Nov. 17, 1953 E. F. PETERSON 2,659,119

WEAR RESISTING INSERT FOR CORE MAKING APPARATUS

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Fig. 1.

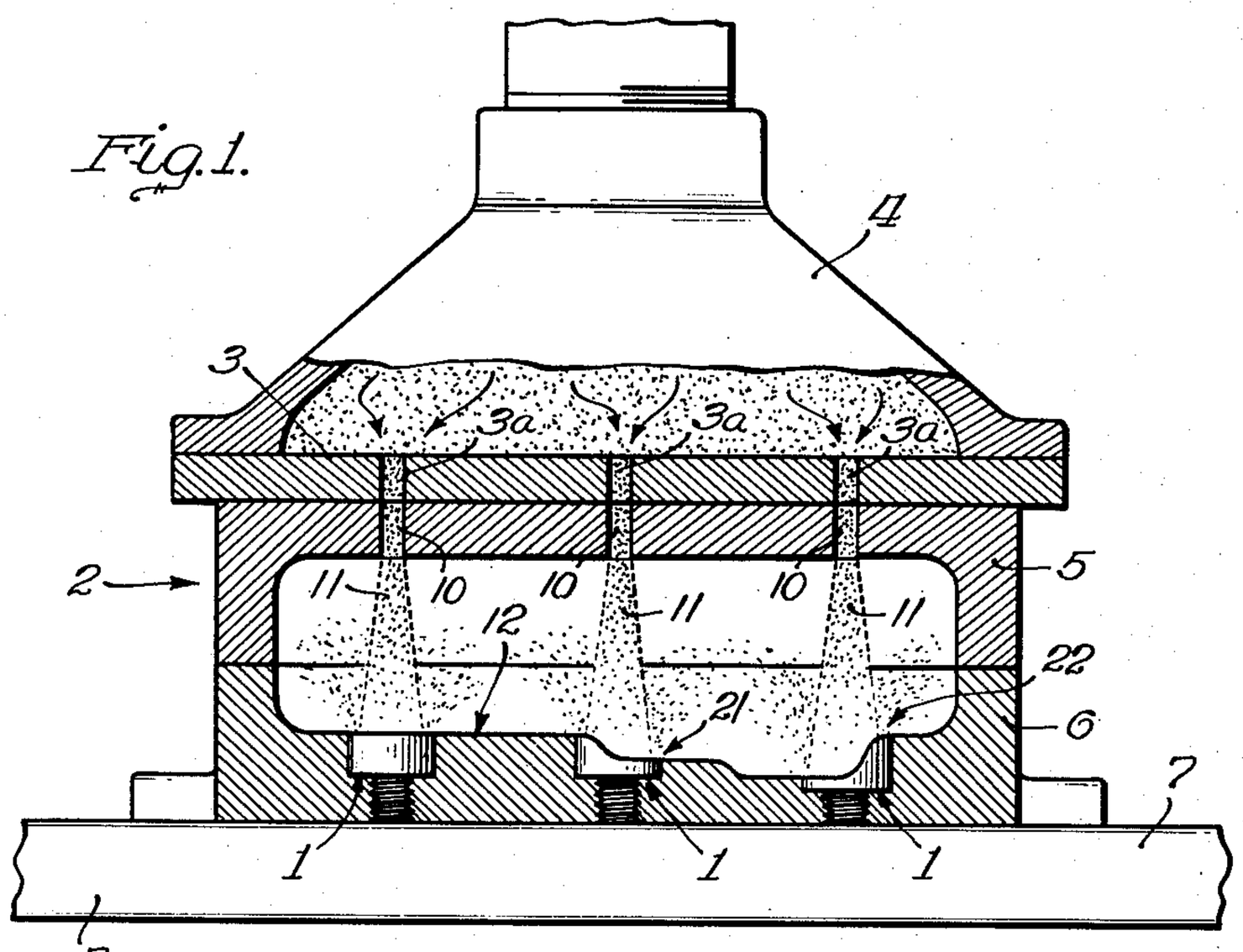
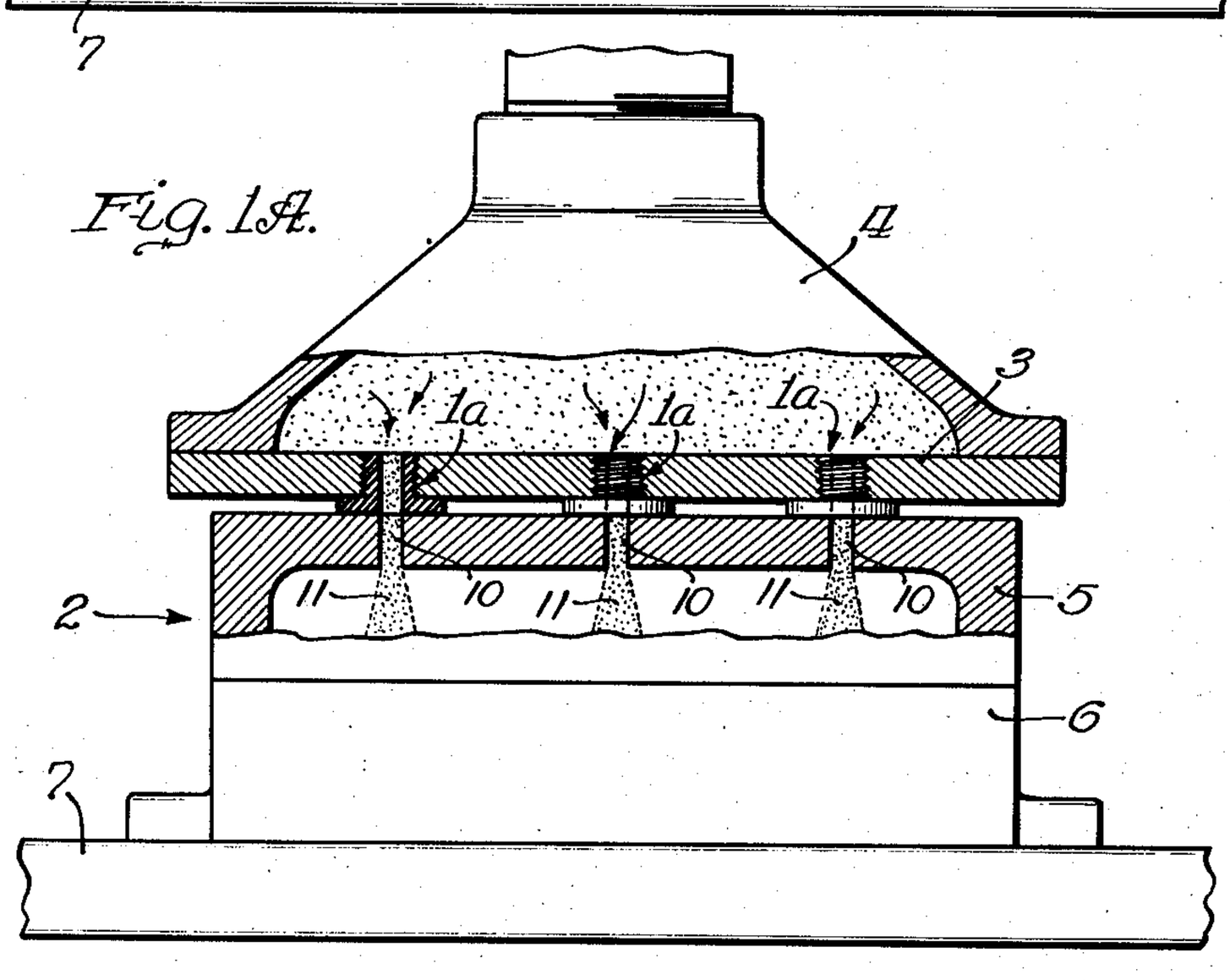


Fig. 1A.



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WEAR RESISTING INSERT FOR CORE MAKING APPARATUS

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Fig. 2.

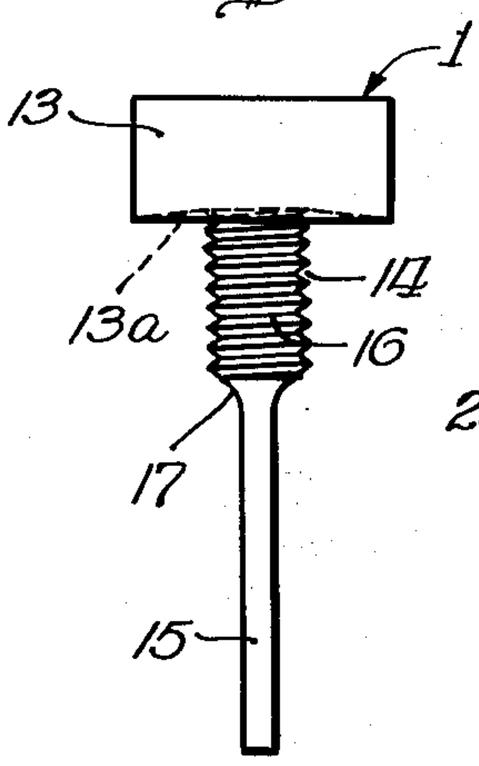


Fig. 4.

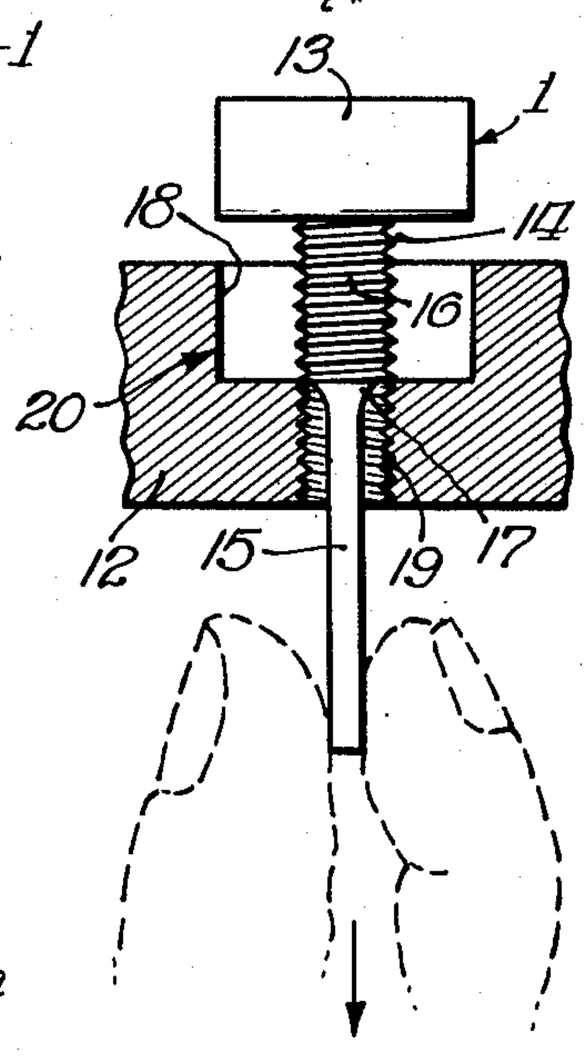


Fig. 5.

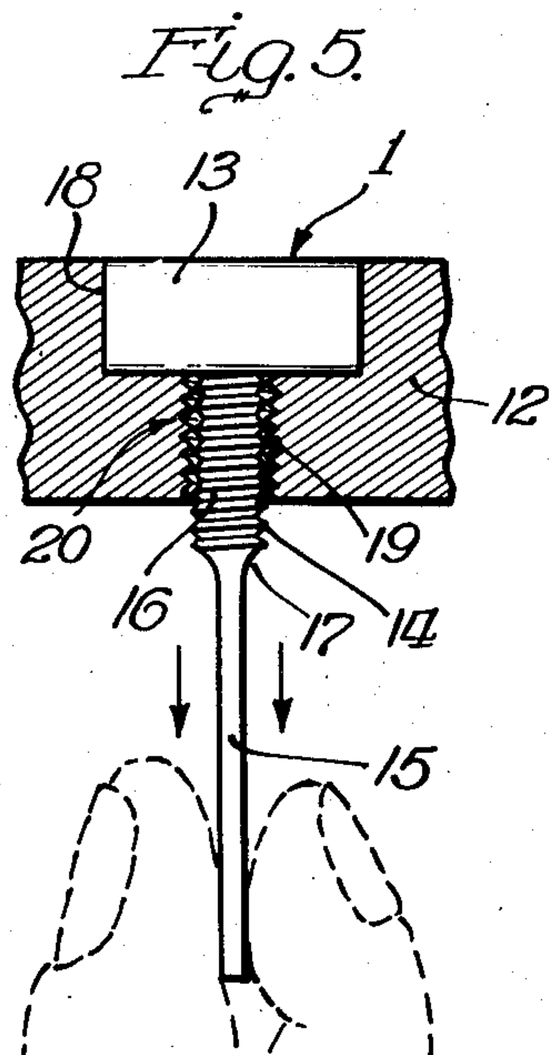


Fig. 3.

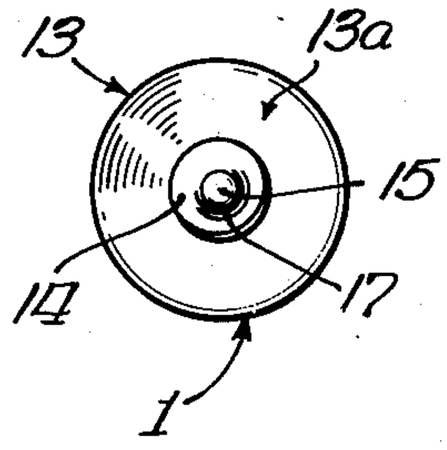
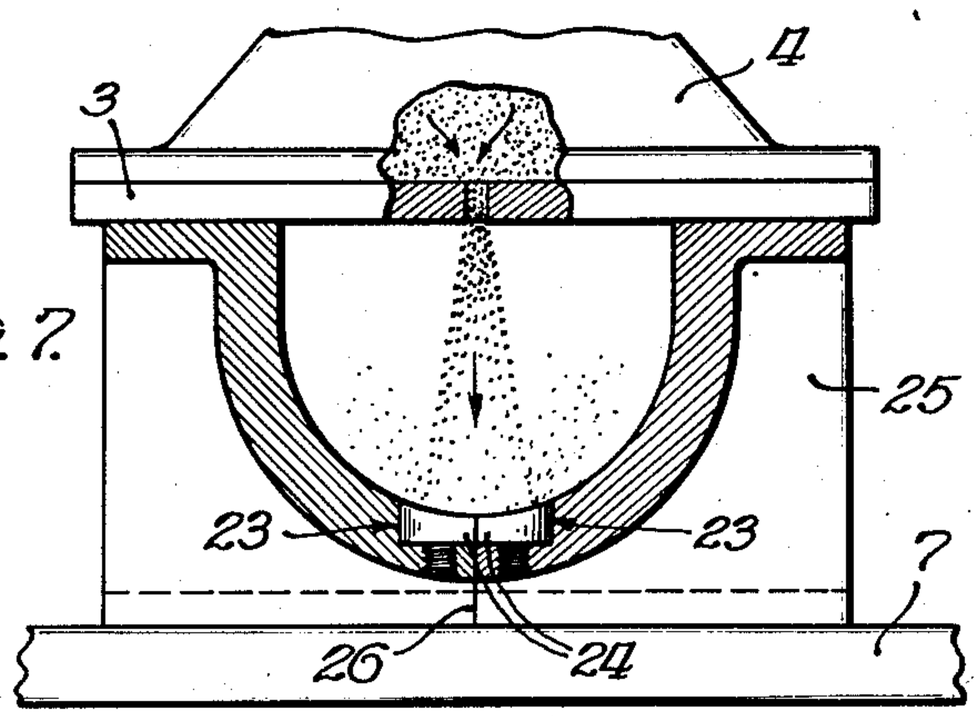


Fig. 7.



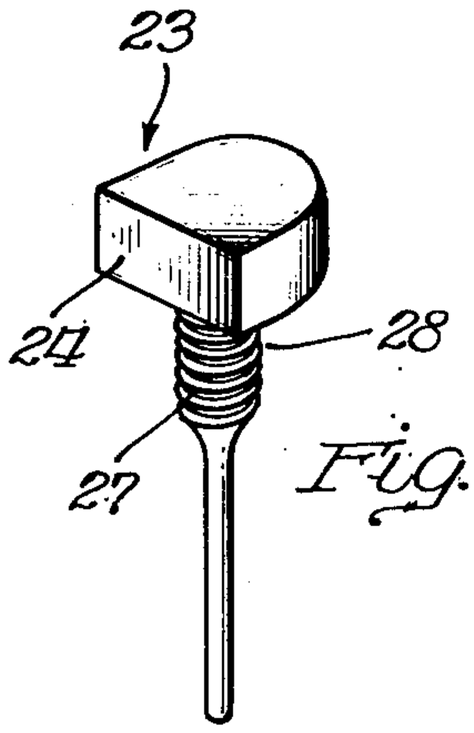


Fig. 6.

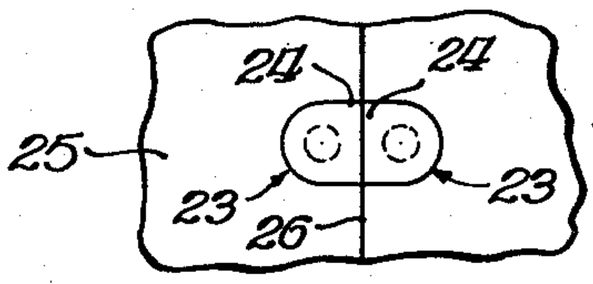


Fig. 8.

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WEAR RESISTING INSERT FOR CORE MAKING APPARATUS

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Fig. 9.

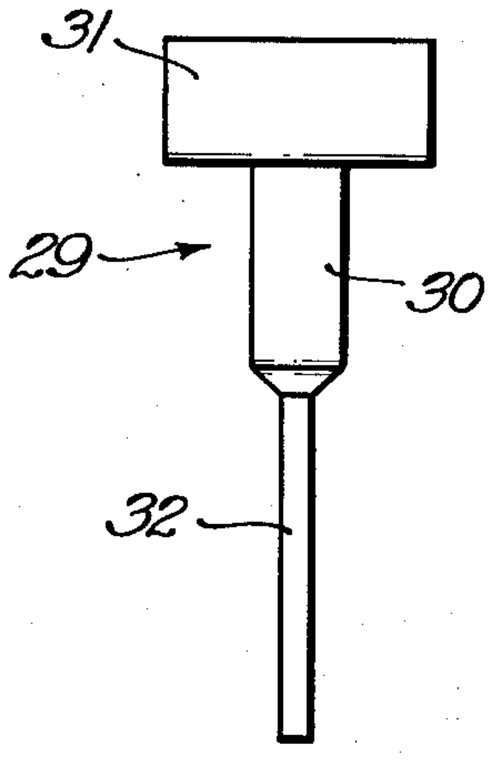


Fig. 13.

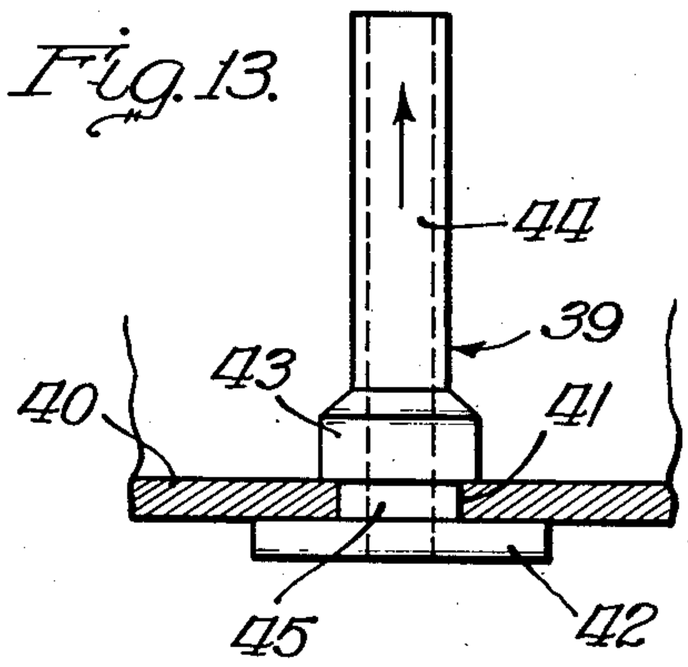


Fig. 14.

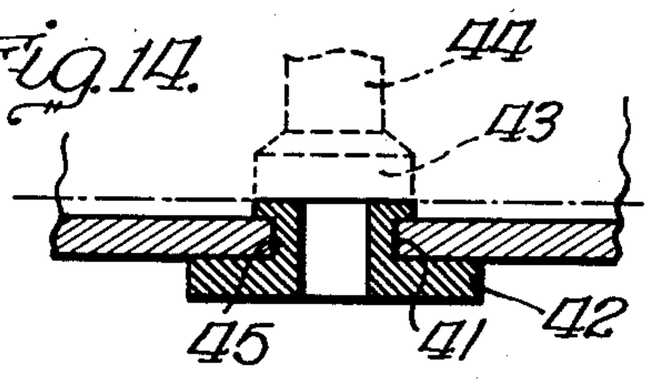


Fig. 15.

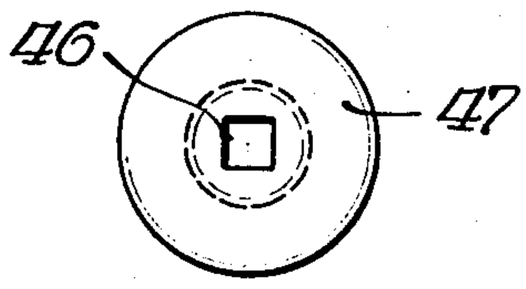


Fig. 10.

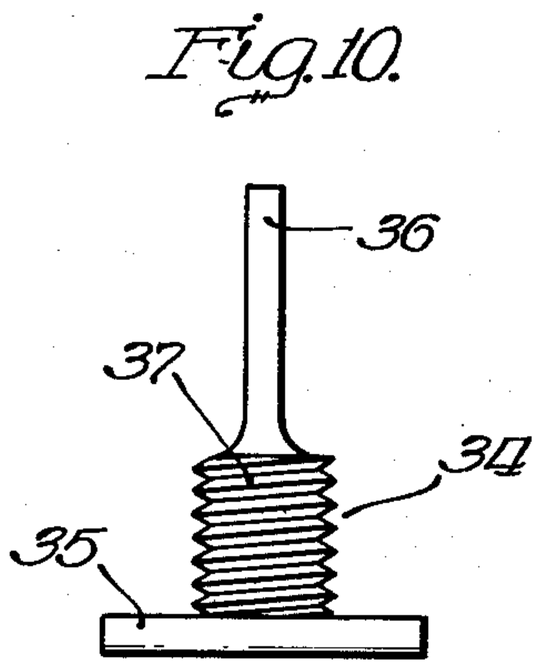


Fig. 11.

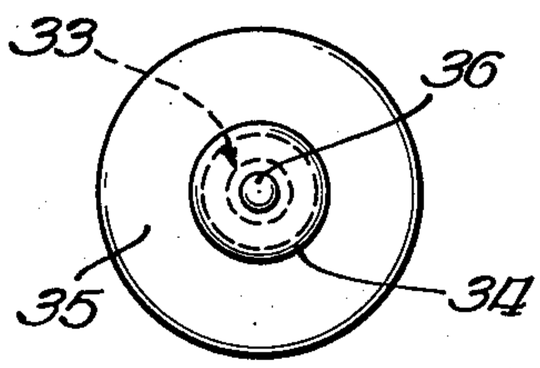
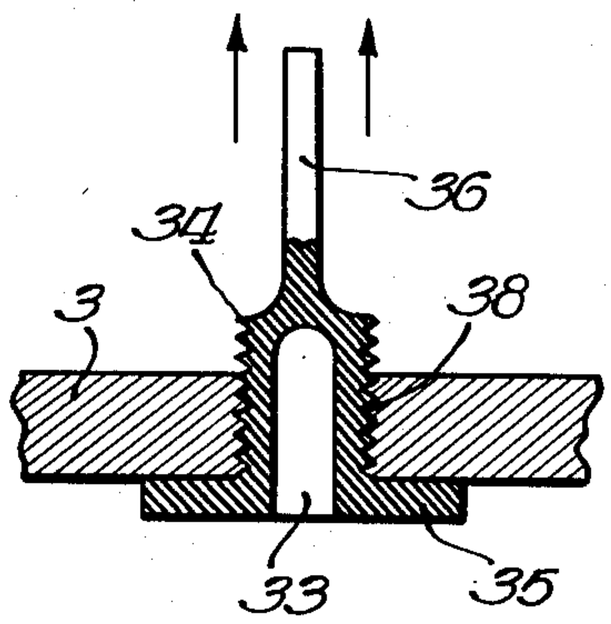


Fig. 12.



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UNITED STATES PATENT OFFICE

2,659,119

WEAR RESISTING INSERT FOR CORE MAKING APPARATUS

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Application June 15, 1950, Serial No. 168,254

6 Claims. (Cl. 22—13)

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This invention relates to an insert of resilient material for connection with a core box part or other similar unit to function as a means to counteract wear induced by an air blast impelled sand stream directed into an empty core box to fill the latter in making sand cores.

In making sand cores it is a known fact that the abrasive action of the sand as it is conducted to a core box and directed into the latter causes unavoidable difficulties in maintenance and replacements due to the excessive wear to the core making parts leading to loss of time in production while adding to the expense of making cores. The action is identical with sand blasting used for many purposes to create dull finishes or desirable controlled wear. Even in sand storms with less sand concentration, a high wind will remove the paint from automobiles and cause frosted windshields and door glass as well.

With the present invention, the main general object is to provide resilient means made of rubber or like material which can be used in strategic locations to resist sand wear and to lengthen the useful life of a core box, or a blow plate or other part associated with core making apparatus. Metal wears relatively fast under the action of air driven sand, but experience has shown that rubber will last many times longer under the same comparable conditions of operation. This is no doubt due to the inherent resiliency of rubber and its ability to yield under impact.

It is a more specific object of the present invention to provide insert plugs in core boxes as a replaceable part thereof in locations where the sand blasts impinge against the internal surface of the core box during the filling operation. These plugs are designed for easy assembly into sockets formed in the core box wall and also possess the facility of being easily replaceable when they start to show enough wear to warrant such procedure. By using plugs with relatively thick heads it is possible to use the plugs in places where they can be ground down and shaped to conform with the surface contour of the core box at the plug location. If desired, the plug heads could likewise be molded to a predetermined shape for replacements of plugs adapted for a given spot in any type of a core box particularly of a more intricate internal shape or design.

Another object of this invention is to provide an insert plug having the facility of being manually applied to a core box wall or other wall that has been supplied with an appropriate opening for the reception of such a plug. The plug comprises a head, a securing shank to hold the head in place, and a pigtail for manually drawing the plug into its socket.

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Other variations in the design of the plug may be used to adapt such a plug to further uses such as a conduit means in a blow plate of a core making machine where the plug functions as an orifice for sand expulsion into a core box.

Other objects and advantages relating to the pull insert plugs of the present invention shall hereinafter appear in the following detailed description thereof having reference to the accompanying drawings forming a part of this specification.

In the drawings:

Fig. 1 is a general vertical cross-sectional view taken through a core box operatively displayed as in use between the blow plate of a sand box of a core making machine and the box supporting table of the latter, and illustrating the insert plugs of the present invention as they may be used to carry out one of the functions for which they were designed;

Fig. 1A is a similar section to that shown in Fig. 1, but the plugs are here shown as adapted to another purpose with very little modification;

Fig. 2 is a side elevational view of one of the solid head plugs per se in its completed state ready for use;

Fig. 3 is an end view of the plug as seen from the tail end thereof;

Fig. 4 shows the same plug being pulled into a wall socket arranged for the specific reception of the plug;

Fig. 5 illustrates the plug in the wall socket after the head is seated and prior to the release of the pigtail which will then allow the plug shank to expand into the shank cavity upon resuming its unstretched and normal shape;

Fig. 6 is a perspective view of a modified plug for use adjacent a dividing line of a core box, this plug also using parallel ridges surrounding the holding shank instead of a threaded contour;

Fig. 7 is a vertical sectional view through a core box to illustrate the more specific use of a pair of the Fig. 6 plugs in coacting relation at opposite sides of a parting plane of a core box;

Fig. 8 is a fragmentary plan view of the internal portion of the core box shown in Fig. 7 and containing the pair of coacting plugs;

Fig. 9 is a side elevational view of a plug having a smooth shank for insertion into either a threaded or smooth wall opening;

Fig. 10 is a side elevational view of a plug almost identical with that shown in Fig. 2, but having somewhat varied proportions to adapt the same to another use;

Fig. 11 is an end view of the plug of Fig. 10 as the same appears when viewed from the pigtail end thereof;

Fig. 12 is a vertical cross sectional view through the plug of Fig. 10 as the same would look when assembled with a threaded bore of a blow plate and prior to cutting or grinding down the pigtail end as shown in the Fig. 1 plugs of this character;

Fig. 13 shows a modified construction of plug having a continuous central aperture with the plug terminating in a thin walled tube end for use in pulling the plug into place;

Fig. 14 is a cross sectional view of the Fig. 13 design of plug with the excess portion thereof cut off after assembly with a thin walled blow plate; and

Fig. 15 shows an end view of an apertured plug with the opening therein formed polygonally instead of round as are the openings in Figs. 10 to 14.

Referring now to Fig. 1, the plugs of the present invention are indicated as solid plugs **1** for a core box **2** each adapted as reactionary means to receive sand from openings **3***a* of blow plate **3** of a sand box **4** of a core making machine. The core box **2** is of a conventional type having a cope **5** and drag **6** disposed in registry and supported upon a core machine table **7**. Core sand is forced through the sand openings **3***a* and openings **10** in the cope **5** from within the sand box **4** to fill the core box **2** in the usual way.

The adaptation of the plugs of this invention to the use shown in Fig. 1A requires only minor modification of a plug such as **1**. Here plugs **1***a* serve as liners for the sand holes in a blow plate and their more specific construction will hereinafter be explained.

Referring again to Fig. 1, at the start of each blow, the core sand enters the core box in streams **11** from each inlet **10** traversing the box cavity and impinging against the opposite wall **12** of the drag **6**. Obviously each time a blow is made the surface of the core box wall **12** will wear at the points of sand impingement until this action is smothered at some slit second interval during the filling cycle of the core box. By the use of plugs **1** disposed in positions to receive the brunt of the sand streams, wear resisting reactionary areas are provided to retard core box wear and to prolong the useful life of such core boxes.

Plugs **1** are best illustrated in Figs. 2 to 5 inclusive and each comprises a head **13**, a shank **14** and a finger grip pigtail **15**. The shank has a threaded configuration **16** resembling a conventional screw, and the pigtail **15** is neatly filleted into the shank at **17** to eliminate any corner or sharp angle connection that would lead to severance of the tail **15** from the shank **14** under a heavy pull on the tail.

To receive a plug insert such as **1**, the core wall **12** as shown in Fig. 4 is bored out at **18** to a predetermined depth to snugly receive the head **13** of the plug **1**, and further counterbored and threaded as at **19** for the reception of the shank **14** of the plug **1**. Thus the aligned openings **18** and **19** together form a socket **20** to receive the plug **1**.

Then by grasping the pigtail **15** of the plug **1** positioned as shown in Fig. 4, and by pulling downwardly, the shank stretches and narrows in diameter permitting the shank to be bodily drawn into the threaded opening **19**. When fully down, the head **13** will be nested within the opening **18** with the exposed top of the head **13** coincident and flush with the interior surface of the core wall **12**. The exposed portion of the shank **14** and its pigtail **15** may then be cut off or ground away to have the socketed portion of the plug appear as shown in Fig. 1.

Although the shank **14** of the plug **1** and the opening **19** are similarly threaded, it is not essential that the threads of each be oriented when assembled. The threaded ridges will flex under pull on the pigtail **15** and if the threads are not oriented the criss cross intermesh of the plug threads with the metal threads will function to tightly hold the plug seated. Left and right hand threads could be used.

Due to the resilient recoil of the rubber, after stretch insertion, it has been found desirable to undercut the shank end of the head as at **13***a* to obtain a firmer nesting of the plug without further after adjustment because of the rubber recoil action.

When worn, a plug may be removed through the use of a drift or punch applied to the shank end of the plug **1** forcing the latter out of the socket opening **20** to make way for a fresh plug insertable as described immediately above.

In places where the interior contour of the core box is not flat, the plug heads can be ground down or shaped to conform with the interior contour of the core box as best illustrated at **21** and **22** in Fig. 1.

The round head plugs **1** are well adapted for use on all open continuous surfaces, but there are times when plugs of this nature may have to be used on parting planes of a core box to counteract wear. For this purpose, the plug **23** shown in Fig. 6 is a more feasible design having a square sided head **24**. Figs. 7 and 8 show two such plugs in use in a core box **25** having a vertical parting plane **26** as the line of separation between the halves of the core box **25**. With this arrangement the head receiving portion of the socket is milled out in a direction normal to the surface plane of the core box separation to thereby accommodate the square ended head.

Fig. 6 also introduces another variation in design which resides in the use of parallel circumferential ridges **27** disposed about the shank **28** for coaction with a smooth bore or one of similar configuration. By using a plurality of ridges **27** about the circumference of the shank **28**, the insertion of the plug into a socket is made easier and the holding power of the shank is increased to prevent displacement under normal conditions of use. When drawing the plug into place within a wall socket of a core box, the ridges will flex over the ridges in a socket until the plug is pulled completely into the socket. Such flexing action also applies to the threads **16** of the shank **14** thus alleviating the necessity of using too great a pull on the pigtail to draw the plug home.

As another suggested design of plug, Fig. 9 shows a plug **29** having a smooth shank **30** extending from a head **31** with a pigtail **32** connected with the shank. A plug of this type can be frictionally retained in a socket such as **20** with the threads in bore **19** acting to hold the shank **30**. However, a threadless bore similar to **19** may also be employed to hold the shank **30** inasmuch as the tolerances may be kept very closely to carry out the retention of the plug. The insertion of shank **30** into a smooth opening by pulling the pigtail **32** is readily brought about through the stretching action reducing the diameter of shank **30**.

The Figs. 10, 11 and 12 illustrate plugs **1***a* in greater detail for use in an opening provided in a blow plate **3**. Plug **1***a* has a central aperture **33** in a somewhat larger diameter shank **34** that

is connected with a thinner head **35** and the shank terminates in a pigtail **36**. Shank **34** is also deformed as by threads **37** for direct holding connection within a threaded opening **38** in the blow plate **3**. By drawing plug *1a* through the opening **38** in the direction of the arrows in Fig. 12 assembly is accomplished. By grinding or cutting off the excess plug material along the inner surface of the blow plate **3**, the aperture or opening **33** is made continuous and the plug *1a* assumes the appearance in which it is illustrated in Fig. 1A to function as a wear resistant blow hole liner for a blow plate **3** of a core making machine.

Another construction of pull insert **39** is depicted in Figs. 13 and 14 for use in connection with a thin core plate **40** having an opening **41** therein. The pull insert **39** comprises a thin head **42**, a shank **43** and a tubular pigtail **44**, with the shank **43** having an annular recess **45** adjacent the head **42** for fitted engagement within the opening **41** of the blow plate **40**. By drawing the shank **43** of the plug **39** through the opening **41** of the plate **40** by pulling the thin walled pigtail tube **44**, the plug will be snapped into place for subsequent severance of the excess portion of the plug as by cutting along the dot and dash line shown in Fig. 14. The remaining portion of the shank is thus made to form an annular lip to hold the apertured plug in place.

Fig. 15 illustrates the use of a polygonal opening **46** in a plug **47** that may have the same construction as either of the plugs shown in Fig. 12 or 13. With an opening of this nature turning of the plug body may be accomplished by use of an appropriate tool if that should be desirable under certain conditions of use or operation.

It should be understood that the drawings are only illustrative of the fundamental concept of the invention described and that the invention is not to be limited thereto excepting in the manner hereinafter expressed in the language of the appended claims directed to the pull insert of this invention.

What I claim is:

1. In combination with a wall of a core box, a resilient plug adapted to form a portion of said wall, said plug comprising a head, a shank, and a pigtail, said core box wall having a socket shaped to snugly receive said head and shank, said shank having a ridged surface and said shank receiving portion of said wall socket having corresponding depressions to receive the shank ridges therein, and said pigtail providing means to draw said head and shank into nested relation within said socket in the core box wall with the shank ridges disposed in interlocking relation with the depressions in said shank receiving portion of said wall socket.

2. A plug adapted for connection with a wall of a piece of core making apparatus having an opening in said wall, said plug comprising a head, a shank connected with said head and adapted for insertion through said wall opening, and a pigtail connected with said shank to draw the latter through said opening, said head having an aperture therethrough and extending into said shank to a depth beyond the surface of the wall away from said head whereby severance of the extended shank will open said shank aperture to the side of the wall opposite said head.

3. A rubber plug for connection with a wall of a piece of core making apparatus having an opening in said wall, said plug comprising a head, a shank connected with said head and adapted for insertion through said wall opening, and a pigtail connected with said shank to draw the latter through said opening, said head having an aperture therethrough and extending into said shank to a depth beyond the surface of the wall away from said head whereby severance of the extended shank will open said shank aperture to the side of the wall opposite said head, and cooperative frictional locking means carried by said shank and the wall opening to secure the shank within the latter to hold said head to the wall.

4. A rubber plug for connection with a wall of a piece of core making apparatus having an opening in said wall, said plug comprising a head, a shank connected with said head and adapted for insertion through said wall opening, and a pigtail connected with said shank to draw the latter through said opening for frictional connection therein, said pigtail having an opening through the length thereof, and said pigtail opening extending through said shank and head to provide a passageway through the entire plug.

5. In combination, a core box wall constructed of hard material and forming a part of a piece of core making apparatus, said wall having a socket formed therein, and a resilient insert plug adapted for connection within said core box wall socket and arranged to protect said piece of core making apparatus from the abrasive action of core sand at said socket location, and said insert plug comprising a head, a shank connected thereto, and a pigtail on said shank, said head having an aperture extending therethrough and into said shank, said pigtail comprising means to pull said shank and head into said socket in said hard core box wall, said head providing means to stop the plug within one portion of said socket with one surface of said head coincident with one surface of said wall, and said shank providing means to engage another portion of said socket to retain said head in operative coincident position relative to said wall surface.

6. In combination, a core box wall, said wall being provided with a recess in the surface of said wall and with a threaded opening leading away from said recess, and a plug of resilient material adapted to form a portion of said core box wall and comprising a cylindrical head to nest in said core box wall recess, a reduced diameter threaded shank extending axially from said head and into said threaded opening, and an elongated round bodied pigtail of smaller diameter than said shank connected with the latter and extending coaxially with respect to said head and shank to provide means for drawing said head and threaded shank into their respective receiving openings in said core box wall.

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