Tuijin Jishu/Journal of Propulsion Technology
ISSN: 1001-4055
Vol. 44 No. 4 (2023)

Multi-Size Brazing and Soldering Tube Holder

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Abstract-*A Multi-Size Brazing and Soldering Tube Holder (MSBaST) to make soldering and brazing proto-solved installations in the high walls of buildings is more accessible and safer and can prevent accidents or harm caused by fire corrosion. Specifically, the study aimed to design and fabricate a holder and evaluate its acceptability in design, usability (angle position of clamping, fitness of clamping on the tube), and effectiveness. The Holder underwent technical evaluation before the final level of acceptability was assessed. The researcher utilized a validated research instrument to gather data from groups of experts, academe, and users. The evaluation results showed high acceptability regarding the Holder's design, usability, and effectiveness. Additionally, testing demonstrated that the time elapsed while using the Holder was much lower than soldering and brazing without it.*

Keywords: *Brazing Tube Holder, Multi-Size Brazing Tube Holder, Tube Holder, Pipe, Tube, Holder, Clamp, Fly Bolt, Bushing, Bolt, Brazing.*

1. Introduction

In today's situation, findingsomeoneholding the tube when the soldering process starts is difficult. People work alone and require total effort to complete tasks on time. It is difficult for a person to hold the tube while soldering because there is a risk of it moving and taking more time to complete the job. When working with an assistant, the risk of burning one's hands while holding the tube is also possible. Soldering alone is a big challenge because both hands are required to hold tools such as gas and silver rods. The problem here is: who will hold the tube in place during the soldering process to ensure that it does not move or fall, given that the conventional methods of joining the condensing unit to the system of the Heating, Ventilating, Airconditioning (HVAC-R) unit are performed by two technicians? One technician brazed while the other assisted by holding the two tubes to be joined for proper alignment. The HVAC-R technicians did this work. This is inconvenient for two HVAC-R technicians to weld the tube at the height of the outside walls above the floor or ground, using welding gas or oxygen and an acetylene torch, in a limited scaffold space. These are the problems and disadvantages of working with partners while soldering.

A common problem that may lead to difficulties in brazing copper tubing involves high building walls during the domestic, commercial, and industrial installation of HVAC-R units. Scaffolds are limited in size and space for HVAC-R technicians when joining outer tubes at the height of the outside wall above the floor or ground. HVAC-R technicians must use both hands to hold the map gas, an oxygen-acetylene welding torch, and a silver rod when brazing or soldering outside the copper tubes. There is a need for an assistant to hold the tube during brazing to ensure proper alignment. This process is the reason why a multi-size brazing tube holder was developed.

Prior art, such as US Patent 3,684,220 "Pipe Holder", US Patent 6,164,604 "Pipe Clamps", US Patent 4,516,296 "Tubing clamp and method of making the same", and another US Patent 20070034752 A1 "Adjustable pipe

clamp assembly", are all clamps. The purpose of these clamps is to hold or support permanently mounted pipes in a plumbing field. The present study seeks to develop a specific purpose that aligns with the clamping of two tubes for brazing. Unlike the present study, the clamp was adjustable according to the tube size. The clamp can not only hold the tubes but can also be used in elevated locations for holding. It is made of stainless steel, is portable, and can clamp two tubes not only in horizontal and vertical positions but also in any tube size and at different angles for brazing.

Nothing in the prior art can hold two tubes for brazing, is made of stainless steel, is easy to adjust to the size of the tube, and can clamp at any angle. The multi-size brazing tube holder can eliminate the need for another person to assist with the task, making it a new and useful invention.

HVAC-R technicians seek alternatives to make their work faster and easier while saving effort and energy and reducing unsafe work. The Multi-Size Brazing Tube Holder (MSBaST) was explicitly designed to address the existing problem of HVAC-R installation on the high walls of the building for the brazing process and to replace the need for another person to hold the tube for safety from accidents and fire corrosion. With a multi-size brazing tube holder, technicians can perform the task alone.

2. Synthesis

Logsdon (1972) describes a pipe holder designed for holding or mounting pipes to structural members, particularly copper and similar lines or tubing. The patent highlights the need for a pipe holder that can be effectively utilized for mounting copper pipes, which are increasingly used in place of older conduits, particularly for lines conveying hot water. The pipe holder is designed to withstand the water pressures to which such pipes will be subjected while also being adjustable to accommodate tubes of different sizes.

Cirino (2000)describes plastic pipe clamps or hangers commonly used in plumbing to mount pipes on horizontal and vertical surfaces. The clamps may be full or half clamps and can encircle the line before being attached to the mounting surface using suitable fasteners. The patent highlights several objections to known types of full and half clamps, including limitations on flexibility and difficulties loading and spreading clamp halves.

While both original patents were specific to the plumbing field, the present study sought to develop a pipe holder for clamping two tubes for brazing. This study aims to create an adjustable pipe holder to clamp tubes at different angles and accommodate various tube sizes for effective brazing.

The present study describes a new and valuable invention called the MSBaST, a clamp made of stainless steel that can hold two tubes for brazing at different angles and be adjusted to fit any tube size. The invention was designed to address the problem of HVAC-R installation on the high walls of buildings where brazing is necessary, which usually requires the help of another person for safety. With anMSBaST, technicians can work alone, which promotes safety, saves time, and eliminates the need for another person to assist. This unique invention has no prior art; It can hold two tubes for brazing in various positions and sizes, making it an innovative solution for the HVAC-R industry.

3. Significant of the Technology

The invention of the MSBaSTHoldersolves the common problem of holding two tubes during brazing, mainly on high walls or in elevated areas where scaffolds and limited space are present. The multi-size brazing tube holder eliminates the need for a second person to assist in holding the tubes, thus promoting safety and reducing the risk of accidents and fire corrosion. Moreover, this invention can help HVAC-R technicians work faster and more efficiently, saving time and effort. The findings of this study could potentially lead to further innovations in the field of HVAC-R and encourage more efficient and safe practices in the industry.

4. Objectives of the Study

This study aimed to design, fabricate, and evaluate anMSBaST holder. Specifically, this study aimed to(1). Design and manufacture the MSBaSTHolder; and (2) Evaluate the acceptability of the MSBaSTHolder in terms of design, usability, and effectiveness.

5. Summary of Inventions

The MSBaSTHolder is designed for soldering or brazing installations, specifically on high walls or floors. The invention intends to solve the problem of exerting too much effort to finish soldering or brazing work on time because both hands hold tools such as silver rods and welding gas. The invention is versatile, can have multi-angle positions, including offset positions, and can be adjusted to fit any variation in tube diameters. It was invented and designed with its unique novelty to ensure user safety against burns from melted rods and fire corrosion. UsinganMSBaST holder can help HVAC-R technicians perform the task alone on the high walls of the building in a limited scaffold space and ladder, which will help increase the speed and efficiency of work. There is no prior art for a device that can hold two tubes for brazing, is made of stainless steel, is easy to adjust to the size of the tube, and can clamp at any angle position.

6. Brief Description of the Drawing

Figure 1 shows a pictorial view of the invention of a multi-size brazing and soldering tube holder.

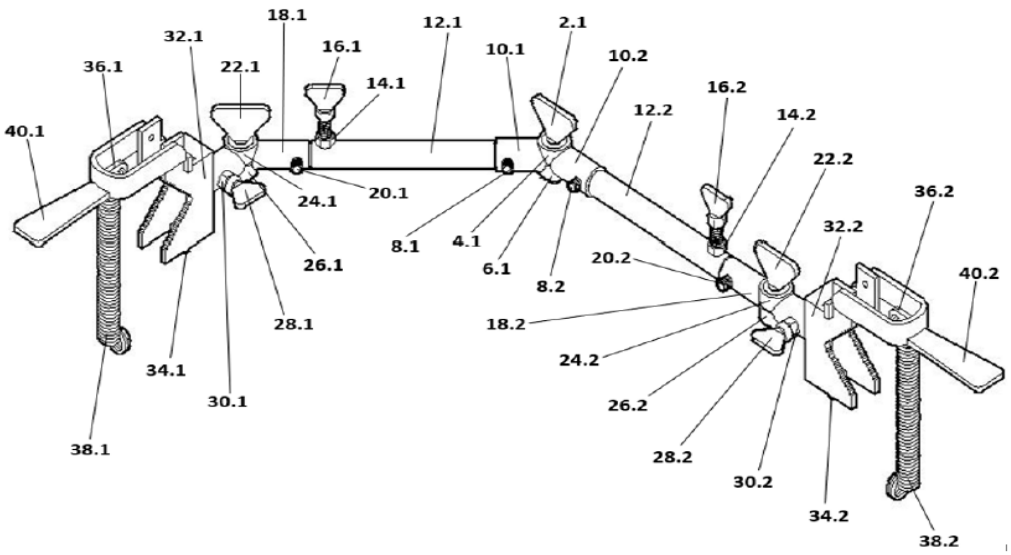

Figure 1

7. Description of the Preferred Embodiment

Figure 1 shows the embodiments of the invention, a multi-size brazing and soldering tube holder used for the brazing and soldering process that can be used in any variation regarding the position of the brazing and soldering material, particularly for copper tubes. The purpose of this invention was to clamp and hold the tube at different angular positions. The Multi-Size Brazing and Soldering Tube Holder, comprising a body employing body clamps 32.1 and 32.2, is characterized by its ability to hold and at the same time clamp tubes or pipes and rotate to 360˚ A handle lock on 40.1 and 40.2 drives the spring to lock the copper tube during the brazing or soldering process.

Spring holders 36.1 and 36.2 attach to their bodies to secure springs 38.1 and 38.2 and are permanently connected to the body of the handle lock at 40.1 and 40.2. The springs 38.1 and 38.2 clamp and hold the tube and adjust to any size variation of domestic HVAC-R tube during the soldering and brazing process, attaching to spring holders 36.1 and 36.2. The body clamp 32.1 and 32.2, where the hangers 34.1 and 34.2 attach to his body to hang the spring 38.1 and 38.2 and lock by pulling the handle lock 40.1 and 40.2 to secure the tube, is not moving before the soldering and brazing start. Fly bolts 28.1 and 28.2 lock the rotation of body clamps 32.1 and 32.2 if the position is fixed. Nut 30.1 and 30.2 is permanently welded to the bushing tube with a combination of tubes 24.1 and 24.2, where the fly bolts 28.1 and 28.2 attach for tightening. A fly bolt (22.1 and 22.2) locks two

moving bushings where they attach to the body tube (12.1 and 12.2) and go to the clamp area—bushing with a combination tube handle. 24.1 and 24.2, and the bushing with the combination of nuts 26.1 and 26.2, used to move parts, also helped with the direction of the angle positions needed and locked by tightening a fly bolt 22.1 and 22.2, which are connected to the bushing with the combination of nuts 26.1 and 26.2. A tube handle of 18.1 and 18.2 permanently attaches to the bushing with a combination of nuts 26.1 and 26.2 and holds the extension tube. The set screws 20.1 and 20.2, and lock the movable extension tube when dismantling and cleaning the tube. Fly bolts 16.1 and 16.2 locks the adjustable tube and lock the rotation position of the extension tube. The nuts are 14.1 and 14.2, respectively, to body tubes 12.1 and 12.2, where the fly bolt attaches for tightening. The tube handles 10.1 and 10.2 hold the body tubes 12.1 and 12.2 to pull them apart in case of maintenance. The set screws 8.1 and 8.2 lock the movable body tubes 12.1 and 12.2 by tightening the screws. A bushing 4.1 is permanently attached to tube handle 10.2, and the bushing with a combination of nut 6.1 was also permanently attached to tube handle 10.1. The bushings are connected by one fly bolt 2.1, which helps adjust the angular position of the embodiment. Fly bolt 2.1 locks the two moving bushing parts by tightening the screws.

8. Results

1. Multi-size Brazing and Soldering Tube Holder 100 comprising:

(a) a fly bolt locks to the moving parts and interlock the two bushings.
(b) a bushing mechanically connected to a body of the fly bolt.
(c) a bushing with a combination nut mechanically connects to lock and tightens the fly bolt.
(d) a tube handle holds the body tube, has a withdrawal type for maintenance purposes, and permanently attaches to the bushing.
(e) a tube handle holds the body tube, has a withdrawal type for maintenance purposes, and permanently attaches to the bushing.
(f) a set screw locks the movable tube, and
(g) a body tubecontains the tube extension in his body.
(h) a nut always connected to body tube.
(i) a fly bolt interconnected to the nut and used to lock to the adjustable or extension tube.
(j) a tube handle holds the extension tube and has a withdrawal type for maintenance purposes.
(k) a set screwlocks the extension tube and loosens when needed to dismantle it.
(l) a fly bolt locks to the moving parts and interconnect the two-bushing.
(m) a bushing with the combination of a nut lock and flybolt.
(n) a fly bolt lock and fix the rotation movement of the clamp.
(o) a nut permanently attaches to the tube.
(p) a body clamp supports the tube to be clamped.
(q) a hanger hangs the spring and lock.
(r) a spring holder; thispurpose is to hold the spring.
(s) a spring clamp, lock the tube, and adjustany domestic HVAC-R tube size.
(t) a handle lock drives the spring to lock the tube;

2. The multi-size brazing tube holder, according to claim 1, where the fly bolt control and lock the vertical and horizontal movement position of the bushing wherein mechanically connected as a body of the fly bolt said the bushing with a combination of nut mechanically connects to lock and tighten the fly bolt.
3. The multi-size brazing tube holder, according to claims 1 and 2, wherein a tube handle holds the body tube,is said to have a withdrawal type for maintenance purposes and permanently attach to the ushing**.**
4. The multi-size brazing tube holder, according to claim 1, wherein a fly bolt interconnected to the nut is said to be used to lock the adjustable or extension tube.
5. The multi-size brazing tube holder, according to claim 1, wherein a tube handle holds the extension tube and has a withdrawal type, for maintenance purposes, said setscrewlocks the extension tube and loosens when needed to dismantle the tube.
6. In the multi-size brazing tube holder, according to claim 1, wherein a fly bolt locks the moving parts and interconnects the two-bushing, the said bushing connects to the bushing with a combination of nut lock by fly bolt.

7. The multi-size brazing tube holder, according to claim 1, wherein a fly bolt lock and fix the rotation movement of clamp the said nutpermanently attach to the tube wherein a fly bolt interconnect.
8. The multi-size brazing tube holder, according to claim 1, wherein a body clamp supports the tube to be a clamp, said hanger and the spring holder are permanently attached to hang and lock the spring and to hold the spring.
9. The multi-size brazing tube holder, according to the claim 1 and 8, wherein a spring clamp and lock the tube and adjusted in any size of domestic HVAC-R tube,
10. According to claims 1 and 9, the multi-size brazing tube holder hasa handle lock drive and pulls the spring to lock the tube.

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