March 3, 1964 D. HOUSTON 3,122,833

DUCT PERFORATOR FOR A DAMPER

Filed June 29, 1962 2 Sheets-Sheet 1

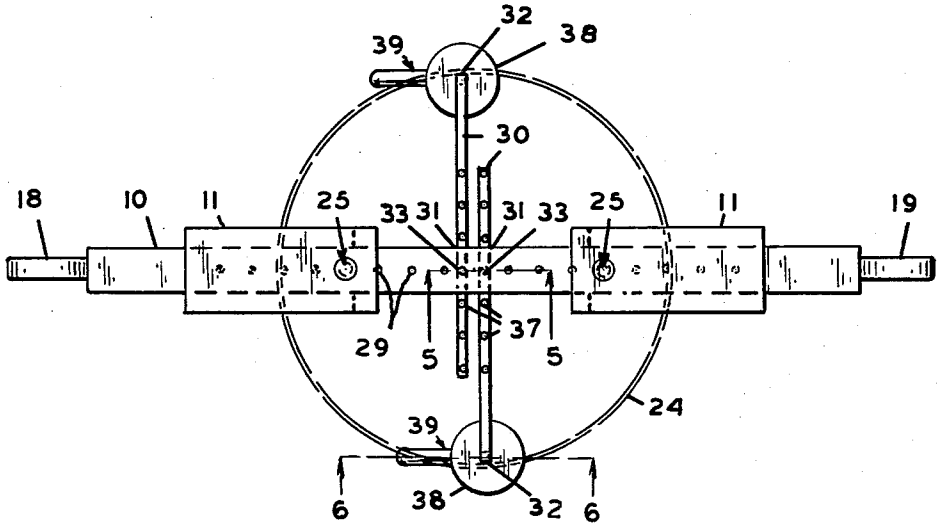

FIGURE 1.

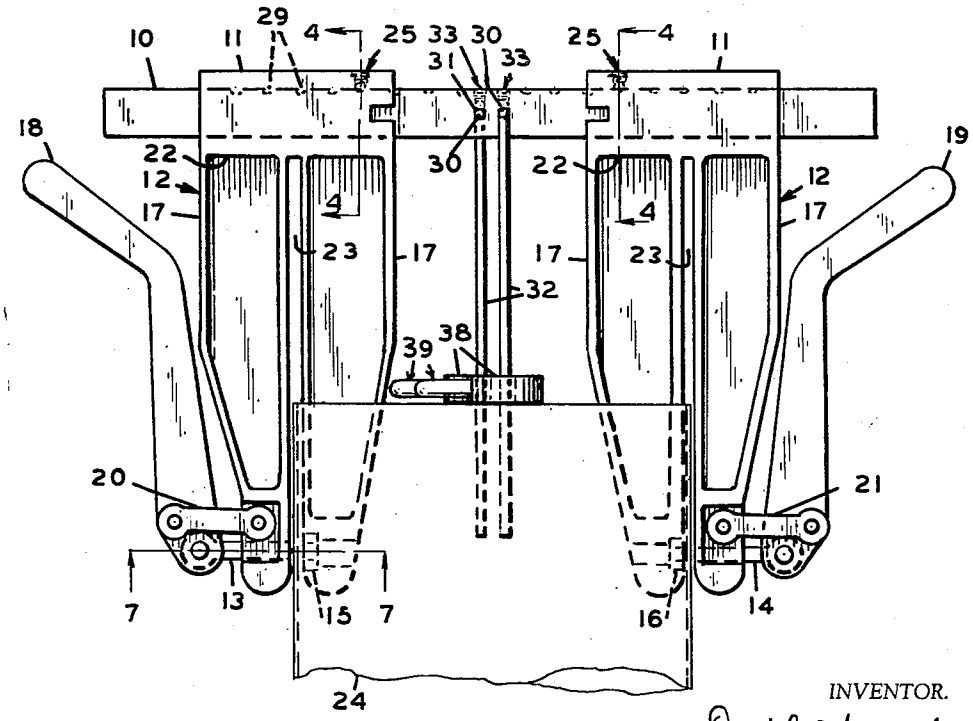

FIGURE 2.

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March 3, 1964 D. HOUSTON 3,122,833

DUCT PERFORATOR FOR A DAMPER

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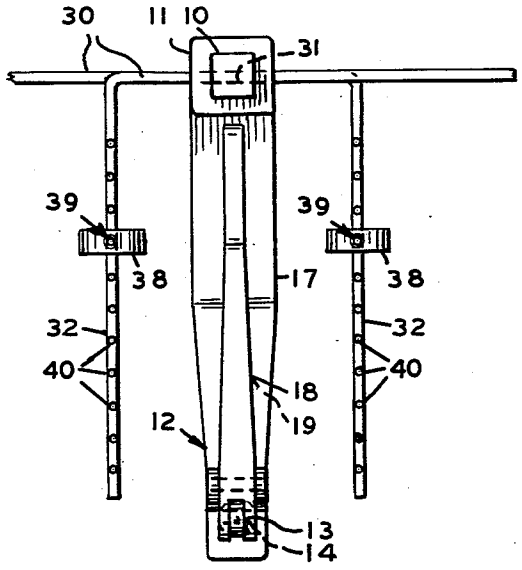

FIGURE 3.

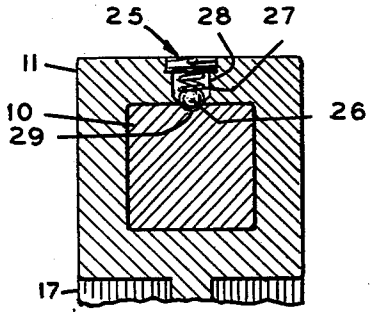

FIGURE 4.

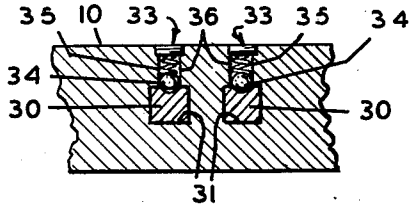

FIGURE 5.

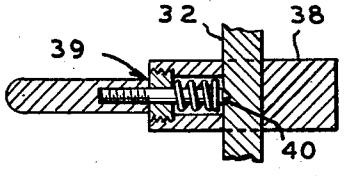

FIGURE 6.

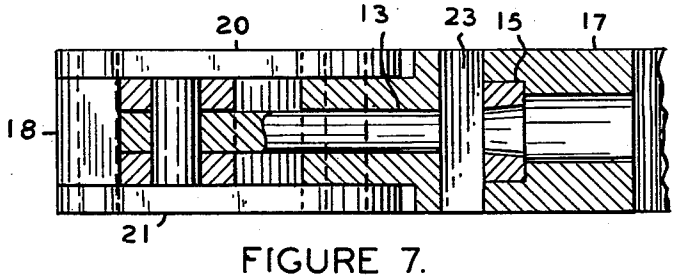

FIGURE 7.

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DUCT PERFORATOR FOR A DAMPER

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4 Claims. (Cl. 30—361)

This invention relates to a duct perforator for aligning and punching holes in opposed wall portions of an open end portion of a duct section for the installation of a damper shaft.

Ducts, especially heating ducts, currently have approximately two foot length sections. Before a new installation of a heating system, I select the different size duct sections requiring dampers. Place them uprightly on a floor, and graduate the locations of sizes for professional use of my duct perforator.

My duct perforator for a damper shaft has two perforators selectively spaceable in parallelism on a straight beam. The perforators are provided with throats therein to relatively receive opposed wall portions of an open end portion of a duct. Gauge members are transversely and slidably mounted on the beam and have bent leg portions extended into the open end portion of the duct to contact the wall thereof to spaceably align the beam with the lateral axis of the duct.

Gauge stops are selectively spaceable on the gauge members to gauge the length of end wall portions of the duct into the throats of the perforators to position the punches of the perforators in alignment with the lateral axis of a duct. The punches are operated with manually controlled levers.

Ball latch units are mounted in the perforator units to engage indentations spaced along the straight beam for selectively latching the positions of the perforators. Each ball latch unit is a spring operated ball mounted to operate in a recess of a respective perforator.

Ball latch units are respectively mounted in the beam to engage indentations spaced along each gauge member portion slidably mounted transversely through the beam.

Each perforator includes a sleeve portion to slidably engage a straight beam having a uniform section. The straight beam and each sleeve portion have companion sections with inherent qualities for straight longitudinal alignment to prevent relative rotation thereof.

An advantage of the use of my duct perforator is that I can manually space the perforators on the straight beam and automatically latch them in position for aligning the throats thereof with opposed wall portions of the open end of a duct; align the bent legs of the transverse positioned gauge members with the inner wall portions of the open end of the duct for alignment of the perforators on the lateral axis of the duct; and adjust the gauge stops on the gauge members to regulate the length from the open end of a duct to the desired positions for holes to be punched by the perforators.

This invention will be further understood with reference to the accompanying drawings:

FIGURE 1 is an illustration of a plan view of my duct perforator positioned on the upper end of a duct. The duct is shown with broken lines.

FIGURE 2 is an illustration of a side elevation of FIGURE 1.

FIGURE 3 is an illustration of an end elevation of FIGURE 2.

FIGURE 4 is an enlarged sectional view taken on lines 4—4 of FIGURE 2.

FIGURE 5 is an enlarged sectional view taken on lines 5—5 of FIGURE 1.

FIGURE 6 is an enlarged sectional view taken on lines 6—6 of FIGURE 1.

FIGURE 7 is an enlarged sectional view taken on lines 7—7 of FIGURE 2.

The straight beam **10** has a uniform section with a sufficient length to receive and slidably operate a pair of sleeves **11** for application to ducts having a plurality of sizes. The pair of sleeves **11** are fitted to slide longitudinally on the straight beam **10**. The sleeves **11** and straight beam **10** have inherent qualities to prevent relative rotation thereof, and the co-operating sectional shapes thereof may be rectangular as shown, or any other obvious shape that will prevent rotation, including a round section with a key fitted thereto.

A pair of perforators **12** comprises; the reciprocating punches **13** and **14**, co-operating dies **15** and **16** respectively mounted on the free end portions of the beams **17**, and manually actuated levers **18** and **19** with links **20** and **21**. The opposite ends of each pair of beams **17** are secured to a side **22** of a respective sleeve **11** to form a throat **23** therebetween to receive an end wall portion of a duct **24**.

Each perforator **12** is a unit of obvious structure with the exception of a respective sleeve **11**.

A pair of ball latch units **25** comprises balls **26** and compression springs **27**. Each ball latch unit **25** is mounted in a recess **28** of a sleeve **11**. Each ball latch unit **25** mounted in a sleeve **11** is positioned to latch in receptive indentations **29** spaced along the beam **10**. The indentations **29** are preferably spaced for one half the differences between the current sizes of ducts to require each sleeve **11** with the respective perforator **12** to be manually moved to the next indentation per duct size.

Gauge members **30** are transversely mounted on the straight beam **10** to manually slide in opposite directions through openings **31** of the straight beam **10**. The gauge members **30** are preferably of L shape and have the bent legs **32** spaced from the perforator beams **17** in parallelism to contact the inner wall portions of an open end of a duct **24** for alignment of the straight beam **10** in parallelism with the lateral axis of the duct **24**.

A pair of ball latch units **33** comprises balls **34** and compression springs **35**. Each ball latch unit **33** is mounted in a respective recess **36** located in the straight beam **10** to latch in receptive indentations **37** spaced along a respective gauge member **30**. The indentations **37** are preferably spaced for one half the differences between the current sizes of ducts to require each gauge member **30** to be moved one space to manually move a respective bent leg **32** thereof to contact the inner wall portions of an open end of a duct.

A pair of gauge stops **38** are slidably mounted on the bent legs **32**, have latches **39** mounted therein and located to engage spaced indentations **40** on the bent legs **32**. The gauge stops **38** are latched in selective indentations **40** to locate the perforations in the duct relative to the distance desired from the open end of a duct preparatory for the installation of a damper shaft.

My reciprocating punch **13** and co-operating die **15** are made slightly larger in diameters than the punch **14** and co-operating die **16** for the reception of damper shafts which usually have a threaded sleeve control on one end portion thereof. The damper and control sleeve are not illustrated.

I claim:

1. A jig punch for perforating a duct section for a damper shaft, the jig punch comprising in combination:

(*a*) a pair of perforators,

(*b*) a straight beam,
(*c*) said pair of perforators being selectively spaceable along said straight beam,
(*d*) said perforators being supported and extended transversely from one side of said straight beam and having sufficient respective throats therein for the relative entrance of opposite wall end portions of a duct,
(*e*) latch units,
(*f*) and said latch units latching said perforators to said straight beam,
(*g*) gauge members,
(*h*) said gauge members being mounted on, and having bent portions selectively spaceable transversely from said straight beam, to engage the inner wall of a duct to align said straight beam parallel with the lateral axis of a duct,
(*i*) a second set of latch units,
(*j*) and said second set of latch units latching said gauge members to said straight beam.

2. A perforator for making holes in a duct section for a damper shaft, the jig perforator comprising in combination:
(*a*) a straight beam having a uniform section,
(*b*) a pair of sleeves,
(*c*) said sleeves being fitted around the section of said straight beam to slide longitudinally thereon,
(*d*) said straight beam and said pair of sleeves being inherently held against relative rotation,
(*e*) two pair of cantilever beams,
(*f*) each sleeve having a respective pair of said cantilever beams spaced and extended transversely in parallelism from one side thereof,
(*g*) a pair of perforators,
(*h*) each perforator being mounted on a respective pair of spaced cantilever beams near the free ends thereof,
(*i*) a pair of gauge rods,
(*j*) said pair of gauge rods being L shaped,
(*k*) each L-shaped rod having one respective leg slidably supported by said straight beam with the major portion thereof projected in an opposite lateral direction from said straight beam,
(*l*) each opposite leg of said pair of gauge rods being spaced from said cantilever beams in parallelism,
(*m*) a pair of ball latch units,
(*n*) each sleeve having a respective ball latch unit mounted therein to engage companion indentations spaced longitudinally along said straight beam,
(*o*) a second pair of ball latch units,
(*p*) each mentioned second ball latch unit being mounted in said straight beam to engage companion indentations spaced along a respective first mentioned leg of said pair of gauge rods,
(*q*) a pair of gauge stops,
(*r*) each gauge stop being slidably mounted on a respective opposite leg of said pair of gauge rods,
(*s*) said gauge member opposite legs being spaceable from said straight beam to engage the end wall portions of a duct to align said straight beam parallel with and space it from the lateral axis of a duct,
(*t*) said gauge stops being selectively spaceable on said opposite legs of said gauge members to gauge the length of wall portions of a duct relatively projected between each pair of cantilever beams adapted to locate and perforate the opposed wall portions of the duct for installation of a damper shaft.

3. A jig punch for perforating a duct section for a damper shaft, the jig punch comprising in combination:
(*a*) a pair of perforators,
(*b*) a straight beam,
(*c*) said pair of perforators being selectively spaceable along said straight beam,
(*d*) said perforators being supported and extended transversely from one side of said straight beam and having sufficient respectve throats therein for the relative entrance of opposite wall end portions of a duct,
(*e*) latch units,
(*f*) said latch units latching said perforators to said straight beam,
(*g*) gauge members,
(*h*) said gauge members being mounted on, and having bent portions selectively spaceable transversely from said straight beam, to engage the inner wall of a duct to align said straight beam parallel with the lateral axis of a duct,
(*i*) a second set of latch units,
(*j*) said second set of latch units latching said gauge members to said straight beam,
(*k*) gauge stops,
(*l*) said gauge stops being mounted on and selectively spaceable on the bent portions of said gauge members to gauge the length of wall portions of a duct relatively projected into the mentioned throats of said perforators.

4. A punch adapted to perforate a duct section, comprising in combination:
(*a*) an elongate straight beam member,
(*b*) a pair of perforators,
(*c*) said pair of perforators mounted on said beam member in spaced relationship to one another and selectively spaceable therealong,
(*d*) said perforators extending substantially at right angles to said beam member and having a sufficient depth of throat thereof to permit substantial entrance thereinto of opposed wall end portions of a duct,
(*e*) means releasably engaging each said perforator with said beam member,
(*f*) a pair of gauge members mounted on said beam member and having portions thereof selectively spaceable from said beam member in directions substantially normal to the longitudinal axis of said beam member,
(*g*) said latter portions adapted to engage the wall of a duct and align said beam member in parallel relationship with the longitudinal axis of the duct,
(*h*) and means connecting said gauge members to said beam in such manner that the portions thereof selectively spaceable may be positioned at a plurality of laterally spaced locations from said beam member.

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