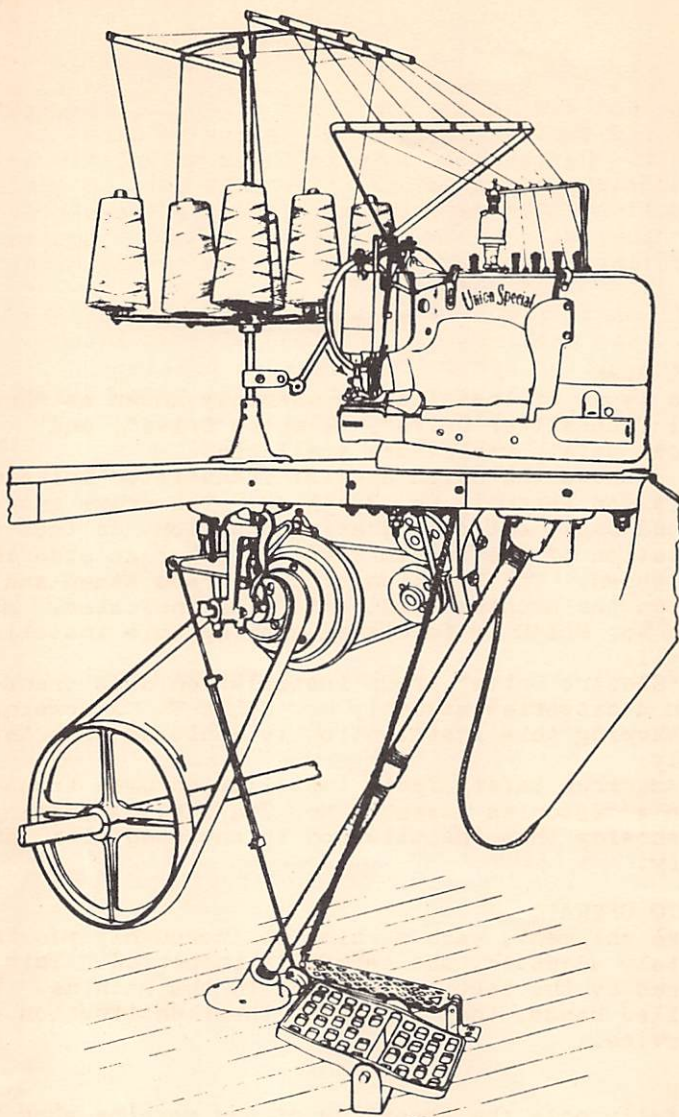


Fig. 1

Installation of Style 35800 V on open line shaft table with transmission assembly No. 28636 AU. The installation of the remaining styles is substantially the same.

INSTALLING

GENERAL PLAN

Three types of installation commonly known as "Union Special Transmitter Drive", "Electro Drive", and "American Safety Table" are available.

Fig. 1 shows the Union Special Transmitter Drive with transmission assembly No. 28636 AU. The dress guard is turned back, out of operating position, so that the installation of the transmitter and other accessories can be shown. The location of the thread stand and direction the machine rotates is also indicated. A drawing No. PL130 is furnished showing this installation in detail.

The "Electro Drive" group installation uses transmission accessories assembly No. 29470 T. A drawing No. PL132 showing this installation is enclosed with this assembly.

The American Safety Table installation uses transmission accessories assembly No. 29470 U. A drawing No. PL139 showing this installation is enclosed with this assembly.

READY TO OPERATE

Before shipment, each machine is thoroughly run in, accurately adjusted, and carefully inspected. This is evidenced by the test sample left in the machine. Packed by skilled hands, they arrive at their destination ready for service.

CAUTION

Carefully note the threading of the machine when taken from the shipping box. Do not withdraw the threads. The operator can use the threads advantageously by tying the ends and drawing the new thread into the machine. It will do no harm to turn the machine pulley one or two revolutions, provided it is turned in the indicated direction.

TABLES

Any sewing machine table of ordinary construction can be used. If a new table is to be erected, a height of twenty-nine inches will be found best suited for operators of average size. New table tops, made of maple, can be

INSTALLING

TABLES (Continued)

promptly furnished. They are 16 inches wide, $1\frac{3}{4}$ inches thick and are made in 42, 48, 54 and 60 inch lengths. No. 21371 GV is designed for open line shaft installations as shown in Fig. 1, No. 21371 GY is designed for "Electro Drive" group installations, No. 21371 GU is designed for American Safety Table group installations.

BELTS

A $1\frac{1}{4}$ inch flat belt for driving the transmitter and a $\frac{9}{32}$ inch round belt for driving the machine are recommended. It is preferable to run the flat belt on the small cone of the transmitter driven pulley. These machines can also be equipped with "V" belt when installed with "Electro Drive" on individual power table No. 21371 HH-21 and also group installations.

SPEED AND PULLEY DIAMETERS

The recommended speed for Styles 35700 G, 35700 H, 35700 J, 35700 K, and 35700 S is 4500 R.P.M., and 4000 R.P.M., for Styles 35800 C, 35800 D, 35800 V, 35800 W, and 35800 X. Speed variations are secured by using varying sizes of line shaft pulleys, "Electro Drive" pulleys and American Safety Table transmitter pulleys. Working diameters of the various pulleys with $\frac{9}{32}$ inch round belt are viz: machine pulley on Styles 35700 G, 35700 H, 35700 J, 35700 K, and 35700 S-2 $\frac{3}{4}$ inches, for Styles 35800 C, 35800 D, 35800 V, 35800 W, and 35800 X-3 $\frac{3}{8}$ inches; transmitter driving pulley 7 inches, transmitter driven pulley, small cone, $3\frac{3}{4}$ inches, large cone 5 $\frac{3}{4}$ inches.

Line shaft pulleys are made in diameters of 6, 8, 9, $9\frac{1}{2}$, 10, $10\frac{1}{2}$, 11, $11\frac{1}{2}$, 12, $12\frac{1}{2}$, 13, $13\frac{1}{2}$, 14, $14\frac{1}{2}$ and 15 inches.

"Electro Drive" pulleys are furnished in $\frac{1}{4}$ inch sizes ranging from $1\frac{3}{4}$ inches to $6\frac{1}{2}$ inches working diameters, both inclusive.

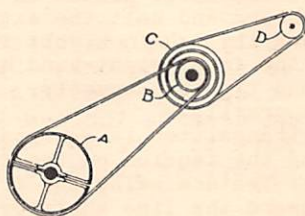
American Safety Table transmitter pulleys are furnished in $\frac{1}{2}$ inch sizes ranging from 6 inches to $10\frac{1}{2}$ inches working diameters, both inclusive.

UNION SPECIAL TRANSMITTER DRIVE

This is shown in Fig. 1. To find the required diameter of the line shaft pulley "A" to produce the required speed on the sewing machine (see adjacent diagram) when the R.P.M. of the line shaft and diameters of pulleys "B", "C", and "D" are known, allowing 6% for the inevitable belt slippage:

RULE

The required diameter of the line shaft pulley "A" equals the required speed of the machine, times the diameter of the machine pulley "D", times the diameter of the transmitter driven pulley "B", divided by the diameter of the transmitter driving pulley "C", times the R.P.M. of the line shaft, times 94%.



EXAMPLE

4500 R.P.M. equals required speed of machine
2 3/4 inches equals diameter of machine pulley "D"
(driven pulley)
3 3/4 inches equals diameter of transmitter pulley "B"
(driven pulley)
7 inches equals diameter of transmitter pulley "C"
(driving pulley)
590 R.P.M. equals speed of line shaft
94% equals belt efficiency (6% allowance for slippage)

Then the required diameter of the line shaft pulley "A" is:

$$\frac{4500 \times 2 \frac{3}{4} \times 3 \frac{3}{4}}{7 \times 590 \times .94} \text{ equals } 12 \text{ inches}$$

"ELECTRO DRIVE" AND AMERICAN SAFETY TABLE DRIVE

To find the required diameter of the driving pulleys to produce the required speed on the sewing machine when the R.P.M. of the driving pulleys and diameter of the machine pulley are known, allowing 3% for belt slippage:

RULE

The required diameter of the driving pulley equals the required speed of the machine times the diameter of the machine pulley divided by the product of the driving pulley R.P.M. times 97%.

EXAMPLE

4500 R.P.M. equals required speed of machine
2 3/4 inches equals diameter of machine pulley
3500 R.P.M. equals speed of driving pulley
97% equals belt efficiency (3% allowance for slippage)

Then the required diameter of the driving pulley is:

$$\frac{4500 \times 2 \frac{3}{4}}{3500 \times .97} \text{ equals } 3 \frac{1}{2} \text{ inches}$$

UNION SPECIAL TRANSMITTER AND MACHINE

New table tops are drilled for the type of installation for which they are designed. If an old table top is to be used a template No. PL131 will be of great assistance in locating these holes.

Place the metal plates on the under side of the main table board and bolt the extension in position.

Insert the 1/4 inch bolt from the top of the table. Place the front right-hand hole of the transmitter over the bolt and tighten securely. This will be sufficient to hold it temporarily.

The transmitter is equipped with a pivoted frame for regulating the tension on the flat belt. To secure the benefit of this feature swing the frame 1/2 inch out of the vertical and toward the line shaft by loosening the rear belt adjusting screw, and tightening the front one. Fasten the lock nuts securely to maintain the adjustment.

INSTALLING

UNION SPECIAL TRANSMITTER AND MACHINE (Continued)

Place the pulley on the line shaft. Tighten sufficiently to bind, allowing for susceptibility of movement. Measure the length of flat belt required to go around the line shaft pulley and the transmitter pulley. Cut the belt 1 1/4 inches short. This will give ample tension without readjusting the transmitter frame. Place the belt around the line shaft and abut the ends on the cone. Drive in the malleable iron belt lacing No. 21350. See that the lacing conforms to the curvature of the cone and that the teeth are well clinched. Turn the pulleys by hand to note whether the belt runs true. Should it fail to ride the crowns evenly, the error may be rectified by turning the transmitter and laterally moving the line shaft pulley as required. Once set correctly, the transmitter should be permanently secured to the table by placing screws in the remaining holes. Tighten the line shaft pulley securely.

The oil is drained from the transmitter before shipment, consequently it is necessary to refill it before applying the power. This is done through the oil cup at the left end of the shaft. But first the plug at the right end of the shaft should be removed to allow the air to escape. By holding the thumb loosely over the opening and putting the oil in the cup at the opposite end the entire shaft can be filled with oil. A quick insertion of the plug will retain it.

Bolt the idler pulley bracket support to the under side of the table top extension, and assemble the idle pulleys. Fill the idle pulley oil cups before applying the power.

Assemble the two sections of the table top extension brace column securely, bolt the upper flange to the extension, screw the column into both flanges and fasten the lower flange to the floor. Turn the column clockwise until the resistance is noticeable. Tighten the lock nut to maintain the adjustment.

Attach the brass oil drain pipe to the threaded nipple in the base of the machine and place the machine in position. Center the pipe in the hole in table top extension. Assemble the oil drain support and clamp spring. Fasten to the under side of the table board extension so that the pipe is in the center of the support. Place the glass reservoir in position. Remove the machine and tighten the pipe securely.

Assemble the cushion mounting parts comprising No. 29401 C as shown on PL120. It gives full directions. Replace the machine and fasten the oil drain support and glass reservoir in position.

Measure the length of round belt required to go around the transmitter pulley, idle pulleys and machine pulley. Cut the belt 1 inch short and fasten with belt hook No. 21351.

The transmitter treadle should be located so that its center is directly under the needles. The pitman rod should be adjusted in length to give a forward slope to the treadle best suited for the operator. Likewise, the treadle can be located farther to the rear to suit the operator's convenience. The pitman rod need not necessarily hang in a vertical position.

INSTALLING

UNION SPECIAL TRANSMITTER AND MACHINE (Continued)

Fasten the lifter treadle assembly at the right of the transmitter treadle. The end to which the chain is attached should be $\frac{3}{4}$ inch higher than the transmitter treadle.

A starting hole for the fastener stud screws, to which the cloth dress guard is attached, is drilled in the right side of the table top extension. Insert the stud screw in the wood and snap the end fastener over this stud, draw the guard around the table top extension reasonably tight, mark the location of the next hole, drill a $\frac{1}{8}$ inch hole, insert the stud, and snap the next fastener in position. Repeat the process until all the fasteners are in position. The well known "lift the dot" fasteners are employed. They can only be removed from the studs by raising the end on which the dot appears.

Remove the screw and washer from the front tension release shaft hanger and attach the lead in thread eyelet with this screw. Do not use the washer.

Fasten the thread stand base to the table top as shown in Fig. 1, and assemble the thread stand parts as shown on the thread stand drawing furnished. Set the lead eyelet No. 21114 S so that it is midway between the lead-in eyelets on the sewing machine and the eyelets on top of the thread stand.

Two styles of thread stands are available. Style "G" is equipped with cone holders and is designed for use with thread wound on cones where there is no tendency for the thread to pass under the cone. Style "H" is equipped with discs and is designed for use with thread wound on spools or tubes where there is a tendency for the thread to pass under the spool. Either style can be partially equipped with cone holders and discs by ordering the necessary parts.

To equip one seat of Style "G" thread stand to use spools, order one of the discs No. 21114 and one of the cushions No. 21104 V.

To equip one seat of Style "H" thread stand to use cones, order three cone holder springs No. 21114 V.

Spool caps No. 21106 E and thread guide rings Nos. 21114 X-17, 21114 X-24 and 21114 X-32 are also available as extras. The spool caps are designed for use with small spools and the thread guide rings where an abnormal whip occurs in the thread in its passage from the cones or spools to the upper thread eyelets.

The sight feed oil cup is detached from the machine before shipment. A plug screw is placed in the hole in the top cover to prevent foreign matter from entering. Remove this plug screw and fill this hole with oil until it over flows. This is vital to allow the oil to reach various important bearings before applying the power. Assemble the oil cup in position.

The installation of the machines with "Electro Drive" or on American Safety Table is substantially the same as with Union Special Transmitter.

OPERATING

SIMPLICITY

Inexperienced operators quickly adapt themselves to Union Specials. Obviously, practice will increase proficiency in threading the machine, and handling the work.

OILING

It is important that the machine be oiled four times a day—morning start, midway to noon, afternoon start, and midway to close. To secure the best results use an S.A.E. 10 W oil. Its body is correct for the oil clearance in the bearings. A heavier oil flows too slow and a lighter oil flows too fast.

PL135 shows the various oiling places. This sequence once memorized can be followed in a surprisingly short time without possibility of missing any places. The flow of oil from the sight feed reservoir "A" is started and stopped by the flag "B". When the flag is vertical as shown in the drawing, the oil flows. When it is tipped downwardly as far as its slot will permit, the flow ceases. The volume of oil flowing from the reservoir "A" is regulated by turning the valve "C". To increase the volume turn the valve clockwise. Turning it counter-clockwise acts the reverse. Different grades of oil will flow with greater or lesser volume, consequently the valve will have to be adjusted to suit the oil used.

When starting a new machine or one that has been idle for some time the best plan is to put in all the oil the oil cup No. 10 will take and turn the valve "C" clockwise as far as possible. This will give the maximum flow from the reservoir "A". Turn the flag "B" downwardly and fill the oil cup "A" through No. 9. Turn the flag "B" vertically and note the flow of oil through the sight feed. The valve "C" should then be turned counter-clockwise until a flow of four drops per minute is secured. This will give an abundant flow until the final adjustment is made, which can be decided only by trial. The correct flow should empty the reservoir "A" each one-half day of operation.

Oiling places Nos. 3 and 4 have oil valves. The parts are oiled by pressing the valves with the oil can spout.

At the close of each days work the flag "B" should be tipped downwardly to stop the flow of the oil. At the start of each days work the flag should be set vertically.

Surplus oil in the crank chamber drains into a glass reservoir attached to the underside of the table. The reservoir should be emptied at definite periods. An oil suction gun No. 660-67 is available for removing surplus oil from the front end of the cylinder.

The transmitter has a one-shot oiling system through an oil cup located at the left end of the shaft. It should be filled once a week.

The oil cups for the idle pulleys should likewise be filled once a week.

CAUTION

The reservoir "A" should never be empty. Should the supply of oil become exhausted, stop the machine immediately and put enough oil in the oil cup No. 10 to over flow it. Then replenish the oil in the reservoir "A" through No. 9.

OPERATING

THREADING

Fig. 1 shows the thread stand arrangement for the three needle machines and manner in which the threads are taken from the cones, passed through the thread stand eyelets and led into the machine. The threading of the thread stand eyelets for the two needle machines is substantially the same.

PL136 shows the threading of the three needle machines. The threading of the two needle machines is the same, except the middle threads are omitted.

Place the cones or spools in position and thread the thread stand eyelets. Tie the threads to the ends left in the machine and draw in the new thread. If the threads have been withdrawn from the machine rethread it as shown in PL136. The threads should never crisscross.

When passing the thread between the tension discs, raise the upper disc and see that the thread passes into the slot in the tension stud.

The front end of the takeup eyelet can be raised above the cylinder and the loopers can be moved to the left for convenience in threading. Pass the threads through their respective eyelets and loopers as shown in PL136, move the loopers to the right until they snap into position, pass the threads through the slot at the left of the throat plate and under the takeup as shown at "D" on PL136. This is readily accomplished by drawing about two inches of slack through the tensions, seizing all the threads between the eyelets "B" and "C" and placing all the threads under the takeup with the pair of tweezers. Move the front end of the takeup thread eyelet downwardly into the cylinder as far as it will go and take up the slack in the looper threads by drawing the threads through the eyes of the loopers.

Pass the needle threads through the various eyelets as shown in PL136 and the machine is ready to sew.

TO COMMENCE SEWING

There should be about 2 1/2 inches of thread beyond the eyes of the needles and loopers. The looper threads should be brought to the right of the loopers and the end cap put on but only partially closed. After making a few stitches the end cap can be entirely closed.

Place the fabric under the foot and start the machine by pressing the far edge of the treadle. When the pressure is released, the machine will automatically stop. To instantly stop the machine, apply pressure with the heel to the near edge of the treadle.

REMOVING THE WORK

To remove the work from the machine without running off the fabric, turn the pulley in the operating direction until the needles reach their highest position. Raise the presser foot, which will automatically release the tension on the threads. Pass a pair of scissors under the foot and draw off 3 or 4 inches of thread, then cut the needle threads close to the surface of the fabric. The work can then be drawn off from the cylinder and the under threads cut. In

OPERATING

removing the work from the cylinder the cut ends of the needle threads are automatically drawn to the under side of the fabric and tied.

CLEANING

Twice a week the machine should be given a thorough cleaning. Remove all dirt and lint from the oil holes. Remove the throat plate and clean the lint from the slots in the feed dog. This will prevent breaking these parts.

SETTING THE NEEDLES

They have two grooves; a short groove terminating in a spot milled out just above the eye or extending from the shank to a point about $1/8$ inch above the eye. The opposite side has a long groove extending from the shank to the eye. Insert the needles as far up into the needle holder as they will go with the long grooves to the front, so that the eyes will be in line with the cylinder. Then tighten the needle set screws securely.

SUGGESTIONS

If a machine fails to work satisfactorily, though apparently in good repair, it is possible that some minor trouble exists. For this reason, delay may be avoided by acting on the following suggestions:

- (1) Note carefully whether the machine is threaded as instructed. Remove any lint which may have accumulated.
- (2) Insert a new set of needles, making sure that the long grooves are toward the operator and the eyes are in line with the cylinder.
- (3) Clean the machine thoroughly, especially the groove in the loopers. Oil the machine thoroughly.
- (4) See that the proper amount of tension is applied to each thread. The tension on the needle threads should be as tight as is consistent with their strength. The proportionate amount of tension on the looper threads should be about $1/3$ of that on the needle threads.
- (5) Remove all threads from the machine and carefully re-thread it.