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(54) Suction device for holding rivets in a riveting tool
Saugvorrichtung zum Halten von Nieten in einem Nietwerkzeug
Dispositif d’aspiration pour le maintien de rivets dans une riveteuse

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(56) References cited:
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Description

Technical Field

[0001] The invention involves a riveting tool with a device for suctioning rivets, as defined in the pre-characterizing portion of claim 1. Such a tool is known from US 5,500,990.

Background Art

[0002] At the present time hydraulic-pneumatic riveting tools have a passage opening for transfer of the torn-off pins of blind rivets into the catching box. It sometimes happens, during the operation of the riveting tool, that this passage opening becomes clogged. If the inner rivet suctioning device is firmly connected to some part of the tool, for example to the hydraulic piston or the rear screw joint, it is necessary in the event of such trouble, which commonly occurs, to dismantle the riveting tool in a complicated operation and to unblock or change the part. The operator of the tool is often unable to carry out these repairs himself and specialist repairs are necessary.

Disclosure of Invention

[0003] The above defects are eliminated by the device as defined in independent claim 1. The dependent claims describe advantageous embodiments of the invention. The riveting tool comprises a hydraulically controlled clamping assembly for rivet pins with collets in which the cylinder of the hydraulic piston is provided with a supply of pressurized air from the lower pneumatic part. The suctioning of the rivets by means of pressurized air serves to hold them in position in the tool thus making it possible to carry out the riveting operation in whatever work position is required. The device for suctioning rivets consists of a tube passing through the axial central passage opening of the hydraulic piston, the back end of which is tightly fitted in the rear screw joint closing off the body of the riveting tool in the part forming the cylinder of the hydraulic piston; into the other forward end of the tube there is pressed a small hollow piston, between whose inner elongated end and the tube there is a ring-shaped space. In this area the tube is provided with at least one opening, connected with the supply of pressurized air. The basis of the invention lies in the fact that the tube has clearance along the whole length of its positioning in the hydraulic piston, where the ring-shaped gap thus created between the tube and the body of the hollow hydraulic piston forms a connection between the radial opening of the tube and the space in the cylinder of the hydraulic piston connected to the supply of pressurized air. At the same time, the outer shoulder of the small piston with its radial projection reaches the inner shoulder of the hydraulic piston under pressure from the compression spring of the spacing mandrel of the collets. Furthermore, the small piston and the tube are removably located within the axial central passage opening of the hydraulic piston and can be withdrawn therefrom in the event of blockage.

During blockage of the passage channel for pins of torn-off blind rivets in the area of the suctioning device, the operator of the riveting tool can easily replace the blocked part himself. The suctioning device is freely positioned as an independent element in the hollow hydraulic piston and is permanently pressed by the spring of the spacing mandrel of the collets against the inner shoulder of the hydraulic piston. The replacement of the suctioning device is simple and does not call for expert intervention by a specialized workshop or the manufacturer of the riveting device.

[0004] The tube has preferably an inner conical recess, narrowing in the direction of the back end of the riveting tool, into which the elongated end of the small piston, whose outer surface is also conical, is partly inserted, so that a suction nozzle is formed. Pressurized air is directed by the nozzle to the space between the elongated end of the small piston and the adjacent inner conical recess of the tube. In that space there is thus effectively created sub-atmospheric pressure which causes air to be drawn, through the inner axial opening in the small piston, from the front part of the riveting tool, into which the blind rivet is inserted.

[0005] The small hollow piston can have at its front end a conical widening of its axial opening, which serves as the entry point for the torn-off pins of the blind rivets.

[0006] Preferably the seal of the small piston, for its positioning in the hollow hydraulic piston, is generally formed by means of an O-ring in the hollow hydraulic piston, which obstructs the entrance of air to other parts of the riveting tool.

Brief Description of Drawings

[0007] The invention can be explained in greater detail by means of the attached drawings. Figure 1 shows a section of the device for suctioning rivets in the upper part of the riveting tool and Figure 2 shows in detailed section the arrangement of the tube, into the forward end of which is pressed the small hollow piston, between whose inner elongated end and the tube there is a ring-shaped space. In that area the tube has a radial opening (connected with the supply of pressurized air).

Modes for Carrying Out the Invention

[0008] In the upper part of the body 1 of the riveting tool there is a hydraulically controlled clamping assembly for rivet pins, with collets 11. The cylinder 18 of the hydraulic piston 2 is provided with a supply of pressurized air from the lower pneumatic part of the tool. A tube 4 passes through the axial central passage opening of the hydraulic piston 2, the back end 23 of which is tightly fitted (by means of a tight rubber O-ring 24) in the hollow
A riveting tool with a device for suctioning the rivets comprising a hydraulically controlled clamping assembly for rivet pins with collets (11), spacing mandrel (13) and compression spring (9) in which the cylinder (18) of the hollow hydraulic piston (2) is provided with a supply of pressurized air from the lower pneumatic part, and which consists of a tube (4) passing through the axial central passage opening of the hollow hydraulic piston (2), the back end (23) of which is tightly fitted in the rear screw joint (15) closing off the body (1) of the riveting tool in the part forming the cylinder (18) of the hollow hydraulic piston (2); into the other, forward end (22) of the tube (4) there is pressed a small hollow piston (3) between whose inner elongated end (25) and the tube (4) there is a ring-shaped space (17). In that area the tube (4) is provided with an opening (5), connected with the supply of pressurized air. The tube (4) has clearance along the whole length of its positioning in the hydraulic piston (2). The ring-shaped gap (27) thus created between the tube (4) and the body of the hollow hydraulic piston (2) forms a connection between the radial opening (5) of the tube (4) and the space (6) in the cylinder (18) of the hydraulic piston (2) connected to the supply of pressurized air. The outer shoulder (7) of the small piston (3) with its radial projection (8) contacts the inner shoulder (29) of the hydraulic piston (2) under pressure from the compression spring (9) of the spacing mandrel (13) of the collets (11). The outer shoulder (7) of the small piston (3) lies closely adjacent (due to its seal (21)) to the surface of the central operating channel in the direction of the back part of the riveting tool. After riveting the rivet pins are collected and move through the central operating channel in the direction of the back part of the riveting tool to the catching box (20). The suctioning system (the piston (3) with the tube (4)) is freely placed as an independent element in the hollow hydraulic piston (2) and is permanently pressed against the inner shoulder (29) of the hydraulic piston (2) by the compression spring (9) of the spacing mandrel (13) of the collets (11). The back end (23) of the tube (4) is led through the inner opening (16) of the back screw joint (15).

Pressurized air from the pneumatic part of the riveting tool is brought through channels (not illustrated) to the space (6) in the cylinder (18) of the hydraulic piston (2) beyond the hydraulic piston (2) (on the outer surface of the suctioning system). From here the pressurized air is directed along the outer casing of the tube (4) through the ring-shaped gap (27) between the tube (4) and the body of the hollow hydraulic piston (2) (which forms a connection between the radial opening (5) of the tube (4) and the space (6) in the cylinder (18) of the hydraulic piston (2), connected with the supply of pressurized air) to the radial opening (5) in the tube (4). The pressurized air goes through the opening (5) to the ring-shaped space (17) between the tube (4) and the small piston (3) and is directed to the suction nozzle. In the nozzle (19) sub-atmospheric pressure arises under the impact of the flow of pressurized air to the back part of the tool, which causes suctioning of the air in the central operating channel (part of that channel is the central passage opening of the small piston (3) and the tube (4)) from the front part of the riveting tool. This makes possible the suctioning of the torn-off rivets to the opening of the extension (10) in the front part of the tool, without it being necessary to remove them by hand. At the same time the rivet is held fast in the given position regardless of the position of the riveting tool.

Claims

1. A riveting tool with a device for suctioning the rivets comprising a hydraulically controlled clamping assembly for rivet pins with collets (11), spacing mandrel (13) and compression spring (9) in which the cylinder (18) of the hollow hydraulic piston (2) is provided with a supply of pressurized air from the lower pneumatic part, and which consists of a tube (4) passing through the axial central passage opening of the hollow hydraulic piston (2), the back end (23) of which is tightly fitted in the rear screw joint (15) closing off the body (1) of the riveting tool in the part forming the cylinder (18) of the hollow hydraulic piston (2); into the other, forward end (22) of the tube (4) there is pressed a small hollow piston (3) between whose inner elongated end (25) and the tube
1. A device for suctioning the rivets in a riveting tool according to claim 1, characterized by the fact that the tube (4) has an inner conical recess (12), narrowing in the direction of the back end of the riveting tool, into which the elongated end (25) of the small hollow piston (3), whose outer surface is also conical, is partly inserted, so that a suction nozzle (19) is formed.

2. A device for suctioning the rivets of a riveting tool according to claim 1 or 2, characterized by the fact that the small hollow piston (3) has, at its forward end, a conical widening (28) of its axial opening.

3. A device for suctioning the rivets of a riveting tool according to any of the preceding claims 1 to 3, characterized by the fact that the seal (21) of the small hollow piston (3) for its positioning in the hollow hydraulic piston (2) is formed by means of an O-ring in the hollow hydraulic piston (2).

4. A device for suctioning the rivets of a riveting tool according to any of the preceding claims 1 to 3, characterized by the fact that the seal (21) of the small hollow piston (3) for its positioning in the hollow hydraulic piston (2) is formed by means of an O-ring in the hollow hydraulic piston (2).

5. A device for suctioning the rivets of a riveting tool according to any of the preceding claims 1 to 3, characterized by the fact that the tube (4) has clearance along the whole length of its positioning in the hollow hydraulic piston (2), where the ring-shaped gap (27) thus created between the tube (4) and the body of the hollow hydraulic piston (2) forms a connection between the opening (5) of the tube (4) and a space (6) in the cylinder (18) of the hollow hydraulic piston (2) connected to the supply of pressurized air, while an outer shoulder (7) of the small hollow piston (3) with its radial projection (8) reaches an inner shoulder (9) of the hollow hydraulic piston (2) under pressure from the compression spring (9) of the spacing mandrel (13) of the collets (11) and that the small hollow piston (3) and the tube (4) are removably located within the axial central passage opening of the hollow hydraulic piston (2) and can be withdrawn therefrom in the event of blockage.

Patentansprüche

1. Nietwerkzeug mit einer Einrichtung zur Saughalterung der Niete eines Nietwerkzeugs gemäß Anspruch 1, gekennzeichnet dadurch, dass die Dichtheit der kleinen Hohlkolben (3) an einem nach vom gerichteten Ende eine konische Erweiterung (28) seines axialen Durchlasses besitzt.

2. Einrichtung zur Saughalterung der Niete eines Nietwerkzeugs gemäß Anspruch 1 oder 2, gekennzeichnet dadurch, dass die Dichtheit der kleinen Hohlkolben (3) an einem nach vom gerichteten Ende eine konische Erweiterung (28) seines axialen Durchlasses besitzt.
comprenant un assemblage de serrage à commande hydraulique pour des rivet-goupilles, ayant des pinces de serrage (11), un mandrin espaceur (13) et un ressort de compression (9), dans lesquels le cylindre (18) du piston hydraulique creux (2) est fourni avec une alimentation d’air sous pression provenant de la partie pneumatique inférieure, et qui se compose d’un tube (4) traversant l’ouverture du passage central axial du piston hydraulique creux (2), dont l’extrémité arrière (23) est étroitement ajustée dans l’assemblage arrière par vis (15) condamnant le corps (1) de la riveteuse dans la partie formant le cylindre (18) du piston hydraulique creux (2) ; dans l’autre extrémité avant (22) du tube (4), un petit piston creux (3) est pressé entre une extrémité allongée interne (25) et le tube (4), il existe un espace en forme d’anneau (17), zone dans laquelle le tube (4) est prévu avec au moins une ouverture (5) connectée à l’alimentation d’air sous pression, caractérisé par le fait que le tube (4) possède un jeu le long de la longueur entière de son positionnement dans le piston hydraulique creux (2), où l’espace en forme d’anneau (27) ainsi créé entre le tube (4) et le corps du piston hydraulique creux (2) forme une connexion entre l’ouverture (5) du tube (4) et un espace (6) dans le cylindre (18) du piston hydraulique creux (2) connecté à l’alimentation d’air sous pression, alors qu’un épaulement externe (7) du petit piston creux (3) avec sa projection radiale (8) atteint un épaulement interne (29) du piston hydraulique creux (2) sous pression à partir du ressort de compression (9) du mandrin espaceur (13) des pinces de serrage (11) et que le petit piston creux (3) et le tube (4) sont placés de façon amovible à l’intérieur de l’ouverture du passage central axial du piston hydraulique creux (2) et peuvent être retirés de celui-ci dans le cas d’un blocage.

2. Dispositif pour aspirer les rivets dans une riveteuse selon la revendication 1, caractérisé par le fait que le tube (4) possède un évidement conique interne (12), diminuant dans la direction de l’extrémité arrière de la riveteuse, dans laquelle l’extrémité allongée (25) du petit piston creux (3), dont la surface externe est également conique, est en partie insérée de sorte qu’une buse d’aspiration (19) est formée.

3. Dispositif pour aspirer les rivets d’une riveteuse selon la revendication 1 ou 2, caractérisé par le fait que le petit piston creux (3) possède, à son extrémité frontale, un élargissement conique (28) de son ouverture axiale.

4. Dispositif pour aspirer les rivets d’une riveteuse selon l’une quelconque des revendications précédentes 1 à 3, caractérisé par le fait que le joint d’étanchéité (21) du petit piston creux (3) prévu pour son positionnement dans le piston hydraulique creux (2) est formé au moyen d’un joint torique dans le piston hydraulique creux (2).