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(54) **MODULAR SADDLE FOR PIPE CLAMP**

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(57) **ABSTRACT**

A clamp saddle for attachment to a pipe clamp that allows the clamp to be used for plugging leaks in different diameters of pipe is disclosed. The clamp saddle includes a semi-circular main body that is conformed to a specific pipe diameter. An attachment mechanism on the main body that interchangeably connects to an arm of a clamp. A different diameter clamp saddle may replace the initial saddle to allow the clamp to be used for a different diameter pipe.

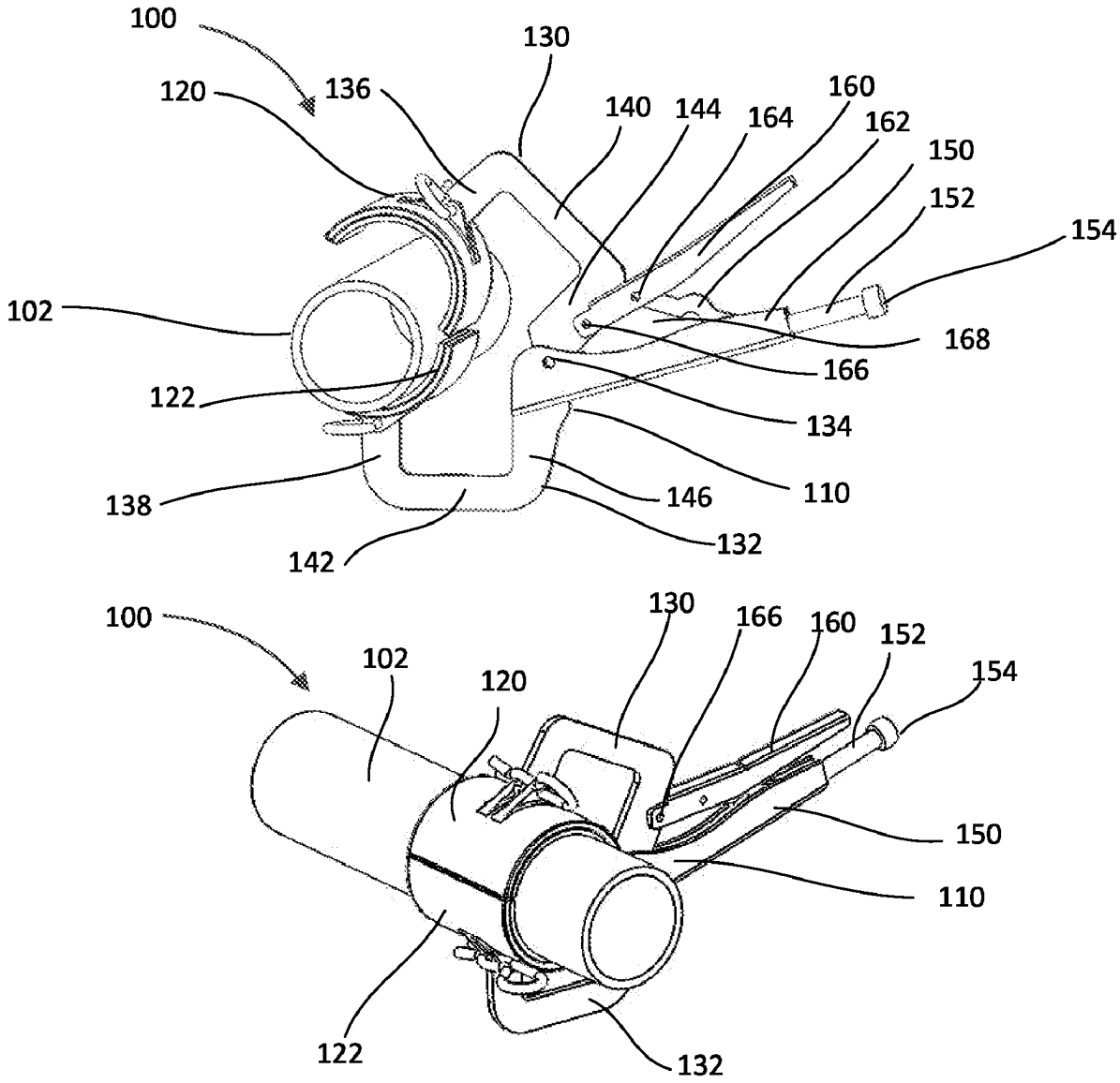


FIG. 1A

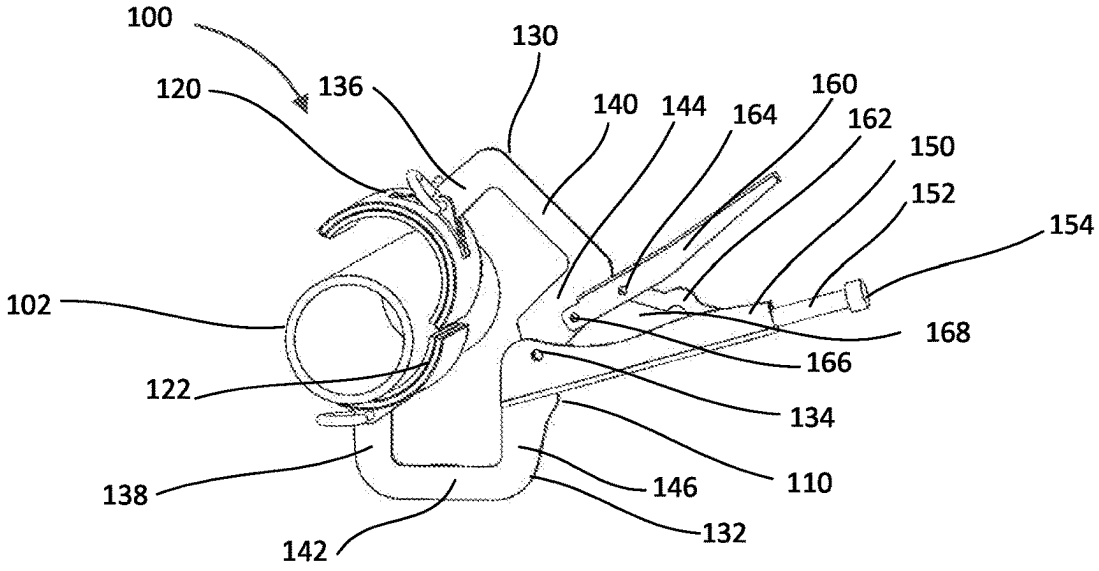


FIG. 1B

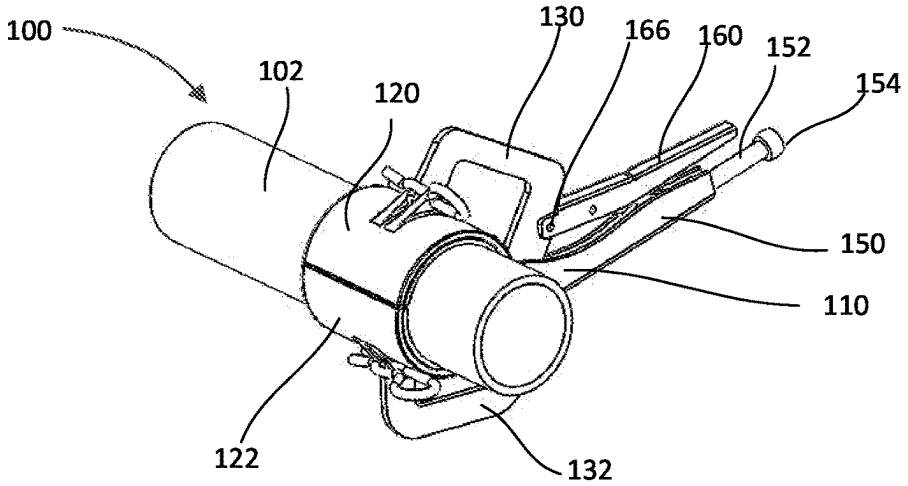


FIG. 1C

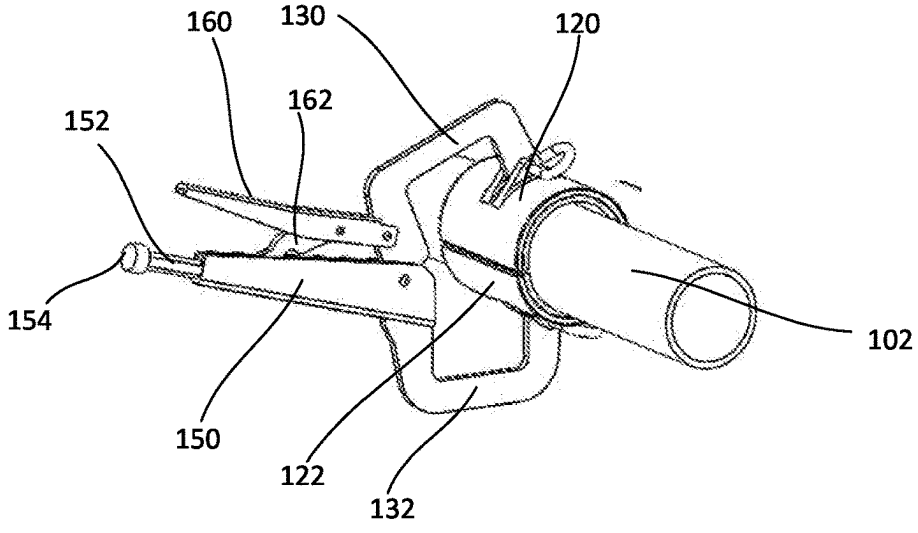


FIG. 2

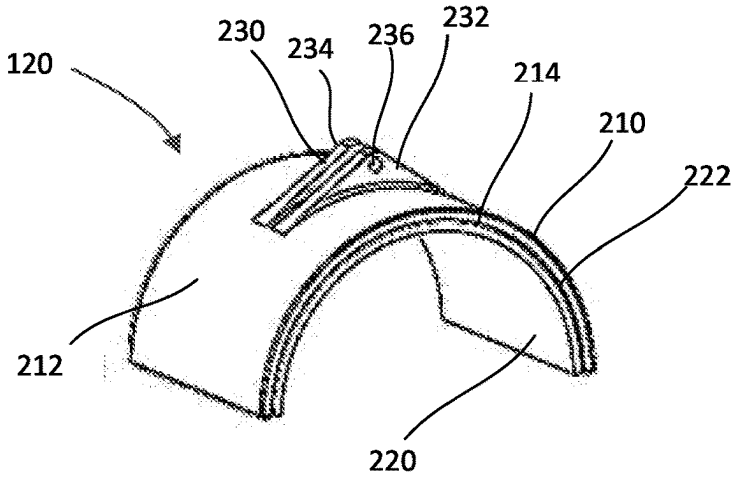

120
230
234
236
232
214
210
222
212
220

FIG. 3

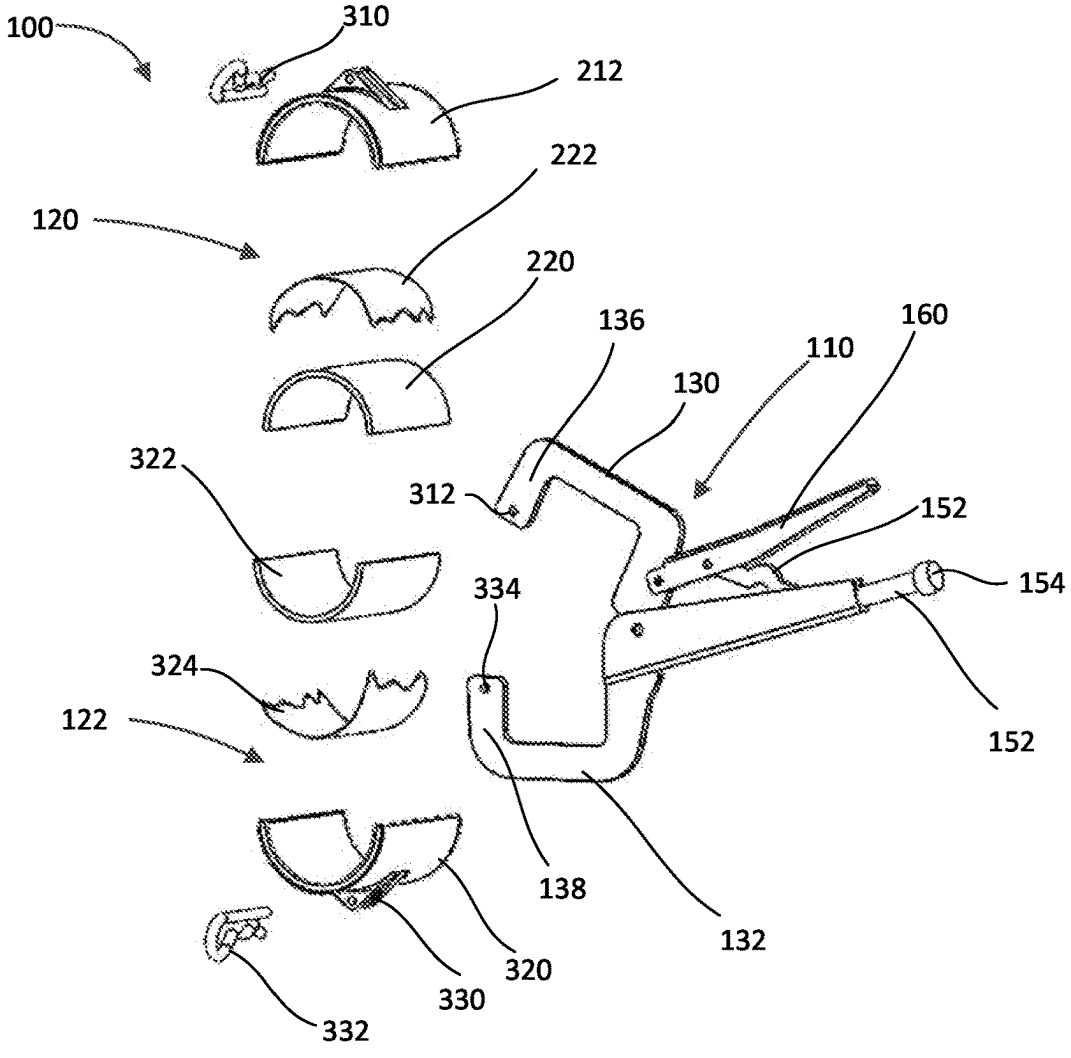

100
310
212
222
120
220
136
160
110
130
322
312
152
154
334
324
122
152
138
132
320
330
332

FIG. 4A

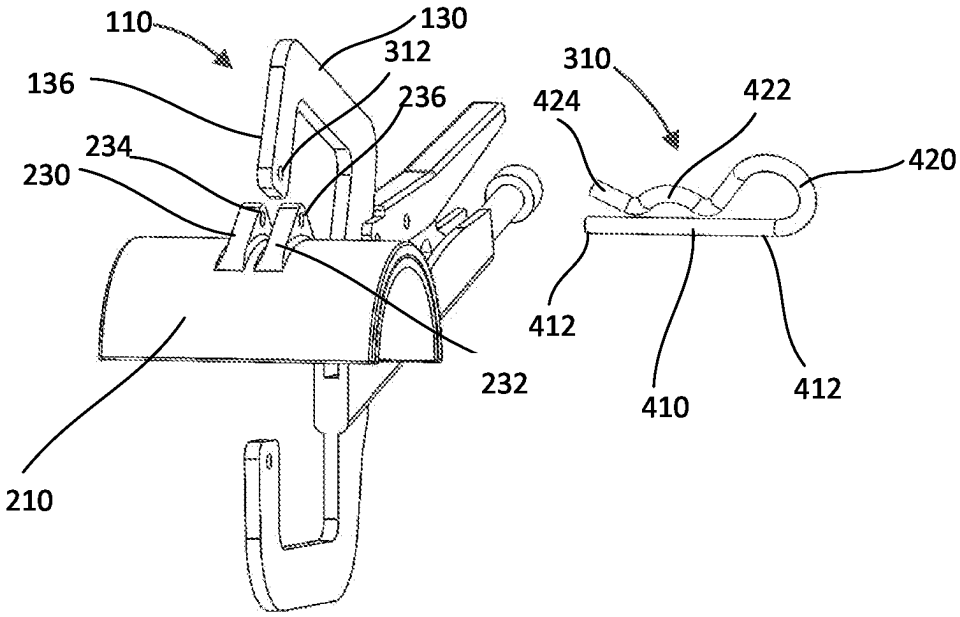

110
130
312
136
236
310
424
422
234
230
420
412
232
410
412
210

FIG. 4B

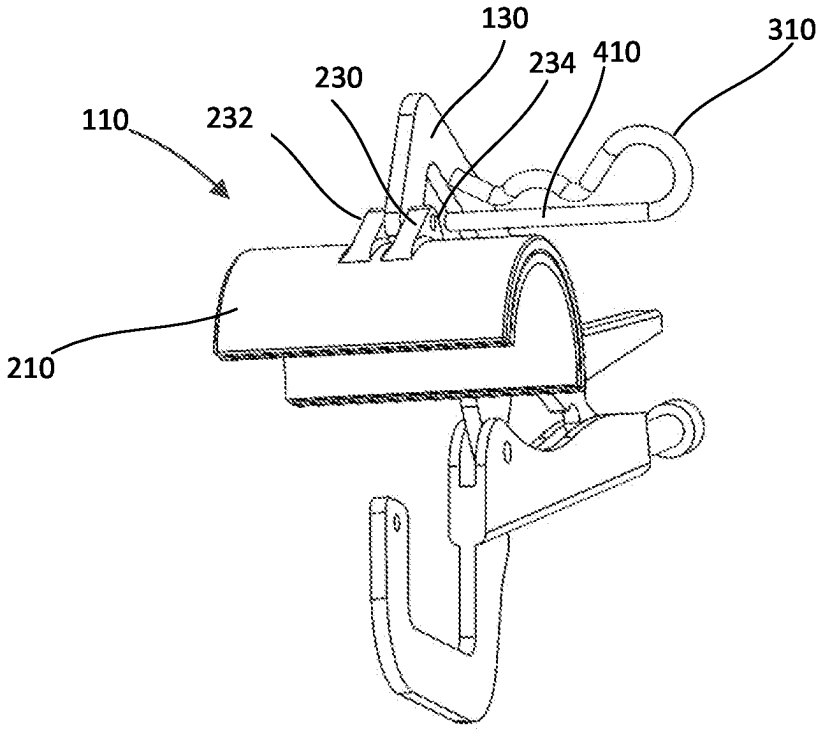

130
310
234
410
230
110
232
210

FIG. 4C

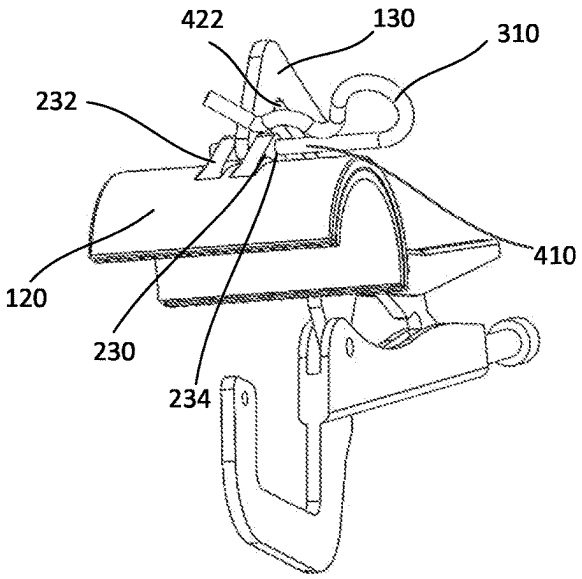


FIG. 4D

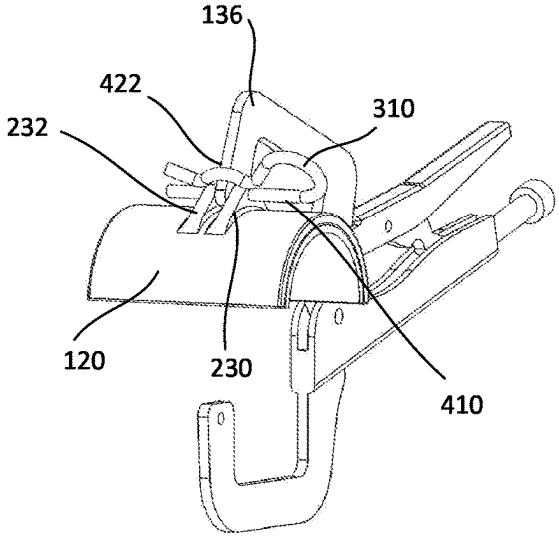


FIG. 5

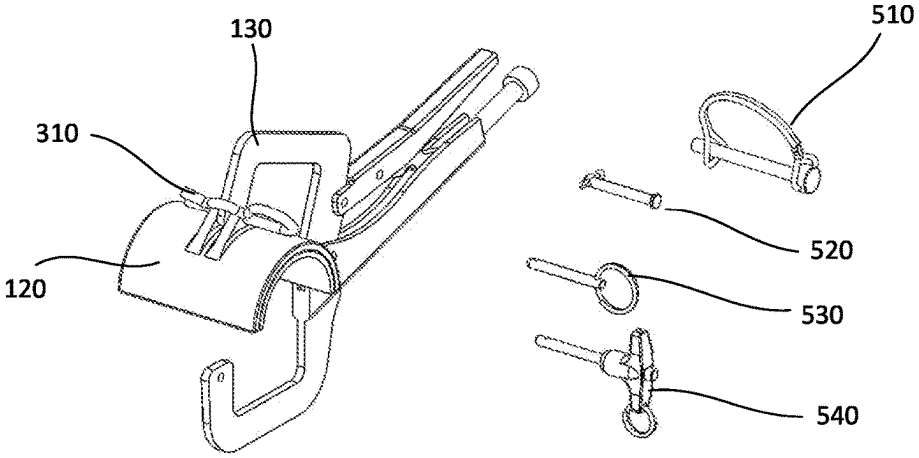


FIG. 6A

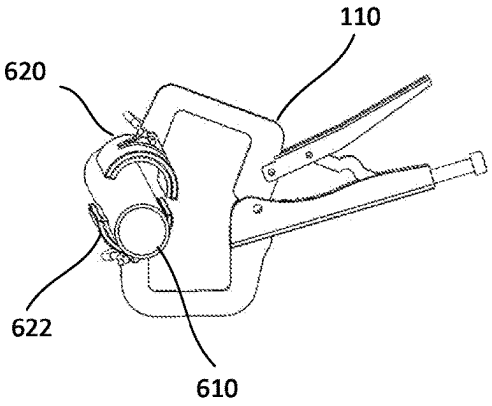


FIG. 6B

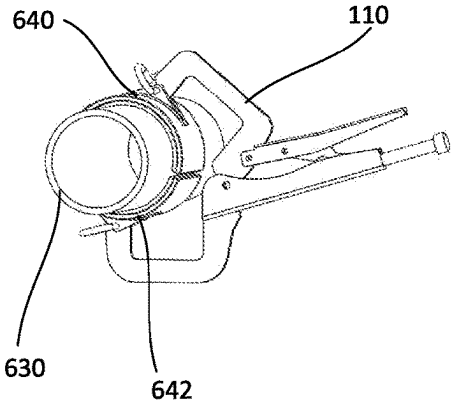


FIG. 7A

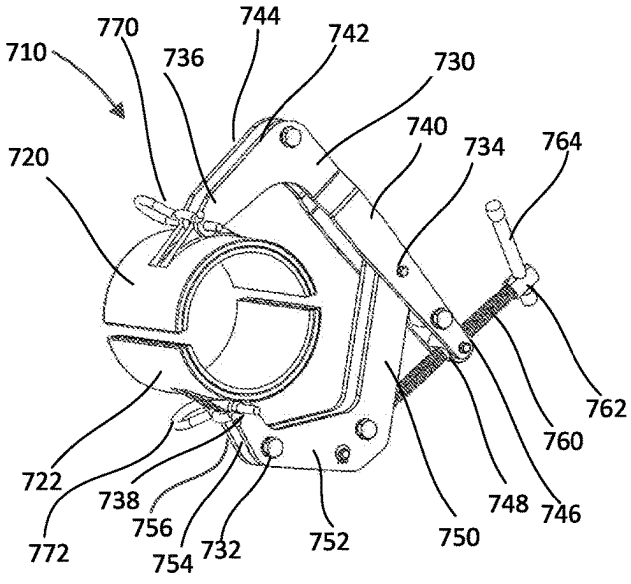


FIG. 7B

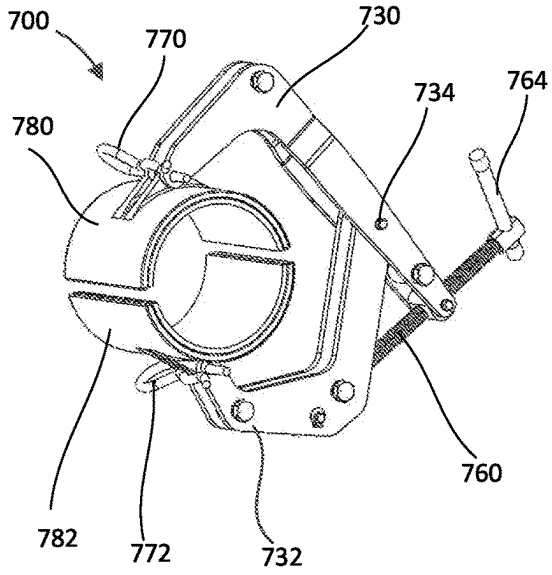
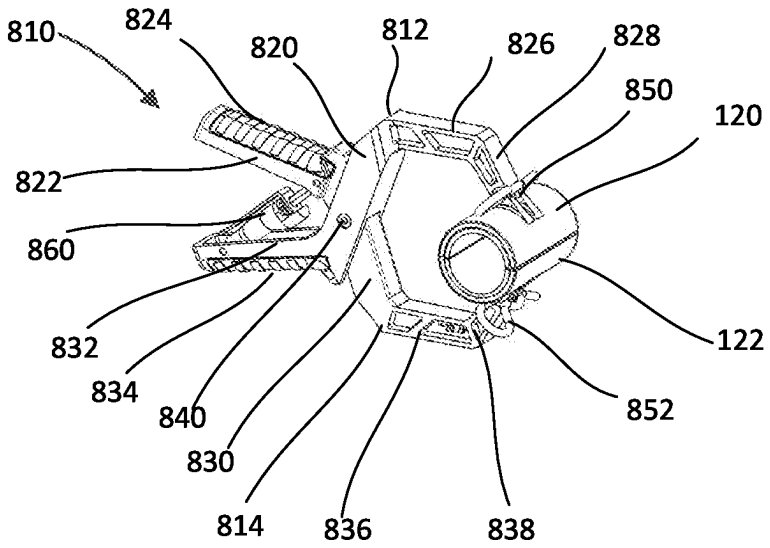


FIG. 8


810
824
820
812
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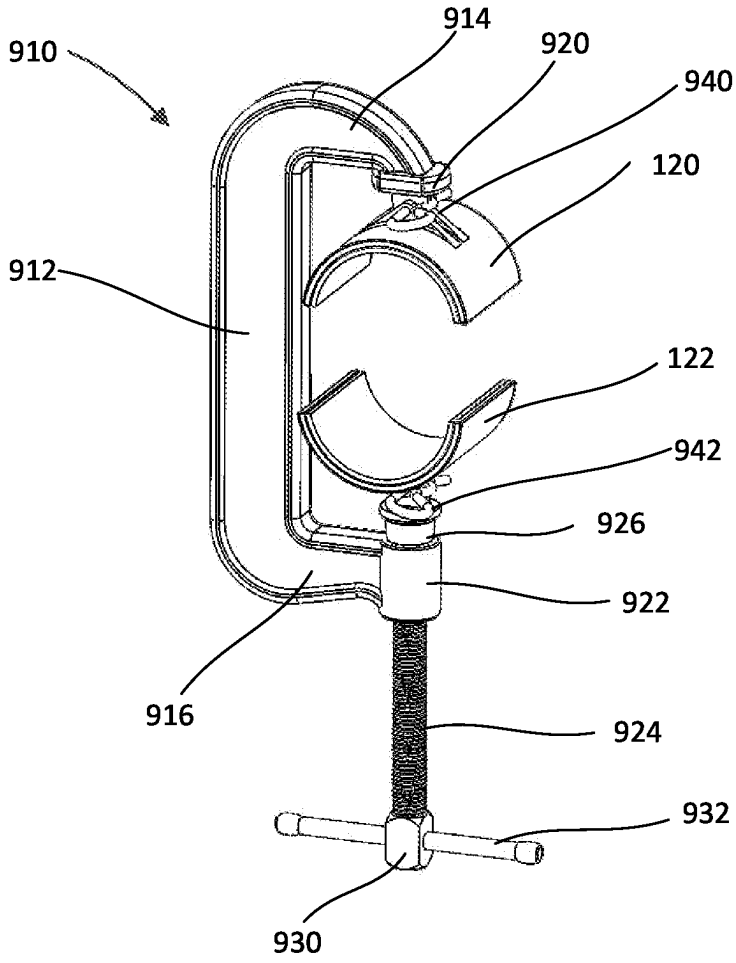
850
120
822
860
832
834
840
830
814
836
838
852
122

FIG. 9


910
914
920
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120
912
122
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930

MODULAR SADDLE FOR PIPE CLAMP

TECHNICAL FIELD

[0001] The present disclosure relates generally to a saddle device for pipe clamp. More particularly, aspects of this disclosure relate to a modular saddle allowing adaptable use of a clamp for pipe leaks on different diameter pipes.

BACKGROUND

[0002] Pipes are well known conduits for liquids or gasses. One well-known problem is when a pipe begins to leak liquids or gasses through a pinhole sized rupture. Emergency pipe repairs are necessitated by such leaks in a pipe. It is desirable that a temporary repair be made that plugs the leak to allow the pipe to continue to function. On discovery of the leak location, a user will typically apply a covering over the area of pipe where the leak occurs. The covering then requires a clamp that seals the leak by applying pressure to the covering. This allows flow to continue through the pipe without leaking out of the pinhole. The short term covering material held in place with the clamp allows the pipe to continue functioning until a more permanent repair such as replacing the pipe may be scheduled.

[0003] The problem with current clamping techniques is that they require tools such as channel locks, sockets, crescent wrenches, and open end wrenches to be employed. Further, clamps must be adapted to match the covering materials and specific diameter pipes. Such adaptations are sometimes ineffective in plugging leaks. Current methods require tools for the installation of the clamp. Such tools are cumbersome and require both hands for installation.

[0004] Thus, there is a need for a device that allows any type of clamp to be used in conjunction with preventing pipe leaks. There is another need for a clamp saddle that has sufficient adhesion to a pipe to prevent a pipe leak.

SUMMARY

[0005] One disclosed example is clamp saddle for attachment to a pipe clamp. The clamp saddle has a semi-circular main body that is conformed to a specific pipe diameter. An attachment mechanism on the main body interchangeably connects to an arm of a clamp.

[0006] A further implementation of the example clamp saddle is where the clamp is one of the group consisting of a C-clamp, a plier clamp, a twist clamp, or a hand clamp. Another implementation is where the clamp further has another arm that may be connected to another saddle. Another implementation is where the example clamp saddle includes an interior surface layer fabricated from one of nitrile rubber, silicone rubber, or neoprene rubber that engages the pipe surface. Another implementation is where the interior surface layer is attached to the interior surface of the saddle via an adhesive. Another implementation is where the clamp saddle is fabricated from aluminum or steel. Another implementation is where the pipe diameter is one of 0.5 inch, 0.75 inch, 1 inch, 1.25 inches, 1.5 inches, 2 inches, 2.5 inches, 3 inches, or 4 inches. Another implementation is where the pipe is one of plastic pipe, steel pipe, or copper pipe. Another implementation is where the attachment mechanism is a pin mechanism, and wherein the saddle includes brackets with a hole aligned to a hole on the arm of the clamp, where a shaft of the pin mechanism is inserted in the holes.

[0007] Another disclosed example is a clamp for plugging a pipe leak. The clamp includes a first arm having a first end and a second arm having a second end. A first saddle includes a semi- semi-circular main body that is conformed to a specific pipe diameter. The first saddle includes an attachment mechanism on the main body that attaches to the first end of the first arm. A second saddle has a semi-circular main body that is conformed to the specific pipe diameter. The second saddle has an attachment mechanism on the main body that attaches to the second end of the second arm.

[0008] A further implementation of the example clamp is where the clamp is one of the group consisting of a C-clamp, a plier clamp, a twist clamp, or a hand clamp. Another implementation is where the first and second saddles each include an interior surface layer fabricated from one of nitrile rubber, silicone rubber, or neoprene rubber that engages the pipe surface. Another implementation is where the interior surface layer is attached to the interior surface of the respective first and second saddles via an adhesive. Another implementation is where the first and second saddle are fabricated from aluminum or steel. Another implementation is where the pipe diameter is one of 0.5 inch, 0.75 inch, 1 inch, 1.25 inches, 1.5 inches, 2 inches, 2.5 inches, 3 inches, or 4 inches. Another implementation is where the pipe is one of plastic pipe, steel pipe, or copper pipe. Another implementation is where the attachment mechanism of the first and second saddles is a pin mechanism. The first and second saddles each include brackets with a hole aligned to a hole on the respective first and second arms. The pin mechanisms include a respective shaft that may be inserted in the holes.

[0009] Another disclosed example is a kit for patching pipes of different diameters. The kit has a first set of saddles. Each of the saddles include a semi-circular main body that is conformed to a specific first pipe diameter. Each of the saddles of the first set have an attachment mechanism on the main body attaches to an end of an arm of a clamp. The kit has a second set of saddles. Each of the saddles of the second set include a semi-circular main body that is conformed to a specific second pipe diameter. The second set of saddles also each include an attachment mechanism on the main body that attaches to the end of the arm of the clamp.

[0010] The above summary is not intended to represent each embodiment or every aspect of the present disclosure. Rather, the foregoing summary merely provides an example of some of the novel aspects and features set forth herein. The above features and advantages, and other features and advantages of the present disclosure, will be readily apparent from the following detailed description of representative embodiments and modes for carrying out the present invention, when taken in connection with the accompanying drawings and the appended claims.

BRIEF DESCRIPTION OF THE DRAWINGS

[0011] The disclosure will be better understood from the following description of exemplary embodiments together with reference to the accompanying drawings, in which:

[0012] FIG. **1**A is a perspective view of a C-clamp locking plier and an example set of saddles for stopping leaks in a pipe;

[0013] FIG. **1**B is a perspective view of the C-clamp locking plier in FIG. **1**A that is locked in a closed position with the saddles plugging a leak in the pipe;

[0014] FIG. **1**C is a reverse perspective view of the C-clamp locking plier in FIG. **1**A that is locked in the closed position;

[0015] FIG. **2** is a close up perspective view of an example saddle in FIGS. **1**A-**1**B that may be attached to different types of clamps;

[0016] FIG. **3** is an exploded perspective view of the components of the clamp and saddles in FIG. **1**;

[0017] FIG. **4**A is a close-up exploded perspective view of the saddle, the pin and one of the arms of the clamp in FIG. **1**;

[0018] FIG. **4**B is a close-up perspective view showing the saddle aligned with the arms of the clamp;

[0019] FIG. **4**C is a close-up perspective view showing the pin mechanism being inserted to attach the saddle to the clamp arm;

[0020] FIG. **4**D is a close-up perspective view showing the pin mechanism being fully inserted;

[0021] FIG. **5** shows a set of alternative pin mechanisms that may be used to join the example saddle to a clamp arm;

[0022] FIG. **6**A is a perspective view of the C-clamp locking plier in FIG. **1**A fitted with different diameter saddles to plug a leak in a different diameter pipe;

[0023] FIG. **6**B is a perspective view of the C-clamp locking plier in FIG. **1**A fitted with a second set of different diameter saddles to plug a leak in a second different diameter pipe;

[0024] FIGS. **7**A-**7**B are perspective views of a twist type clamp with example saddles of different diameters to plug leaks in different diameter pipes;

[0025] FIG. **8** is a C-clamp fitted with the example saddles to plug leaks in a pipe; and

[0026] FIG. **9** is a hand clamp fitted with the example saddles to plug leaks in a pipe.

[0027] The present disclosure is susceptible to various modifications and alternative forms, and some representative embodiments have been shown by way of example in the drawings and will be described in detail herein. It should be understood, however, that the invention is not intended to be limited to the particular forms disclosed. Rather, the disclosure is to cover all modifications, equivalents, and alternatives falling within the spirit and scope of the invention as defined by the appended claims.

DETAILED DESCRIPTION OF THE ILLUSTRATED EMBODIMENTS

[0028] The present inventions can be embodied in many different forms. Representative embodiments are shown in the drawings, and will herein be described in detail. The present disclosure is an example or illustration of the principles of the present disclosure, and is not intended to limit the broad aspects of the disclosure to the embodiments illustrated. To that extent, elements and limitations that are disclosed, for example, in the Abstract, Summary, and Detailed Description sections, but not explicitly set forth in the claims, should not be incorporated into the claims, singly or collectively, by implication, inference, or otherwise. For purposes of the present detailed description, unless specifically disclaimed, the singular includes the plural and vice versa; and the word "including" means "including without limitation." Moreover, words of approximation, such as "about," "almost," "substantially," "approximately," and the like, can be used herein to mean "at, near, or nearly at," or "within 3-5% of," or "within acceptable manufacturing tolerances," or any logical combination thereof, for example.

[0029] The present disclosure relates to an emergency pipe repair tool system that may be adapted to different diameters of pipes and use different types of clamps. The pipe repair tool system includes saddles that may be interchangeably attached to the arms of a clamp to cover an area of a pipe with a leak. The clamp may then be locked in place by the clamp to provide pressure to the saddles. The example saddles clamp down on the pipe in order to create a temporary repair to pinhole leaks in the pipe. The example saddles include a resilient member that allows a better seal with the pipe to plug such leaks. The example saddle also includes an attachment mechanism that allows easy modular attachment and removal from different types of clamps. Thus, one clamp may be used with different diameter pipes by simply interchangeably attaching saddles having a diameter that matches the pipe diameter.

[0030] FIG. **1**A shows an example tool system **100** is used to temporarily plug a leak in a pipe **102**. In this example, the pipe **102** is a 2 inch diameter pipe. The tool system **100** includes a clamp **110** fitted with example interchangeable saddles **120** and **122**. In this example, the saddles **120** and **122** have a semi-circular shape that matches the 1.25 inch of diameter of the pipe **102**. As will be explained, different diameter saddles may be selected for the use of the clamp for plugging leaks in different diameter pipes by interchanging the saddles **120** and **122** with saddles of different diameters. The saddles **120** and **122** may also be interchanged with each other. In this example, the clamp **110** is a C-clamp locking plier clamp having an upper arm **130** and a lower arm **132**. The arms **130** and **132** are generally C-shaped and rotatably coupled via a pin **134** that allows the rotation of the arms **130** and **132** relative to each other. The arms **130** and **132** have corresponding mandible members **136** and **138**. As will be explained the saddles **120** and **122** may be interchangably attached and removed on connector mechanisms on the ends of the mandibles **136** and **138**. The arms **130** and **132** have corresponding opposite actuator members **140** and **142** that are joined to the respective mandibles **136** and **138** via connector members **144** and **146**.

[0031] A handle member **150** is rotatably attached to the pin **134**. The handle member **150** has a threaded interior surface that holds a drive shaft **152**. One of the drive shaft **152** moves linearly within the handle member **150** when the drive shaft **152** is rotated. The opposite end of the shaft **152** is connected to a dial **154** that allows a user to rotate the shaft **152**. A lever **160** is rotatably attached to an actuator member **162**. One end of the actuator member **162** is attached to the end of the shaft **152** in the handle member **150**. The opposite end of the actuator member **162** is rotatably attached to the lever **160** via a pin **164** that is located in the middle of the lever **160**. Another pin **166** rotatably attaches the lever **160** to the support **144** of the upper arm **130**. The rotation of the shaft **152** allows the transversal of the actuator member **162** along the length of the handle member **150**. A spring **168** is attached between the handle member **150** and the lever **160** to prevent the lever **160** to be fully rotated to contact the handle member **150**. The movement of the actuator member **162** either moves the lever **160** to close the arm **130** or open the arm **132**. Thus, when a user rotates the dial **154** clockwise, the rotation of the shaft **152** pushes the actuator member **162** toward the pivot **134**. The movement of the

actuator member **162** causes the lever **160** to rotate counter-clockwise around the pin **166**, thus moving the arm **130** toward the other arm **132**. This creates pressure on the pipe **102** between the saddles **120** and **122** and thus creates the seal to prevent leaks.

[0032] FIG. **1**B is a perspective view of the clamp **110** engaged with the pipe **102**. FIG. **1**C is a reverse perspective view of the clamp **110** engaged with the pipe **102**. As shown in FIGS. **1**B-**1**C, a user can fully actuate the arms **130** and **132** by rotating the shaft **152** to allow the saddles **120** and **122** to grip the pipe **102**. As the shaft **152** is rotated clockwise, more pressure on the pipe **102** is applied by the saddles **120** and **122**. When force is applied to the saddles **120** and **122** via the arms **130** and **132**, the saddles **120** and **122** cover leaks in the area of the pipe as shown in FIGS. **1**B-**1**C. The pressure from the clamp **110** thus prevents liquid or gasses flowing through the pipe **102** from leaking. The shaft **152** is fixed in place in the handle member **150** and thus consistent pressure is applied through the arms **130** and **132** to plug the leak in the pipe **102**. Additional coils with appropriate tightening devices may be applied around the saddles **120** and **122** to add additional pressure to plug the leak. The clamp **110** thus may be left on the pipe **102** for a relatively long period of time to allow the pipe **102** to function without leaking. Alternatively, with other attachment mechanisms such as coils applied to join the saddles **120** and **122**, the clamp **110** may be detached from the saddles **120** and **122** and other saddles may be attached for using the clamp **110** for another pipe.

[0033] As explained above, rotation of the dial **154** moves the connection ends **136** and **138** of the arms **130** and **132** toward each other providing pressure on the saddles **120** and **122** to hold the pipe **102** as shown in FIG. **1**B. When the dial **154** is twisted in a counter-clockwise direction, the actuator member **162** is pulled away from the pivot point **134**. This causes the lever **160** to rotate in a clockwise direction around the pin **166**, which pulls the arm **130** away from the arm **132**. The respective mandibles **136** and **138** are thus moved away from each other, thus releasing the saddles **120** and **122** from the pipe **102**. This allows the clamp **110** to be removed from the pipe **102** for a more permanent repair of the leak.

[0034] FIG. **2** is a close up perspective view of the saddle **120**. The saddle **120** is a modular component that may be attached and detached to different types of clamps such as the clamp **110**. The saddle **120** includes a main semi-circular body **210** of sufficient thickness to withstand a certain amount of pressure to contain pipe leaks. In this example, the semi-circular body **210** may be fabricated from a high strength material such as die cast **319** aluminum or steel. The diameter of the semi-circular body **210** may be selected to match the diameter of known common pipe diameters. Thus, any diameter pipe may be plugged using a clamp and by selecting the appropriate saddle having the matching diameter to the pipe. Thus, common pipe diameters such as 1¼", 1½", 2", 2½", 3" and 4" for plastic pipes, and ½", ¾" and 1"diameters for copper pipes may have saddles of corresponding diameters in the form of a patch kit.

[0035] The semi-circular body **210** has an exterior surface **212** and an interior surface **214**. A resilient interior layer **220** is attached to the interior surface **214** via an adhesive layer **222**. In this example, the resilient layer **220** is nitrile rubber, silicone rubber, or neoprene rubber sheeting. In this example, the resilient interior layer **220** is attached to the interior surface **214** via a self adhesive backing on the interior layer **220** or an applied adhesive such as Pliobond 25 brush on adhesive. The resilient interior layer **220** is compressed by the force applied to the clamp **120** to assist in sealing off the leak.

[0036] The exterior surface **212** includes parallel brackets **230** and **232**. Each of the brackets **230** and **232** include respective holes **234** and **236** that allow a pin mechanism to be used to attach the saddle **120** to a clamp arm such as the clamp arm **130** in FIG. **1**A. Thus, the brackets **230** and **232** form an attachment mechanism of the saddle **120**. Of course other attachment mechanisms may be used such as nuts and bolts or any other suitable attachment devices.

[0037] FIG. **3** is an exploded perspective view of the components of the saddles **120** and **122** in relation to the clamp **110**. A pin mechanism **310** is used to attach the saddle **120** to the mandible **136** of the arm **130**. The mandible **136** has a hole **312**. The hole **312** is aligned with the holes **134** and **136** of the brackets **130** and **132**. The pin mechanism **310** is then inserted and locks the saddle **120** to the mandible **136**. As shown in FIG. **3**, the saddle **122** is identical to the saddle **120** and includes a semi-circular main body **320**, a resilient interior layer **322** and an adhesive layer **324**. The saddle **122** also includes an attachment mechanism **330** having parallel brackets for a pin mechanism **332**. The mandible **138** of the bottom arm **132** includes a hole **334** for the insertion of the pin mechanism **332** to hold the saddle **122**.

[0038] FIG. **4**A is a close up exploded perspective view of the saddle **120**, the mandible **136**, and the pin mechanism **332**. As may be seen, the parallel brackets **230** and **232** are triangular shaped with the respective holes **234** and **236** in lateral alignment. The parallel brackets **230** and **232** are spaced apart sufficiently to accommodate the mandible **136** of the clamp arm **130**.

[0039] The pin mechanism **310** is a hitch pin clip. The pin mechanism **310** has a lateral shaft **410**. The shaft **410** has a free end **412** and an opposite end **414** that is connected to a curved section **420**. The section **420** includes a crimped section **422** and a free end **424**. The pin mechanism **310** is fabricated from a high strength metal such as steel.

[0040] FIG. **4**B shows the first step in attaching a saddle such as the saddle **120** to the clamp arm **130**. The mandible **136** includes the hole **312**. The saddle **120** is moved in position so the end of mandible **136** is positioned between the brackets **230** and **232**. The saddle **120** is positioned so the holes **234** and **236** of the brackets **230** and **232** are aligned with the hole **312** as shown in FIG. **4**B. The end **412** of the shaft **410** of the pin mechanism **310** is aligned with the hole **236** of the bracket **232**.

[0041] The end **412** is inserted in the hole **234** of the bracket **230** and the shaft **410** is inserted through the holes **234**, **312** and **236** as shown in FIG. **4**C. The shaft **410** thus joins the saddle **120** to the mandible **136**. The crimp section **422** is moved around the end of the mandible **136**.

[0042] FIG. **4**D shows the pin mechanism **310** fully inserted and thus connecting the saddle **120** to the mandible **136**. The shaft **410** has been fully inserted and rests in the holes **232**, **312**, and **326** thus joining the mandible **136** to the brackets **230** and **232**. The crimp section **422** rests on the edge of the mandible **136** to hold the pin mechanism **310** in place.

[0043] FIG. **5** shows a series of alternate pin mechanism that may be used for the pin mechanism **310**. Thus, any suitable pin mechanism that has a shaft that can be inserted

in the holes in the brackets of the saddle and the mandible of the clamp may be used. For example, pin mechanism **510**, which is a Hillman Round Lock pin clip may be used. Another type of pin **520**, which is a Clevis pin may be used. Still another pin mechanism **530**, which is a quick release pin may be used. Still another pin mechanism **540**, which is a quick release pin with handle may be used.

[0044] The example saddles such as the saddle **120** may be adapted for different diameter pipes. Thus, the clamp **110** may be used by interchanging the saddles **120** and **122** with different diameter saddles for a different diameter pipe. FIG. **6**A shows the clamp **110** in FIG. **1**A used to plug a leak in a 1.25 inch pipe **610**. In this example, saddles **620** and **622** are attached to the mandibles **136** and **138** of the clamp **110**. The saddles **620** and **622** have matching diameters to allow a fit with the 1.25 inch diameter pipe **610**. Thus, exchanging the saddles **120** and **122** in FIG. **1**A that are used for 2 inch pipe with the saddles **620** and **622** allow the clamp **110** to be used with a smaller diameter pipe such as the 1.25 inch pipe **610**. The same pin mechanisms may be used to attach the saddles **620** and **622** to the clamp arms **130** and **132**.

[0045] FIG. **6**B shows the clamp **110** in FIG. **1**A used to plug a leak in a 3 inch pipe **630**. In this example, saddles **640** and **642** are attached to the mandibles **136** and **138** of the clamp **110**. The saddles **640** and **642** have matching diameters to allow a fit with the 3 inch diameter pipe **630**. Thus, exchanging the saddles **120** and **122** in FIG. **1**A that are used for 2 inch pipe with the saddles **640** and **642** allow the clamp **110** to be used with a larger diameter pipe such as the 3 inch pipe **630**.

[0046] The example saddles may be adapted for use with different types of clamps. FIG. **7**A is a perspective view of a twist type clamp **710** that may be used in conjunction with the example saddles to plug a leak in a pipe. In this example, the pipe is a 2 inch diameter pipe.

[0047] The twist type clamp **710** is fitted with example saddles **720** and **722**. In this example, the saddles **720** and **722** have a semi-circular shape that matches the 2 inch of diameter of the pipe **710**. Similar to the saddles **120** and **122** in FIG. **1**A, the saddles **720** and **722** have a semi-circular main body with an attachment mechanism on the exterior surface and a resilient material adhered to the interior surface. The resilient material is used to contact the exterior of the pipe **710**.

[0048] In this example, the clamp **710** has an upper arm **730** and a lower arm **732**. The upper arm **730** has a general "L" shape while the arm **132** has a general C-shape. The two arms **730** and **732** are rotatably coupled via a pin **734** that allows the rotation of the arms **730** and **732** relative to each other. The arms **730** and **732** have corresponding mandible sections **736** and **738**. Similar to the above example, the saddles **720** and **722** may be attached and removed on connector mechanisms on the ends of the mandible sections **736** and **738**. In this example, the upper arm **730** has a main support section **740** that is attached to the mandible section **738**. The upper arm **730** has two parallel plates **742** and **744** that define the mandible section **738** and the main support section **738**. The pin **734** is mounted between the plates **742** and **744** in the main support section **740**. An end **746** of the main support section **740** holds a shaft guide **748**.

[0049] The lower arm **732** includes a main support section **750** that is connected via a connector section **752** to the mandible **738**. The sections **738**, **750** and **752** are formed by parallel plates **754** and **756**. A free end of the main support section **750** is inserted between the plates **742** and **744** of the upper arm **732**. The pin **734** is inserted through the plates **754** and **756** at the free end of the main support section **750** to allow the arms **730** and **732** to rotate relative to each other.

[0050] A shaft **760** has one end that is attached to the intersection between the main support section **750** and the connector section **752**. The shaft **760** has a threaded exterior surface that intermeshes with the interior surface of a hole bored through the shaft guide **748**. The opposite end of the shaft **760** is connected to a cylindrical socket **762**. A rod **764** is inserted in the socket **762** in perpendicular orientation to the shaft **760**.

[0051] In this example, the attachment mechanisms of the saddles **720** and **722** are the parallel brackets with a hole similar to those in the saddles **120** and **122** in FIG. **1**A. The parallel plates **742** and **744** at the end of the mandible **736** have a hole that may be aligned with the hole in the attachment mechanism of the saddle **720**. A pin mechanism **770** holds the saddle **720** to tend of the mandible **736**. Similarly, the parallel plates **756** and **756** at the end of the mandible **738** have a hole that allows a pin mechanism **772** to attach the saddle **122** to the mandible **738**.

[0052] The rod **764** allows a user to apply force to rotate the shaft **760**. When the rod **764** and shaft **760** are rotated clockwise, the shaft **762** moves the arm **732** to rotate and thus move the mandible **738** closer to the mandible **736**. This causes the saddles **720** and **722** to grip the pipe and thus seal leaks on the surface of the pipe covered by one of the saddles **720** or **722**. By turning the rod **764** counter-clockwise, the shaft **760** is rotated counter-clockwise and move the arm **732** in the opposite direction, thus increasing the gap between the saddles **720** and **722** and releasing the pipe.

[0053] As explained below, fitting saddles of different diameters allows the clamp **700** to be used to plug leaks in different diameter pipes. FIG. **7**B shows a perspective view of the twist type clamp **700** that is fitted with saddles **780** and **782** instead of saddles **720** and **722** to plug a leak in a different diameter pipe. In this example, the pipe is a 3 inch diameter pipe. In this example, the saddles **780** and **782** have a semi-circular shape that matches the 3 inch diameter of the pipe. The operation of the clamp **700** to plug a leak in the 3 inch pipe is described above.

[0054] FIG. **8** shows another example how the saddles **120** and **122** may be fit on different types of clamps. FIG. **8** shows a hand clamp **810** that has been fitted with the saddles **120** and **122** for the purposes of patching a leak in a pipe. The hand clamp **810** has two opposing arms **812** and **814**. The arm **812** has a main body member **820** with a handle section **822** and an extension section **824**. The handle section **822** has a ridged grip section **826**. The end of the extension section **824** is attached to a mandible **828**. Similarly, the arm **814** has a main body member **830** with a handle section **832** and an extension section **834**. The handle section **832** has a ridged grip section **836**. The end of the extension section **834** is attached to a mandible **838**. The arms **812** and **814** are attached to each via a pin **840** that extends through the main body members **820** and **830**. The arms **812** and **814** may be rotated relative to each other via the handle sections **822** and **832**.

[0055] Each of the mandibles **828** and **838** have a hole that may be aligned with holes on the mounting brackets of the respective saddles **120** and **122**. Pins **850** and **852** may be used to attach the saddles **120** and **122** to respective mandibles **828** and **838**.

[0056] Once the saddles **120** and **122** are attached to the mandibles **828** and **838**, the clamp **810** may be used to grip a pipe between the saddles **120** and **122**. A user may squeeze the handle sections **822** and **832** together to apply pressure on the pipe through the saddles **120** and **122** thereby plugging a leak. A locking mechanism **860** is located between the handle sections **822** and **832**. The locking mechanism **850** applies spring force to keep the handle sections **822** and **832** apart, thus forcing the mandibles **828** and **838** apart. The locking mechanism **850** may be actuated to keep the arms **812** and **814** in place thus locking the clamp **810** on the pipe.

[0057] FIG. **9** shows another example how the saddles **120** and **122** may be fit on different types of clamps. FIG. **9** shows a C-clamp **910** that has been fitted with the saddles **120** and **122**. The C-clamp **910** has a main body **912** with an upper arm **914** and a lower arm **916**. An end **920** of the upper arm **914** holds a fixed attachment bracket that allows attachment of the saddle **120**. The lower arm **916** has a cylindrical guide section **922** that holds a shaft **924**. One end of the shaft **924** is connected to a clamp holder **926** that includes mechanical features for attachment of the saddle **122**. The shaft **924** has a threaded exterior that allows the shaft **924** to engage a threaded interior surface of a hole in the guide section **922**. An opposite end **930** of the shaft **924** is connected to a cylindrical socket **930**. A rod **932** is inserted in the socket **930** in perpendicular orientation to the shaft **924**.

[0058] The saddles **120** and **122** matching the diameter of the pipe are installed on the end **920** and the clamp holder **926** via respective pins **940** and **942**. After the saddles **120** and **122** are attached, the clamp **910** and the saddle **120** and **122** are positioned around the pipe with the leak. By turning the rod **932** clockwise, the shaft **924** is rotated and moves the clamp holder **926** toward the end **920** of the upper arm **914**. Turning the shaft **924** further creates pressure on the pipe between the saddles **120** and **122** to seal the leak.

[0059] The example saddles in conjunction with an appropriate clamp is an emergency pipe repair tool for pipes of different materials such as steel, plastic, and copper pipe. The example clamp and saddle tool clamps down on the pipe in order to create a temporary repair to pin hole leaks in the pipe.

[0060] The example saddles are applied with different types of clamping devices such as locking pliers. The easy grip closing action of the locking pliers and other clamps is extremely user friendly. The example tool assembly has been tested and it has been determined that the assembly is effective with water leaks up to 250 PSI as well as air leaks to 135 PSI. The example tool allows instant temporary repair to minimize water damage to surrounding products and or machinery from leaking pipes. This allows for piping systems to be kept in use until a permanent repair can be done.

[0061] The tool is reusable, and no other tools are required to apply the tool system to plug leaks in pipes. The saddles may be provided in kits with saddles matching different common diameters of pipes. The kit may include the clamp, or the clamp may be available separately. For example, a kit may include saddles for 1 ¼", 1 ½", 2", 2 ½", 3" and 4" diameter plastic pipes allowing use for common diameter plastic pipes. The kit may also include saddles for ½", ¾" and 1" diameter copper pipes allowing use for common copper pipes.

[0062] The terminology used herein is for the purpose of describing particular embodiments only, and is not intended to be limiting of the invention. As used herein, the singular forms "a," "an," and "the" are intended to include the plural forms as well, unless the context clearly indicates otherwise. Furthermore, to the extent that the terms "including," "includes," "having," "has," "with," or variants thereof, are used in either the detailed description and/or the claims, such terms are intended to be inclusive in a manner similar to the term "comprising."

[0063] Unless otherwise defined, all terms (including technical and scientific terms) used herein have the same meaning as commonly understood by one of ordinary skill in the art. Furthermore, terms, such as those defined in commonly used dictionaries, should be interpreted as having a meaning that is consistent with their meaning in the context of the relevant art, and will not be interpreted in an idealized or overly formal sense unless expressly so defined herein.

[0064] While various embodiments of the present invention have been described above, it should be understood that they have been presented by way of example only, and not limitation. Although the invention has been illustrated and described with respect to one or more implementations, equivalent alterations and modifications will occur or be known to others skilled in the art upon the reading and understanding of this specification and the annexed drawings. In addition, while a particular feature of the invention may have been disclosed with respect to only one of several implementations, such feature may be combined with one or more other features of the other implementations as may be desired and advantageous for any given or particular application. Thus, the breadth and scope of the present invention should not be limited by any of the above described embodiments. Rather, the scope of the invention should be defined in accordance with the following claims and their equivalents.

What is claimed is:

1. A clamp saddle for attachment to a pipe clamp, the clamp saddle comprising:

a semi-circular main body that is conformed to a specific pipe diameter; and

an attachment mechanism on the main body that interchangeably connects to an arm of a clamp.

2. The clamp saddle of claim **1**, wherein the clamp is one of the group consisting of a C-clamp, a plier clamp, a twist clamp, or a hand clamp.

3. The clamp saddle of claim **1**, wherein the clamp further includes another arm that may be connected to another saddle.

4. The clamp saddle of claim **1**, further comprising an interior surface layer fabricated from one of nitrile rubber, silicone rubber, or neoprene rubber that engages the pipe surface.

5. The clamp saddle of claim **4**, wherein the interior surface layer is attached to the interior surface of the saddle via an adhesive.

6. The clamp saddle of claim **1**, wherein the clamp saddle is fabricated from aluminum or steel.

7. The clamp saddle of claim **1**, wherein the pipe diameter is one of 0.5 inch, 0.75 inch, 1 inch, 1.25 inches, 1.5 inches, 2 inches, 2.5 inches, 3 inches, or 4 inches.

8. The clamp saddle of claim **1**, wherein the pipe is one of plastic pipe, steel pipe, or copper pipe.

9. The clamp saddle of claim **1**, wherein the attachment mechanism is a pin mechanism, wherein the saddle includes brackets with a hole aligned to a hole on the arm of the clamp and wherein a shaft of the pin mechanism is inserted in the holes.

10. A clamp for plugging a pipe leak, the clamp comprising:

a first arm having a first end;

a first saddle including a semi-circular main body that is conformed to a specific pipe diameter; and an attachment mechanism on the main body that attaches to the first end of the first arm;

a second arm having a second end; and

a second saddle including a semi-circular main body that is conformed to the specific pipe diameter; and an attachment mechanism on the main body that attaches to the second end of the second arm.

11. The clamp of claim **10**, wherein the clamp is one of the group consisting of a C-clamp, a plier clamp, a twist clamp, or a hand clamp.

12. The clamp of claim **10**, wherein the first and second saddles each include an interior surface layer fabricated from one of nitrile rubber, silicone rubber, or neoprene rubber that engages the pipe surface.

13. The clamp of claim **12**, wherein the interior surface layer is attached to the interior surface of the respective first and second saddles via an adhesive.

14. The clamp of claim **10**, wherein the first and second saddle are fabricated from aluminum or steel.

15. The clamp of claim **10**, wherein the pipe diameter is one of 0.5 inch, 0.75 inch, 1 inch, 1.25 inches, 1.5 inches, 2 inches, 2.5 inches, 3 inches, or 4 inches.

16. The clamp of claim **10**, wherein the pipe is one of plastic pipe, steel pipe, or copper pipe.

17. The clamp of claim **10**, wherein the attachment mechanism of the first and second saddles is a pin mechanism, wherein the first and second saddles each include brackets with a hole aligned to a hole on the respective first and second arm, and wherein the pin mechanisms include a respective shaft that may be inserted in the holes.

18. A kit for patching pipes of different diameters, the kit comprising:

a first set of saddles, each of the saddles including a semi-circular main body that is conformed to a specific first pipe diameter; and an attachment mechanism on the main body that attaches to an end of an arm of a clamp; and

a second set of saddles, each of the saddles including a semi-circular main body that is conformed to a specific second pipe diameter; and an attachment mechanism on the main body that attaches to the end of the arm of the clamp.

19. The kit of claim **18**, wherein the first and second diameters include one of 0.5 inch, 0.75 inch, 1 inch, 1.25 inches, 1.5 inches, 2 inches, 2.5 inches, 3 inches, or 4 inches.

20. The kit of claim **18**, further comprising a clamp having a first and a second arm, wherein each of the first set of saddles and each of second set of saddles are attachable to the first and the second arm of the clamp.

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