March 16, 1965 E. J. DE RIDDER 3,173,199

APPARATUS FOR ASSEMBLING TOGETHER INTERLOCKING EXTRUSIONS OR THE LIKE

Filed April 13, 1961

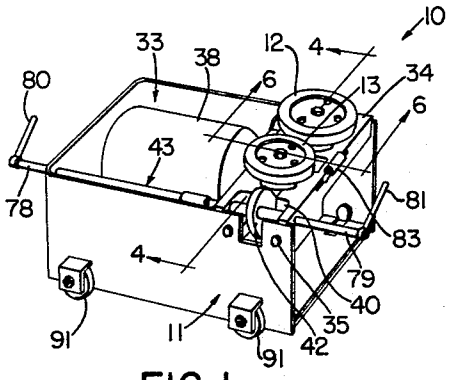


FIG-1

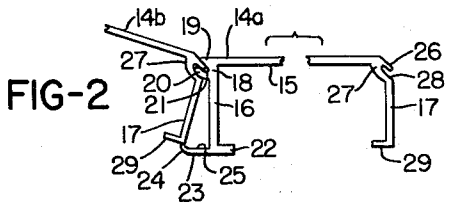


FIG-2

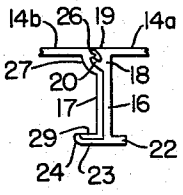


FIG-3

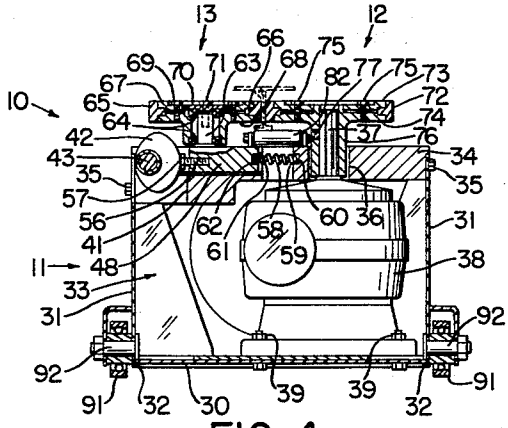


FIG-4

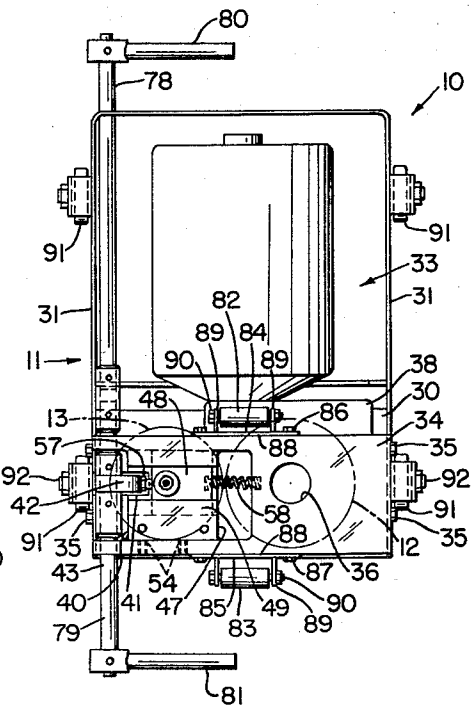


FIG-5

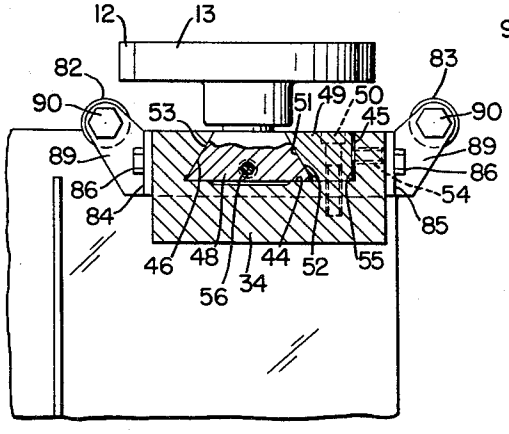


FIG-6

INVENTOR.
ERNST J. DeRIDDER
BY Glenn, Jackson
Palmer & Matthews
HIS ATTORNEYS

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3,173,199

APPARATUS FOR ASSEMBLING TOGETHER INTERLOCKING EXTRUSIONS OR THE LIKE

Ernst J. De Ridder, Henrico County, Va., assignor to Reynolds Metals Company, Richmond, Va., a corporation of Delaware

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6 Claims. (Cl. 29—235)

This invention relates to an improved method and apparatus for interconnecting together interlocking extrusions or the like.

More particularly, this invention relates to an improved apparatus for interconnecting together interlocking extrusions or the like by passing the assembled interlocking portions of the extrusions or articles between a pair of counter-rotating wheels or rolls that force the interlocking portions together.

Heretofore, different apparatus has been provided for mechanically interlocking extrusions or articles together in a press-fit relation.

While the extrusions or articles may vary in their configurations and construction, they each have a portion that is adapted to be press-fitted together with an adjacent cooperating portion of another extrusion or article.

One embodiment of the apparatus of this invention comprises a frame means rotatably carrying a pair of aligned wheels and means for causing relative movement between the wheels to vary the space therebetween. Motor means is carried by the frame means and is operatively interconnected to one of the wheels to cause rotation thereof.

In this manner, the wheels are first set in a spaced relation to readily receive assembled extrusions or articles therebetween before the extrusions or articles have been disposed in a press-fit relation. Thereafter, relative movement is effected between the wheels to cause the portions of the extrusions or articles disposed therebetween to be press-fitted together in interlocking relation.

With the wheels disposed in this latter position, rotation of one of the wheels is effected by the motor means interconnected thereto whereby relative movement is caused between the extrusions or articles and the wheels of the apparatus so that the counter-rotating wheels effectively interconnect the remaining portions of the extrusions or articles passing between the rolls by press-fitting the interlocking portions of the extrusions or articles together.

Therefore, it can be seen that the apparatus of this invention is adapted to interconnect or assemble together a plurality of interlocking extrusions or articles with a minimum of steps and time or effort.

Accordingly, it is an object of this invention to provide an improved apparatus for assembling together interlocking extrusions or the like and having one or more of the novel features set forth above or hereinafter shown or described.

Other objects, uses and advantages of this invention are apparent upon a reading of this description which proceeds with reference to the accompanying drawings forming a part thereof and wherein:

FIGURE 1 is a small perspective view illustrating one embodiment of the apparatus of this invention.

FIGURE 2 is a fragmentary end view illustrating partially assembled extrusions or the like that can be interconnected together by the apparatus and method of this invention.

FIGURE 3 is a view similar to FIGURE 2 and illustrates the extrusions or the like in their fully interlocked position.

FIGURE 4 is an enlarged, cross-sectional view of the apparatus illustrated in FIGURE 1 and is taken on line 4—4 thereof.

FIGURE 5 is a fragmentary, plan view of the apparatus illustrated in FIGURE 1 with the wheels thereof shown in phantom.

FIGURE 6 is a fragmentary, cross-sectional view of the apparatus illustrated in FIGURE 1 and is taken substantially on line 6—6 thereof.

While one specific type of interlocking extrusion or article is illustrated in the drawings and hereinafter described, it is to be understood that such extrusions or articles are merely exemplary of the many types that can be interconnected together by the method and apparatus of this invention.

Further, while the apparatus of this invention is illustrated and hereinafter described as interconnecting together interlocking extrusions or the like, it is to be understood that the apparatus of this invention can be utilized for other purposes, as desired.

Therefore, this invention is not to be limited to only the embodiments thereof illustrated in the drawings, as the drawings are merely utilized to illustrate one of the wide variety of uses of this invention.

Referring now to FIGURE 1, the improved apparatus of this invention is generally indicated by the reference numeral **10** and comprises a frame structure or frame means **11** carrying a pair of wheels **12** and **13** disposed in aligned relation and adapted to interconnect or assemble together interlocking extrusions or articles in a manner hereinafter described.

While the types of extrusions or articles to be interlocked together by the apparatus of this invention do not form any part of this invention, it is deemed necessary to disclose one such type to more fully understand this invention. However, it is to be understood that other types of extrusions or articles can be utilized, as desired.

As illustrated in FIGURE 2, a pair of interlocking extrusions **14***a* and **14***b* are shown in a partially assembled condition before the same are mechanically interlocked together in the manner illustrated in FIGURE 3 by the apparatus of this invention.

Each extrusion **14***a* and **14***b* is identical and comprises a flat body portion **15** having a pair of opposed legs **16** and **17** extending outwardly from the peripheral edges of the body portion **15**.

Each leg **16** has an enlargement **18** at one end thereof provided with a pair of outwardly directed flanges **19** and **20** defining an annularly disposed and outwardly facing channel **21** therebetween.

A pair of oppositely directed flanges **22** and **23** extend from the other end of the leg **16**, the flange **23** having a turned over end **24** cooperating with the body portion of the leg **16** to define a channel **25** therewith.

The other leg **17** of each extrusion **14***a* or **14***b* has an outwardly projecting bead **26** at one end thereof which cooperates with a curved portion **27** of the leg **17** to define a channel **28** therewith, the bead **26** being adapted to being received in the channel **21** of the leg **16** of another extrusion while the channel **28** thereof receives the flange **20** of the leg **16** of the other extrusion in the manner illustrated in FIGURES 2 and 3.

A short flange **29** is carried at the other end of the leg **17** and is adapted to be press-fitted in the channel **25** of the leg **16** of the other extrusion in a manner hereinafter described to interlock the extrusions together.

When it is desired to interconnect the extrusions **14***a* and **14***b* together, the bead **26** of the leg **17** of the extrusion **14***b* is inserted in the channel **21** of the leg **16** of the extrusion **14***a*. However, because the turned over end **24** of the flange **23** abuts the flange **29** of the extrusion **14***b*, the extrusions **14***a* and **14***b* are disposed in the angular and partially assembled position illustrated in FIGURE 2.

By forcing the partially assembled legs **16** and **17** of

the extrusions **14***a* and **14***b* toward each other from the position illustrated in FIGURE 2, the flange **29** of the extrusion **14***b* can be forced into the channel **25** of the extrusion **14***a* in the manner illustrated in FIGURE 3 whereby the extrusions **14***a* and **14***b* are mechanically interlocked together and held in this position by the turned over end **24** of the extrusion **14***a*.

The apparatus **10** illustrated in FIGURE 1 is adapted to assemble together the extrusions **14***a* and **14***b* in the above manner with a minimum of time and effort and without requiring relatively skilled labor or a time-consuming operation.

The more specific details of the apparatus **10** will now be described.

As illustrated in FIGURES 4 and 5, the frame means **11** of the apparatus **10** includes a bottom wall means **30** suitably interconnected to peripheral side wall means **31**. For example the side wall means **31** and bottom wall means **30** may be interconnected together by welding at **32**. The side wall means **31** cooperate with the bottom wall means **30** to define a compartment **33** within the frame means **11**.

A top plate **34** is disposed at the upper end of the side wall means **31** and is secured thereto by a plurality of bolts **35**. The plate **34** has a bore **36** passing transversely therethrough to receive a shaft **37** of a suitable ratio motor **38** disposed in the compartment **33** of the frame means **11** and secured to the bottom wall means **30** thereof by a plurality of bolts **39**.

One end of the plate **34** is interrupted by a rectangular slot **40** which is interconnected to a smaller slot **41**, the slots **40** and **41** cooperating together to receive a cam **42** carried on a shaft assembly **43** rotatably supported by the frame means **11** of the apparatus **10**.

As illustrated in FIGURE 6, the top plate **34** is provided with a transverse slot **44** having a straight side wall **45** and an opposed beveled side wall **46**. The transverse slot **44** extends from the rectangular slot **40** to another rectangular slot **47** formed in the plate **34** intermediate the bore **36** and the rectangular slot **40** previously described.

A dove-tailed sliding block or member **48** is disposed in the transverse slot **44** of the plate **34** and is retained therein by a retaining plate **49** received in the slot **44** and secured thereto by a plurality of bolts **50**. The retaining plate **49** has a beveled surface **51** disposed in sliding engagement with a beveled surface **52** of the sliding block **48** while the other beveled surface **53** of the sliding block **48** is disposed in sliding engagement with the beveled surface **46** of the top plate **34**. The retaining plate **49** is adapted to be adjusted to a proper position relative to the sliding block **48** by a plurality of adjusting screws **54** carried by the top plate **34** and disposed in abutting engagement with a side **55** of the retaining plate **49** as illustrated in FIGURES 5 and 6.

The retaining plate **49** cooperates with the sliding block or member **48** in such a manner that the sliding block **48** is adapted to be moved radially toward or away from the bore **36** in the top plate **34** in a manner hereinafter described.

An adjusting screw **56** is threadedly carried at one end of the sliding block **48** and has an enlarged head **57** disposed in engagement with the cam **42** as illustrated in FIGURES 4 and 5. By adjusting the threaded relationship between the adjusting screw **56** and the sliding block **48**, the position of the sliding block **48** in the slot **44** can be varied for any rotational position of the cam **42**.

A compression spring **58** is disposed in the rectangular slot **47** of the top plate **34** and has one end **59** thereof received in a recess **60** formed in the plate **34** and the other end **61** thereof received in a recess **62** formed in the sliding block **48**.

In this manner, the compression spring **58** is continuously urging the sliding block **48** toward the cam **42** whereby the enlarged end **57** of the adjusting screw **56** is always disposed in engagement with the cam **42** regardless of the rotational position thereof.

A stub shaft **63** is carried by the sliding block or member **48** and projects between the beveled surfaces **46** and **51** of the plates **34** and **49** in the manner illustrated in FIGURES 5 and 6.

The wheel **13** of the apparatus **10** is rotatably carried on the stub shaft **63** of the sliding block **48** with a bearing means **64** disposed between the wheel **13** and the stub shaft **63**.

The wheel **13** comprises an outer peripheral rim **65** formed of any suitable material and having an inner medial flange **66** gripped between two body members **67** and **68** of the wheel **13**, the body member **67** being detachably secured to the body member **68** by a plurality of bolts **69**.

The wheel **13** is retained on the stub shaft **63** of the sliding block **48** by a collar **70** detachably secured to the stub shaft **63** by a bolt **71**.

The wheel **12**, in a manner similar to the wheel **13**, has a peripheral rim member **72** interconnected between two body members **73** and **74** interconnected together by a plurality of bolts **75**. The body member **74** has a hub **76** splined to the shaft **37** of the motor **38** and retained thereon by a set screw **77** carried by the hub **76**.

The wheels **12** and **13** are so constructed and arranged that the same have axes of rotation disposed parallel to each other whereby the rims **65** and **72** thereof are disposed in aligned relation.

Therefore, when it is desired to assemble together relatively thick extrusions or articles between the wheels **12** and **13** of the apparatus **10**, the adjusting screw **56** is telescoped the desired distance within the sliding member **48** through the threaded relation therewith whereby the space between the wheels **12** and **13** will be greater than that that illustrated in the drawings when the cam **42** is in the rotational position illustrated because the compression spring **58** will maintain the enlarged head **57** of the adjusting screw **56** in engagement with the cam **42**. Conversely, by extending the adjusting screw **56** outwardly from the sliding member **48**, the space between the wheels **12** and **13** can be decreased to the desired size for any particular rotational position of the cam **42** to accommodate extrusions or articles of varying thicknesses.

As illustrated in FIGURES 1 and 5, the shaft assembly **43** has a pair of opposed ends **78** and **79** extending from opposite ends of the apparatus **10** and respectively interconnected to handles **80** and **81**. In this manner, the operator of the apparatus **10** can grasp the handles **80** and **81** to rotate the shaft assembly **43** in any desired direction whereby the cam **42** is rotated therewith and causes movement of the sliding block **48** in a radial direction toward or away from the axis of rotational of the wheel **12**. Thus, the gap or space between the wheels **12** and **13** can be selectively varied by movement of the handles **80** and **81**.

A pair of rollers **82** and **83** are respectively carried by the apparatus **10** and project outwardly from the plate **34** thereof in the manner illustrated in FIGURES 4 and 6, the rollers **82** and **83** respectively being carried by brackets **84** and **85** secured to the top plate **34** by a plurality of bolts **86** and **87**.

Each mounting bracket **84** and **85** comprises a base **88** secured to the plate **34** by the bolts **86** or **87** and having a pair of ears or lugs **89** extending outwardly therefrom. The outer ends of the lugs **89** are provided with suitable apertures to receive bolts **90**, the bolts **90** passing through suitable bores in the rollers **82** and **83** whereby the rollers **82** and **83** are rotatably mounted between the lugs **89** of the brackets **84** and **85**.

The rollers **82** and **83** are so constructed and arranged, that the axes of rotation thereof are disposed perpendicular to the axes of rotation of the wheels **12** and **13** and span the gap or space between the wheels **12** and **13** in the manner illustrated in FIGURE 4.

A plurality of wheels or rollers 91 are rotatably carried on shafts 92 supported by the frame means 11 of the apparatus 10, the rollers 91 projecting beyond the bottom wall means 30 of the frame means 11 in the manner illustrated in FIGURE 4. In this manner, the apparatus 10 can be supported by the rollers 91 on any desired supporting structure so that the apparatus 10 can be moved on the supporting structure with a minimum of effort.

The operation of the apparatus 10 will now be described.

Assuming that it is desired to utilize the apparatus 10 to interconnect together the partially assembled extrusions 14*a* and 14*b* illustrated in FIGURE 2, the shaft construction 43 is rotated by the handles 80 and 81 to a position whereby the cam means 42 permits the wheels 12 and 13 to be spaced apart from each other a distance sufficient to permit one end of the partially assembled legs 16 and 17 of the extrusions 14*a* and 14*b* to be inserted therebetween.

Thereafter, the cam means 42 is rotated by the handles 80 and 81 in a direction to cause the wheel 13 to be moved toward the wheel 12 in the manner illustrated in FIGURE 4 to compact together those portions of the legs 16 and 17 of the extrusions 14*a* and 14*b* disposed between the wheels 12 and 13 whereby those portions are mechanically interlocked together.

With the wheels 12 and 13 disposed in this latter position, the motor 38 is operated to cause rotation of the wheel 12 whereby the wheel 12 through frictional engagement with the extrusions 14*a* causes either the partially assembled extrusions 14*a* and 14*b* to move relative to the apparatus 10 or the apparatus 10 to move relative to the extrusions 14*a* and 14*b* on the rollers 91 thereof.

In either event, the rotation of the wheel 12 causes relative movement between the wheels 12 and 13 and the extrusions 14*a* and 14*b* so that the wheels 12 and 13 counter rotate and progressively interlock the legs 16 and 17 of the extrusions 14*a* and 14*b* together throughout the length thereof as the extrusions 14*a* and 14*b* pass between the wheels 12 and 13.

Therefore, it can be seen that the apparatus 10 progressively rolls together the interlocking portions of the extrusions 14*a* and 14*b* in a relatively simple and nontime consuming manner.

In order to positively align the extrusions 14*a* and 14*b* between the wheels 12 and 13 of the apparatus 10, the flanges 23 and 22 of the extrusion 14*a* are disposed against the rollers 82 and 83 of the apparatus 10 so that the proper portions of the legs 16 and 17 of the extrusions 14*a* and 14*b* are accurately located between the rolls 12 and 13. In this manner the wheels 12 and 13 can accomplish their interlocking function as set forth above.

Thus, it can be seen that the apparatus of this invention provide novel means for interlocking together interlocking extrusions or the like in a simple and rapid manner.

While the form of the invention now preferred has been disclosed as required by the statutes, other forms may be used, all coming within the scope of the claims which follow.

What is claimed is:

1. Apparatus for assembling together interlocking extrusions or the like and comprising frame means, a first wheel carried by said frame means and having an axis of rotation, a member carried by said frame means and movable toward and away from said axis of rotation of said first wheel, means interposed between said member and said frame means tending to move said member away from said axis of rotation of said first wheel, an adjusting screw extending from said member on a side thereof opposed to said interposed means, a second wheel rotatably carried by said member and having an axis of rotation disposed parallel to said axis of rotation of said first wheel, and a rotatable cam carried by said frame means and disposed in engagement with said adjusting screw to selectively vary the space between said wheels.

2. Apparatus as set forth in claim 1 wherein a shaft carries said cam and is rotatably carried by said frame means, said shaft having means to rotate the same.

3. Apparatus as set forth in claim 1 wherein a shaft carries said cam and is rotatably carried by said frame means, said shaft having a pair of opposed ends projecting from said frame means, and a pair of handles are respectively connected to said opposed ends of said shaft to rotate the same.

4. Apparatus for assembling together interlocking extrusions or the like and comprising frame means, a first wheel rotatably carried by said frame means and having an axis of rotation, a member slidably carried by said frame means and movable radially toward and away from said axis of rotation of said first wheel, a second wheel rotatably carried by said member and having an axis of rotation disposed parallel to said axis of rotation of said first wheel, and means operatively interconnected to said member to selectively move said member toward and away from said axis of rotation of said first wheel to selectively vary the space between said wheels, said last-named means including means disposed between said frame means and said member and continuously tending to move said wheels apart.

5. Apparatus for assembling together interlocking extrusions or the like and comprising frame means, a first wheel rotatably carried by said frame means and having an axis of rotation, a member slidably carried by said frame means and movable radially toward and away from said axis of rotation of said first wheel, a second wheel rotatably carried by said member and having an axis of rotation disposed parallel to said axis of rotation of said first wheel, and means operatively interconnected to said member to selectively move said member toward and away from said axis of rotation of said first wheel to selectively vary the space between said wheels, said last-named means including means disposed between said frame means and said member and continuously tending to move said wheels apart, said last-named means including a rotatable cam carried by said frame means and operatively interconnected to said member.

6. Apparatus for assembling together interlocking extrusions or the like and comprising frame means, a first wheel rotatably carried by said frame means and having an axis of rotation, a member slidably carried by said frame means and movable radially toward and away from said axis of rotation of said first wheel, a second wheel rotatably carried by said member and having an axis of rotation disposed parallel to said axis of rotation of said first wheel, and means operatively interconnected to said member to selectively move said member toward and away from said axis of rotation of said first wheel to selectively vary the space between said wheels, said last-named means including means disposed between said frame means and said member and continuously tending to move said wheels apart, said last-named means including a rotatable cam carried by said frame means and an adjustable screw carried by said member, said screw engaging said cam.

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WILLIAM FELDMAN, *Primary Examiner.*

WHITMORE A. WILTZ, *Examiner.*