Jan. 15, 1952 N. C. MOORE 2,582,501

WORK HOLDER FOR RIVETING MACHINES

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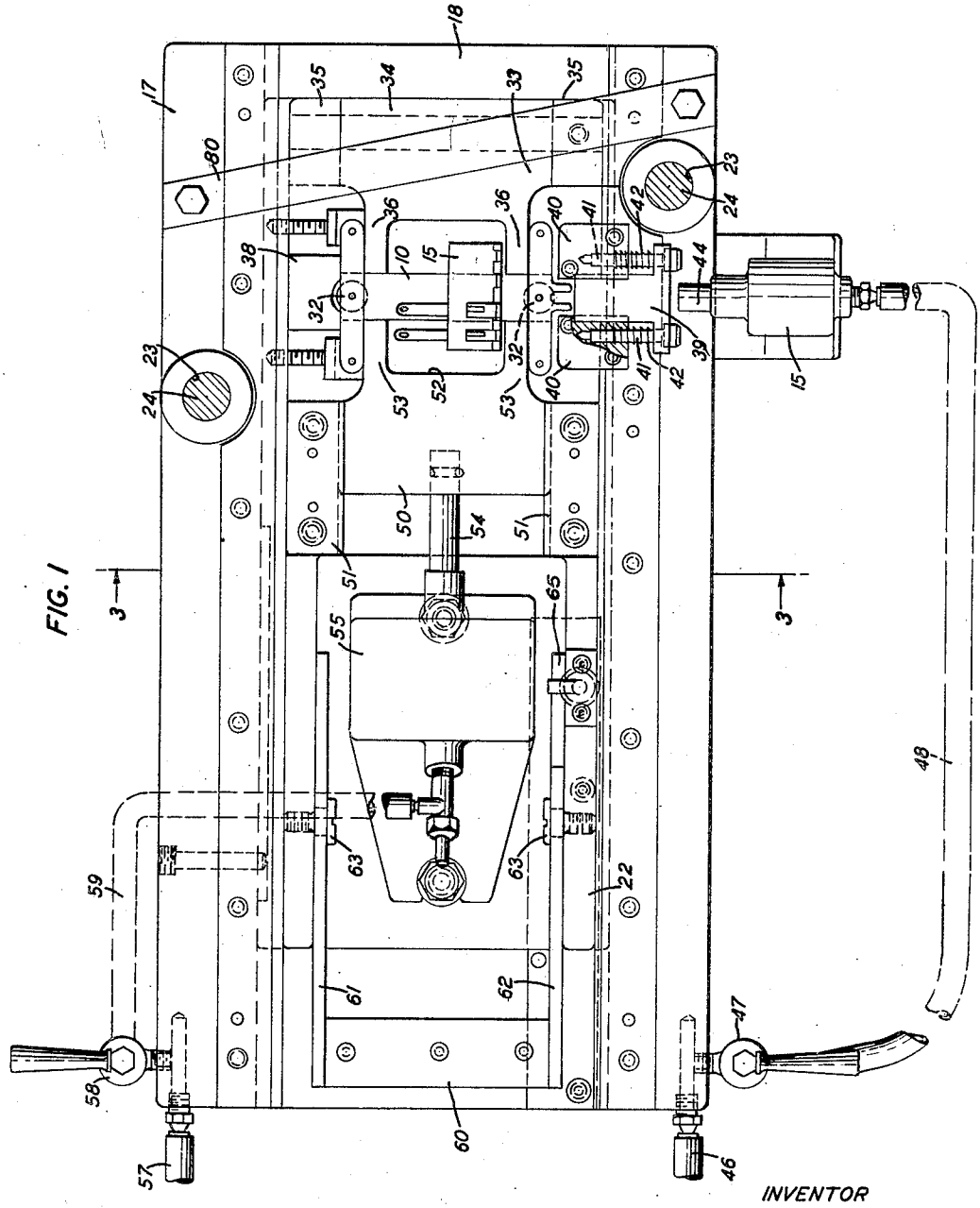


FIG. 1

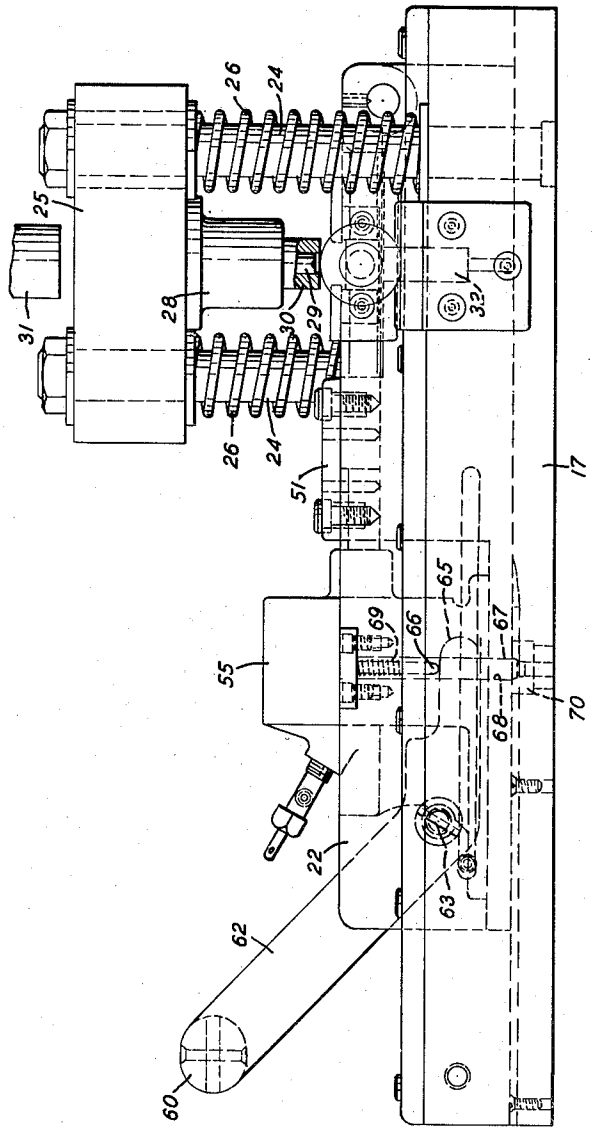
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FIG. 2



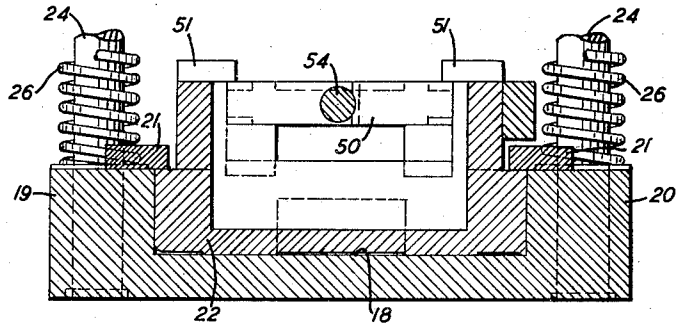
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FIG. 3



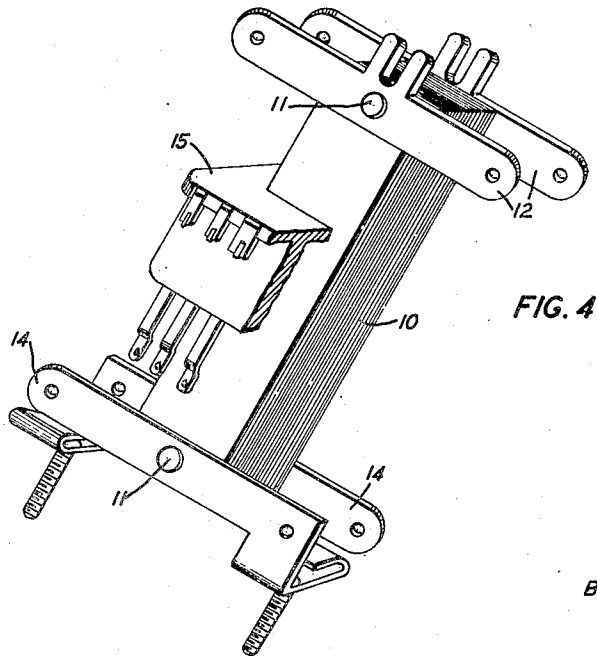


FIG. 4

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WORK HOLDER FOR RIVETING MACHINES

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2 Claims. (Cl. 78—46)

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This invention relates to riveting apparatus, and more particularly to apparatus for riveting into a unitary structure a plurality of articles, such for example, as a pile of laminations and the associated brackets which together form a core of a coil or other electrical unit.

In making such assemblies, it is important that the laminations be accurately aligned and held in alignment during the riveting operation.

An object of the invention is to provide a riveting apparatus, particularly a feeding and holding mechanism, in combination with a riveting head, which is easily operated and highly efficient in aligning and holding articles to be riveted.

Broadly, the apparatus includes a table supporting a riveting head with locating elements mounted at fixed positions to be engaged respectively by one end and one side of a pile of laminations, movable locating elements to respectively engage the other end and side of the pile of laminations and fluid operated means to actuate the movable elements to align the laminations and cause them to be firmly held in place during an operating cycle of the riveting head.

To describe the apparatus more in detail, a carriage is slidable between guides on the table from a loading position to a riveting position relative to the riveting head. The fixed position locating elements are supported by the carriage, one of the elements being pivotally mounted for movement away from the portion of the carriage which is to receive the articles, namely the pile of laminations, the brackets and the rivet members which are to be headed by the riveting head to secure all of the articles together. These articles, when disposed in place, are positioned with one end of the pile of laminations adjacent one of the fixed position locating elements, the pivotal locating element being movable into a position to be engaged by one side of the pile of laminations. Movable locating elements on the carriage are forced toward their respective fixed position elements by fluid operated means such as air cylinders to align the laminations with each other and to firmly hold them in position during the riveting operation.

Other objects and advantages will be apparent from the following detailed description when taken in conjunction with the accompanying drawings, wherein

Fig. 1 is a top plan view of the apparatus with the riveting head removed;

Fig. 2 is a side elevational view of the apparatus;

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Fig. 3 is a lateral sectional view taken along the line 3—3 of Fig. 1; and

Fig. 4 is a perspective view of the assembled article.

Referring now to the drawings, attention is first directed to Fig. 4 which illustrates one type of article which may be formed by the apparatus. The article includes a pile of laminations 10 which are apertured near their ends to receive rivets 11. Like brackets 12 are to be secured by the aid of one of the rivets to one end of the pile of laminations. Like brackets 14 are secured by the aid of the other rivet to the other end of the pile of laminations. A terminal support 15 centrally apertured to receive the pile of laminations 10 is to be included as part of the article and must therefore be positioned on the laminations prior to the securing of the brackets 12 and 14 to the ends thereof. During the assembling of the unit shown in Fig. 4, it is important that the laminations 10 be in alignment with each other in the stacked formation.

The apparatus includes a table 17 with a recessed central portion 18 extending the full length of the table, the vertical sides 19 and 20 cooperating with retaining members 21 to serve as guideways for a carriage 22. The vertical members 19 and 20 of the table are apertured at 23 to receive guide rods 24 for a riveting head 25. This head 25 is normally held in its upper position by springs 26, which also serve to return the head to its upper unoperated position near the end of each operating cycle. It is not believed necessary to describe in detail the riveting head, it being understood that two riveting units 28 are supported thereby at positions where they will operate upon the rivets 11 and form the upper ends thereof when an assembly of the articles, shown in Fig. 4, are positioned therebeneath. The units 28 each include a riveting element 29 and an annular pressure pad 30, which moves in advance of the riveting member to compress the pile of articles prior to the forming of the rivet. The riveting head is actuated by any suitable means such as a reciprocable ram 31 to move the riveting head through its operating cycle at predetermined intervals. Anvils 32 are removably mounted in apertures in the carriage beneath the rivets 11 to support them during the riveting operation.

The carriage 22 is movable from a loading position, where the articles to be assembled may be placed therein, to a riveting position where the rivets 11 will be aligned with their respective riveting members 29. A locating element 33 which

may be termed a fixed position element, is mounted upon a pivot 34, the ends of which are journalled in suitable bearings 35 of the carriage 22. The inner portion of the element 33 is cut away to provide legs 36 to straddle the terminal bracket 15 and engage all of the laminations 10 at spaced positions adjacent the rivets 11. The element 33 is described as a fixed position element due to the fact that it is mounted against movement longitudinally of the carriage when in its locating position, but is rotatable about its pivot to facilitate the initial assembly of the articles including the laminations and brackets prior to the riveting operation.

A fixed position locating element 38 is mounted upon the carriage to engage one end of the pile of laminations 10. A movable locating element 39 on the opposite side of the carriage is supported in guides 40 and upon guide pins 41 in alignment with the fixed locating element 38. Springs 42 normally urge the locating element 39 outwardly to the position shown in Fig. 1. When the carriage is in the riveting position as shown in Fig. 1, the locating element 39 is in alignment with a plunger 44 of an air cylinder 45. The unit 45 is supplied with a fluid such as air under pressure from a supply line 46, through a valve 47 and a fluid line 48.

Another movable locating element 50, similar in contour to the locating element 33 and cooperating therewith, is slidably supported by the carriage between guides 51. The element 50 has a cut away portion 52 forming legs 53 in alignment with the legs 36 of the element 33 to engage the adjacent side of the pile of laminations 10 and to straddle the terminal bracket 15. A piston rod 54 of a fluid operated unit, such as an air cylinder 55, is connected to the element 50 to cause movement thereof toward the laminations 10. The unit 55 is operated by a fluid such as air under pressure from a supply line 57, through a valve 58 and a line 59.

The carriage 22 is moved manually by a handle 60 having arms 61 and 62 connecting it pivotally at 63 to the carriage. The arm 62 has a projection 65 engaging a projection 66 of a locking pin 67, which is normally urged downwardly in its supporting aperture 68 of the carriage by a spring 69. A bushing 70 mounted in the table 17 is formed to receive the lower tapered end of the pin 67 and cooperate therewith in locking the carriage in the operating or riveting position. This mechanism, including the handle and the locking means is so arranged that, when the operator pulls upon the handle to move the carriage from the riveting position to the loading position, the arms will move about their pivots 63 causing the portion 65 of the arm 62 to lift the pin 67 out of the bushing 70 to unlock the carriage and free it for its movement into the loading position. By the same principle, the application of force to move the carriage to the riveting position will cause the portion 65 to free the pin 67 so that the moment it is aligned with its bushing 70, the spring 69 may force the pin into locking position.

Considering now the operation of the apparatus, let it be assumed that the riveting head may be moved at will through single operating cycles. In preparing the apparatus for operation, the slide or carriage is in its rearmost or loading position free of the riveting head, so that the operator may freely assemble the various separate parts or articles which are to constitute the assembly shown in Fig. 4. The rivets have preformed heads on their lower ends which rest on the anvils 32. The remaining portions of the rivets extend through the central apertures of their brackets 12 and 14 and the apertures in the ends of the laminations 10. These articles are loosely assembled on the carriage between the locating elements 38 and 39, the locating element 33 being swung about its pivot, if desired, to facilitate in the arrangement of the articles for assembly. During this time, the locating element 50 is in its normal out of the way position. After the group of articles or parts are disposed upon the carriage, the locating element 33 is moved into position and the carriage may then be moved to its operating position and locked in place. To provide against possible pivoting of the element 33 during operation of the air cylinder 55, a retaining bar 80 lies across the element and is fixed to the table at a position where the element 33 may move therebeneath during movement of the carriage into the operating position. At this time the operator opens both valves 47 and 58, either simultaneously or successively to cause operation of their respective units 45 and 55. These units move their respective locating elements 39 and 50 to compress the laminations into both longitudinal and lateral alignment. The laminations are thus held in alignment during the operation of the riveting head 25 to compress the assembly including, not only the laminations 10, but the brackets 12 and 14 at the ends thereof, prior to the forming of the heads on the upper ends of the rivets 11.

Although specific improvements of the invention have been shown and described, it will be understood that they are but illustrative and that various modifications may be made therein without departing from the scope and spirit of this invention as defined by the appended claims.

What is claimed is:

1. A work holder comprising a carriage to support a pile of laminations, a support for the carriage, stops to respectively locate the carriage in loading and aligning positions, a fixed position locating element on the carriage to be engaged by one side of the pile of laminations, a handle to move the carriage between a loading position and an aligning position supported for pivotal movement between given limits by the carriage, a latch movable into closed position to secure the carriage against movement on the support and into open position to free the carriage for movement, means connecting the handle to the latch operable by movement of the handle toward the aligning position causing pivotal movement of the handle to move the latch into closed position, a movable locating element on the carriage, and means to move the movable element relative to the fixed position element to clamp the laminations in alignment with each other therebetween.

2. A work holder comprising a carriage to support a pile of laminations, a support for the carriage, stops to respectively locate the carriage in loading and aligning positions, a fixed position locating element on the carriage to be engaged by one side of the pile of laminations, a handle to move the carriage between a loading position and an aligning position supported for pivotal movement between given limits by the carriage, a latch movable into closed position to secure the carriage against movement on the support and into open position to free the carriage for movement, and means connecting the handle to the latch operable by movement of the handle away from the aligning position causing

pivotal movement of the handle to move the latch into open position.

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REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
639,604	Neilson	Dec. 19, 1899
881,927	Illingworth	Mar. 17, 1908
1,430,226	Goodreau	Sept. 26, 1922
1,586,540	Tweedy	June 1, 1926
1,713,696	Goldhamer	May 21, 1929
1,841,196	Mass	Jan. 12, 1932
1,986,933	Sime	Jan. 8, 1935
2,128,316	Paul	Aug. 30, 1938
2,165,614	Cook	July 11, 1939
2,240,688	Conner	May 6, 1941
2,433,535	Treis	Dec. 20, 1947