Sept. 26, 1967 J. M. F. MASSACRIER 3,343,741

DOWEL DRIVING DEVICE

Filed July 21, 1965 6 Sheets-Sheet 1

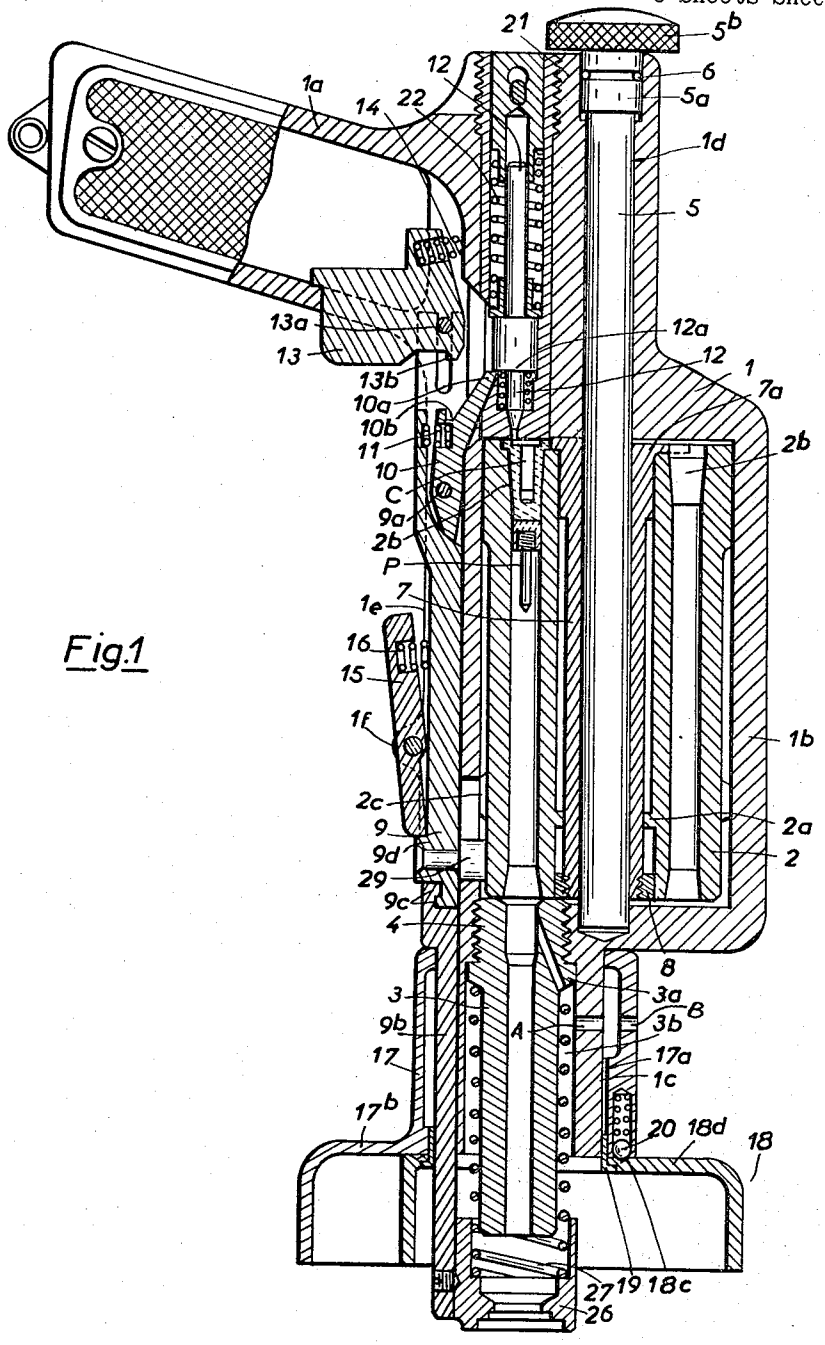

Fig.1

DOWEL DRIVING DEVICE

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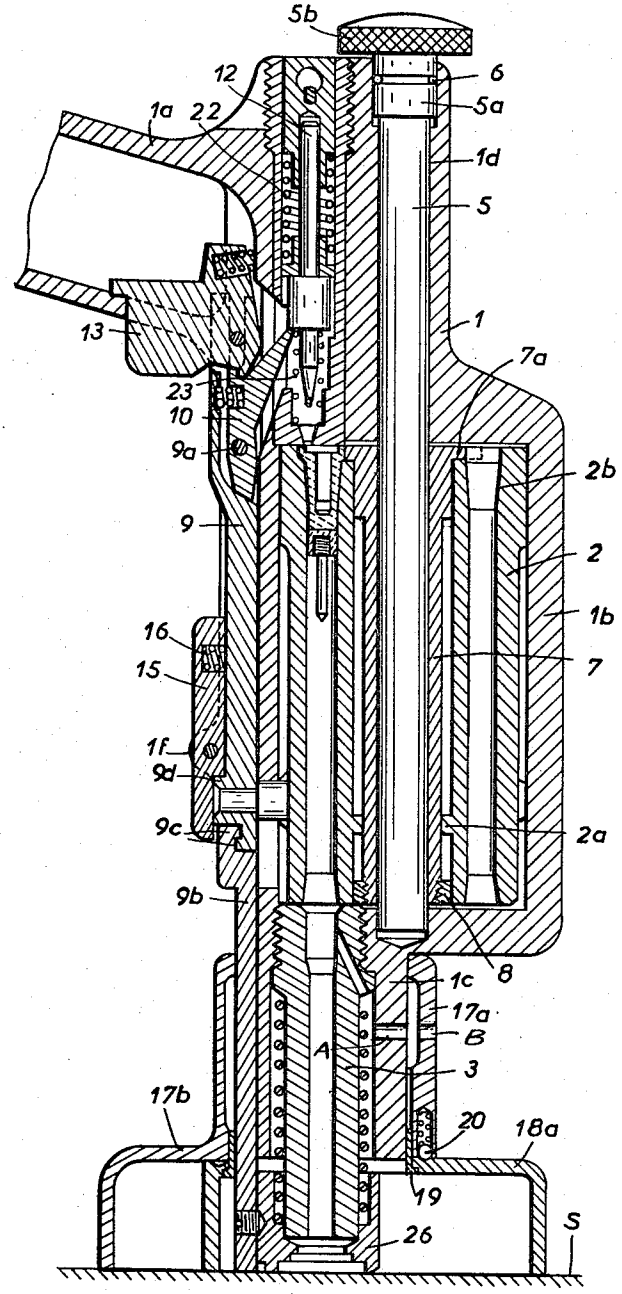
Fig.2



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DOWEL DRIVING DEVICE

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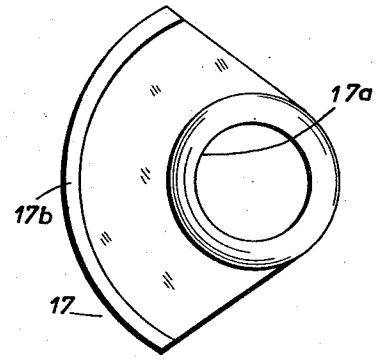
Fig. 3a



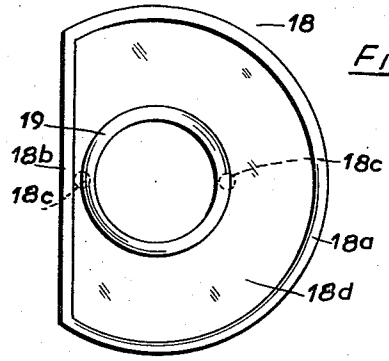


Fig. 3b

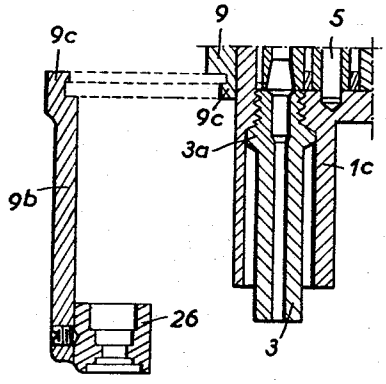


Fig. 3d

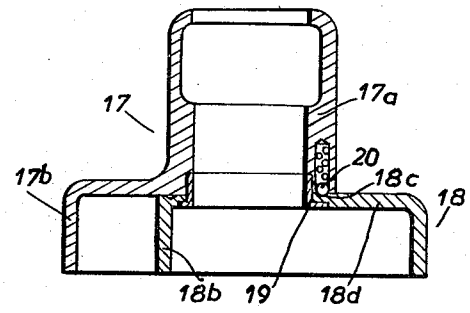


Fig. 3c

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DOWEL DRIVING DEVICE

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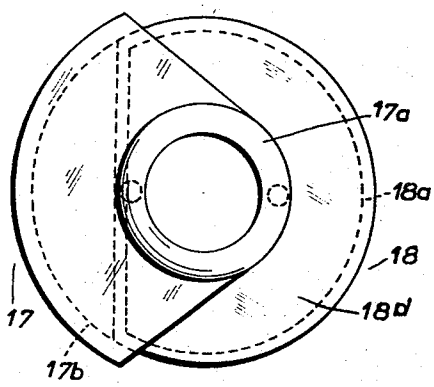
Fig.4



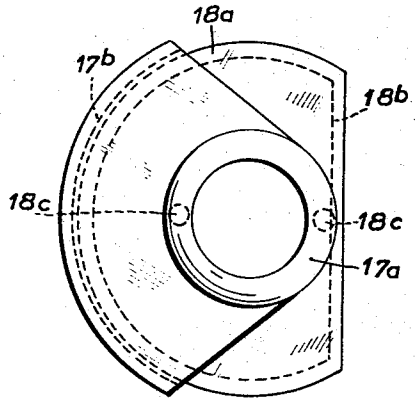


Fig.5

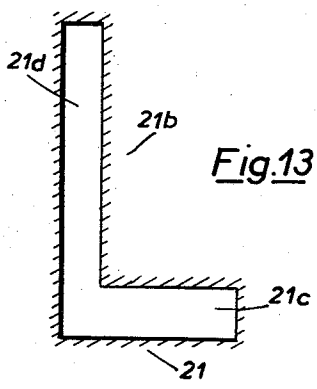
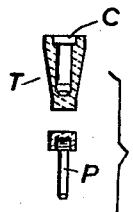
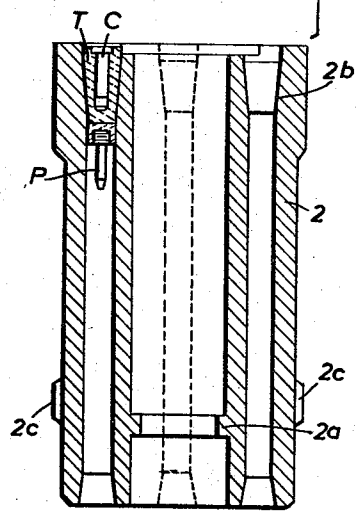


Fig.13

Fig.6





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DOWEL DRIVING DEVICE

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Fig.10

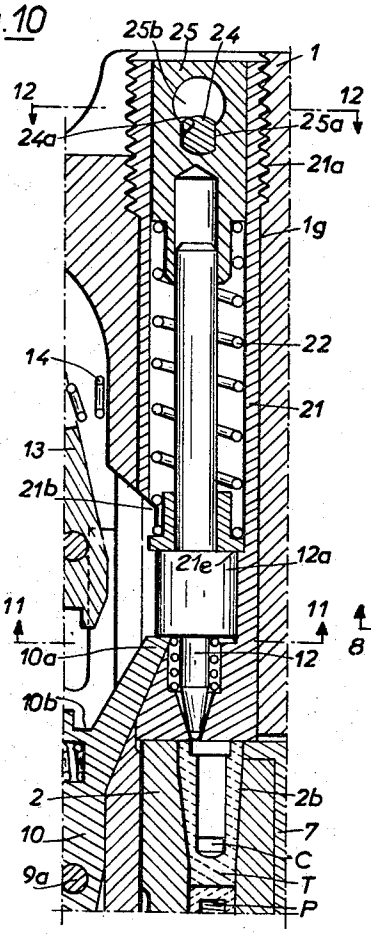


Fig.8

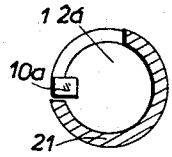


Fig.11

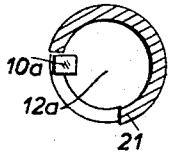


Fig.7

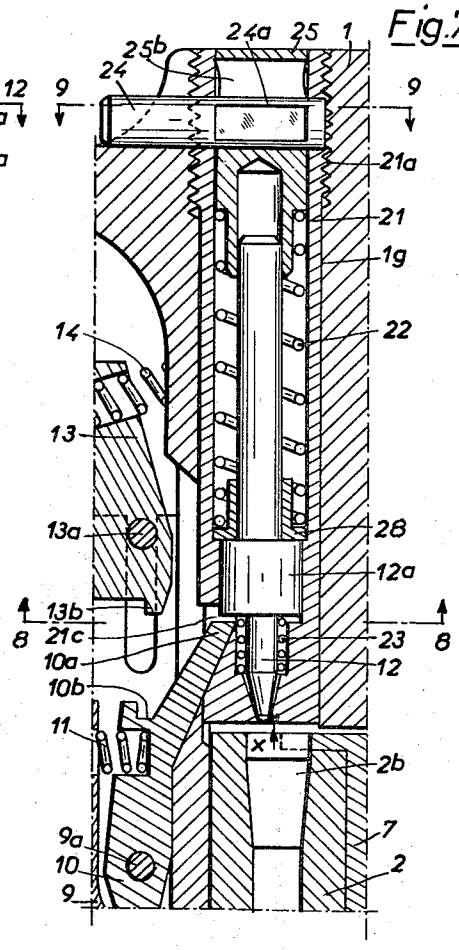


Fig.12

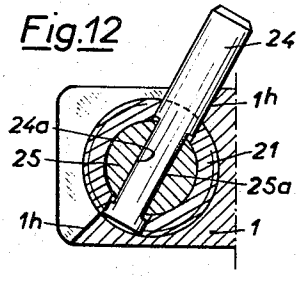
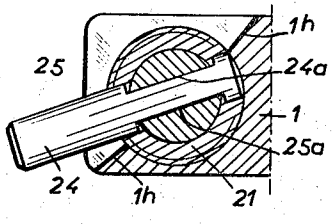


Fig.9



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DOWEL DRIVING DEVICE

Filed July 21, 1965 6 Sheets-Sheet 6

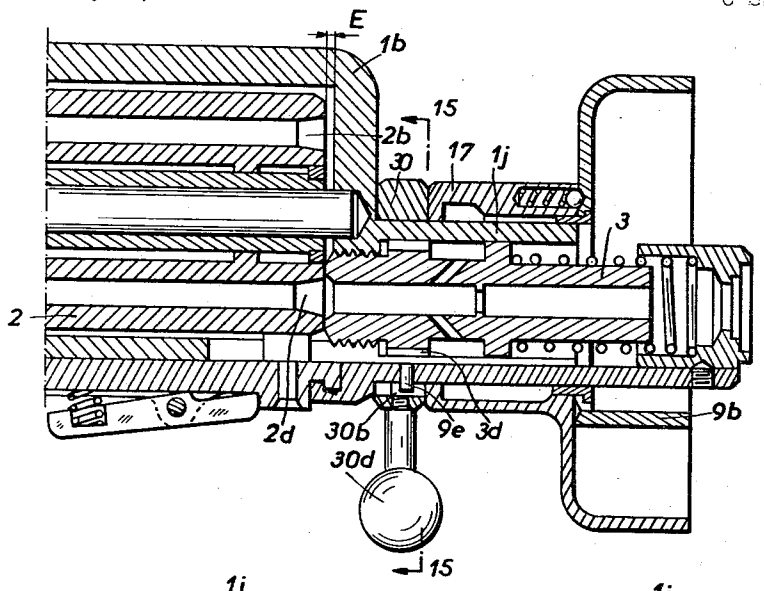

Fig.14

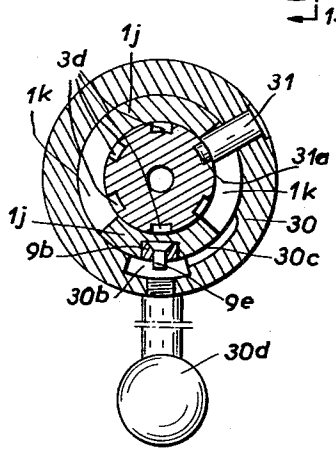

Fig.15

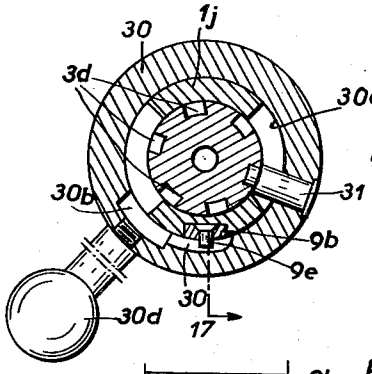

Fig.16

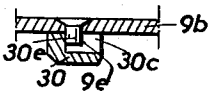

Fig.17

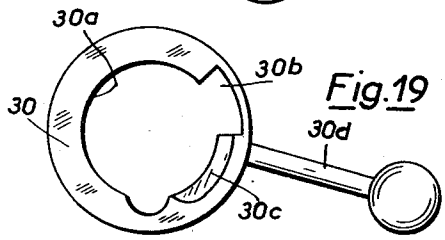

Fig.19

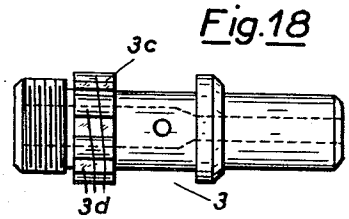

Fig.18

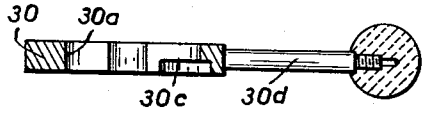

Fig.20

United States Patent Office 3,343,741 Patented Sept. 26, 1967

3,343,741

DOWEL DRIVING DEVICE

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Filed July 21, 1965, Ser. No. 474,213
Claims priority, application France, Aug. 4, 1964, 8,981; Nov. 3, 1964, 9,048
18 Claims. (Cl. 227—8)

ABSTRACT OF THE DISCLOSURE

An improvement in a driving gun in which a member proximate the front or rear face of the magazine cylinder of the gun is mounted so as to be axially movable in the body of the gun and is angularly turnable to be axially displaced in the direction of the barrel and be frictionally engaged therewith so as to be locked against the barrel.

The present invention concerns devices for driving elements such as dowels, pins, studs or nails, herein generally referred to as dowels.

In such dowel driving devices, it is desired to obtain the greatest safety in use and to eliminate, as far as possible, the various causes of accidents which may take place when using the devices, more particularly those resulting from inattentiveness or deliberate or accidental carelessness on the part of the user. It is also desirable to obtain the maximum efficiency for the cartridges used in such devices by utilizing as far as possible the full power produced by the explosive thrust for effecting penetration of the dowel which is fired.

According to the present invention there is provided a dowel device comprising a body member in which is rotatably mounted a magazine formed with a plurality of parallel and axial chambers adapted to accommodate cartridges for firing dowels from the device, the chambers being arranged to be brought successively into alignment with the bore of a barrel member which is mounted in a forward portion of the body member, the device further comprising a trigger, a firing pin arranged in axial alignment with the barrel member for firing cartridges in the magazine chambers, a sear arranged to releasably engage the trigger and the firing pin, and a cocking slider upon which the sear is mounted and which is itself mounted for longitudinal displacement relative to the body member, the firing pin being mounted for longitudinal movement in, and relative to, a breech member which is mounted for angular movement in a rear portion of the body member, the arrangement being such that angular movement of the breech member causes the breech member to be displaced axially for effecting, in one axial direction, frictional engagement between the breech member and the magazine so as to secure the magazine in position for firing the device, axial movement of the breech member in the opposite direction causing the magazine to be released so that the magazine may be rotated.

The breech member may be screwed into the body member, and a lever may be used for actuating the breech member, the lever being fitted in a readily removable manner and at the same time locking an element which supports a return spring for the firing pin and which may guide the sliding of the rear end of said firing pin.

According to another feature of the invention, the cocking slider is made in two parts which hook freely in one another so that the front end carrying a mouth piece is retained in position by a shield arrangement when it is in place, the said front end of the slider being separated automatically from the remainder of the tool simply by gravitational force when the shield arrangement is removed, which ensures safety in operation.

Also according to the invention there is provided a dowel driving device comprising a body member in which is rotatably mounted a magazine formed with a plurality of parallel and axial chambers adapted to accommodate cartridges for firing dowels from the device, the chambers being arranged to be brought successively into alignment with the bore of a barrel member which is mounted in a bore formed in a forward portion of the body member, the device further comprising barrel-engaging means mounted on said forward portion of said body member and arranged to impart angular movement to said barrel member, the arrangement being such that angular movement of the barrel member in one direction causes the barrel member to be displaced longitudinally rearwardly and to frictionally engage the magazine, angular movement of the barrel member in the opposite direction causing the barrel member to be displaced longitudinally forwardly away from the magazine so as to allow the magazine to be rotated.

For a better understanding of the invention, and to show how the same may be carried into effect, reference will now be made, by way of example, to the accompanying drawings, in which:

FIG. 1 is an axial sectional view of one embodiment of the invention;

FIG. 2 is a fragmentary view similar to FIG. 1, certain parts being shown in different positions;

FIG. 3*a* is an end elevation view of one detail of the embodiment illustrated in FIG. 1;

FIG. 3*b* is an end elevation of a further detail of the embodiment illustrated in FIG. 1;

FIG. 3*c* is a sectional view of the assembly of the detail elements in FIGS. 3*a* and 3*b*;

FIG. 3*d* is a fragmentary section of a further detail of the embodiment illustrated in FIG. 1, one member being shown in a disassembled position;

FIG. 4 is an end elevation view of the assembly of FIG. 3*c* in an alternative position;

FIG. 5 is a view similar to FIG. 4 showing a further alternative position;

FIG. 6 is an axial sectional view of yet another detail of the embodiment of FIG. 1, two elements being shown in a disassembled state;

FIG. 7 is an axial sectional view, drawn to a larger scale, of a further detail of the embodiment illustrated in FIG. 1;

FIG. 8 is a section taken on the line **8—8** of FIG. 7;

FIG. 9 is a section taken on the line **9—9** of FIG. 7;

FIG. 10 is a view similar to FIG. 7, shown in a different operative position;

FIG. 11 is a section taken on the line **11—11** of FIG. 10;

FIG. 12 is a section taken on the line **12—12** of FIG. 10;

FIG. 13 is a plan view of a development of an aperture formed in one of the parts of the embodiment illustrated in FIG. 1;

FIG. 14 is a fragmentary sectional view of an alternative embodiment of the invention;

FIG. 15 is a sectional view taken on the line **15—15** of FIG. 14;

FIG. 16 is a view similar to FIG. 15, the parts being shown in a different position;

FIG. 17 is a fragmentary sectional view taken on the line **17** of FIG. 16;

FIG. 18 is a side elevational view, drawn to a smaller scale, of a part of the embodiment illustrated in FIG. 14;

FIG. 19 is an end elevation of another part of the embodiment illustrated in FIG. 14; and

FIG. 20 is a sectional view of the part illustrated in FIG. 19.

In FIGS. 1 to 12 of the drawings, there is shown a dowel driving device comprising a body or frame member **1**, which may be composed of one or more parts so as to comprise: a handling butt **1***a*, a bridge portion **1***b*, in which a rotatable magazine cylinder **2** is located, and a front carrier sleeve portion **1***c*, in which a barrel **3** is fitted and fixed in position by any appropriate means. In FIG. 1 the barrel **3** is shown screwed into a screw threaded bearing portion **4** formed between the bridge portion **1***b* and the sleeve **1***c* of the frame **1**, thus ensuring a secure connection. When in position ready for firing, the rear face of the fixed barrel **3** is arranged to project slightly within the inwardly directed face of the bridge portion **1***b* so as to be in tight frictional engagement with the magazine cylinder **2**. The barrel **3** has bores or vents **3***a* which are so arranged as to be capable of discharging the thrust-exerting gases which are produced upon firing, from the bore of the barrel to an expansion chamber **3***b* which is sufficiently large to stifle or damp noises.

The chamber **3***b* communicates with the exterior through lateral apertures A in the sleeve portion **1***c*, and through apertures B in a shield **17**, **18** mounted on the sleeve portion **1***c*. It is possible to discharge the thrust-exerting gases through the vents **3***a* without reducing the thrust exerted on the dowel or pin P being fired because by the time the pin reaches the inner apertures of the vents **3***a*, it has received the necessary velocity and impulse.

The magazine cylinder **2** is rotatably and removably mounted on a shaft **5** which is slidably fitted in a bore **1***d* of the body **1**. The shaft **5** is retained in the body in a withdrawable manner, either by a sliding fit or by the elastic expansion action of a ring **6** which is retained in a circular groove of a bearing portion of larger diameter **5***a* at the rear end of the shaft **5**. A large diameter knurled head portion **5***b*, which is provided at the end of the shaft **5** adjacent the bearing portion **5***a*, facilitates manipulation of the shaft **5**.

Slidably arranged in the magazine cylinder **2**, and mounted coaxially about the shaft **5**, is a sleeve **7**, the sliding movement of which, relative to the cylinder **2**, is limited by a ring **8** which is screwed onto the sleeve **7** and is so arranged that when the sleeve **7** is moved rearwardly relative to the cylinder **2** the ring **8** abuts against a shoulder **2***a* formed in the bore of the said cylinder. A flange **7***a* of the sleeve fits into the cylinder at the end where cartridge chambers **2***b* are formed therein for the cartridges C, the flange **7***a* being formed with recesses corresponding partly to the rims of the cartridges. The magazine cylinder is removed from the body **1** by extracting shaft **5** and laterally pushing the cylinder **2** from body **1**. When the magazine cylinder is removed the shaft **5** is inserted into sleeve **7** from its opposite end whereby the bearing portion **5***a* of the shaft is used to push the ring **8** and the sleeve **7** axially relative to the cylinder **2** so as to enable the cartridge sleeves, which expand after firing, to be easily withdrawn immediately.

The chambers **2***b* are given a frusto-conical shape which is widened relatively to the usual dimensions of the cartridges, so as to receive cartridge supports T of corresponding form. These cartridge supports and their chambers **2***b* have larger dimensions than those of the pins P which can, therefore, be inserted more easily into the magazine cylinder at the end thereof formed with the chambers **2***b*, thus permitting the magazine cylinder to be loaded more easily from the rear, at the same time achieving satisfactory positioning of the pins in front of the cartridge supports. The cartridge supports T can be made of a synthetic plastic material, and may be discarded after firing. If they are made of steel or other metal it may be desirable to retain them after firing. In loading the magazine cylinder, it is also possible to use assemblies wherein the cartridge supports T and the supports for the pins P are integrally formed of any known material.

The pins P can be equipped with any washers and other rings or arrangements for the axial guiding and centering of the pins either before or during firing, which means are well known and do not have to be described here.

As a result of the structure, shape and interrelationship of the parts described above, the pin is always satisfactorily situated in the magazine cylinder chambers in the vicinity of the cartridge in order to benefit to the maximum extent from the thrust produced by the gases upon firing. This position may be easily and accurately obtained by the employment of the pin support, which, during insertion of the pin, abuts or engages a bearing portion of slight conicity (not shown) formed in the cylinder bore forward of the chambers **2***b*. This slightly conical bearing portion does not prevent the pin from being projected when the cartridge explodes, the washer being forcibly deformed by the passing of the pin.

The provision of loading the magazine cylinder from the rear is extremely useful, as is also the reliable positioning of the pins near the cartridges. Furthermore, there is no need to use rings for loading and adjusting the pins in the chambers.

The device also includes a trigger **13**, a firing pin **12** and a sear **10**. These parts are especially constructed and arranged having regard to the safety of the operator, because it is required, before the device can be fired, that the trigger mechanism be set or cocked by engagement of the nose-end of the device under steady pressure against the surface S into which the pin or dowel is to be driven. (Naturally the surface S is selected only for convenience, it being readily appreciated that the nose-end of the device could be pressed against any other hard surface, e.g. the ground or floor.) To this end, a cocking slider **9** is mounted for longitudinal movement in a groove **1***e* formed in a lower portion of the body **1**. In a slot at the rear end of the slide **9** the sear **10** is pivotably mounted on a pin **9***a*, the sear being constantly urged in a clockwise direction (as seen in FIG. 1) under the action of a spring **11**. A nose portion **10***a* of the sear **10** co-operates with a shoulder **12***a* of the firing pin **12**. The trigger **13** is pivotably mounted about a further pin **13***a* secured to the body **1**, and can be pivoted in a clockwise direction against the action of a spring **14** which constantly urges the trigger in a counterclockwise direction, to effect firing. A nose portion **13***b* of the trigger co-operates, when the slide is pushed rearwards, with a correspondingly shaped recessed portion **10***b* of the sear **10** (see FIG. 2). Thus, when the device is cocked and in order to effect the firing of the cartridge, the trigger is moved pivotally in a clockwise direction, against the action of the spring **14**, this causing the sear to move pivotally in a counterclockwise direction against the action of the spring **11**, until the nose portion **10***a* is moved out of engagement with the shoulder **12***a* and the firing pin **12** is urged forward under the action of its spring **22** to produce firing of the cartridge.

The slider **9** is made in two parts, and it comprises a front part **9***b* to which is secured a mouthpiece **26**. Arranged between a rearwardly directed recess formed in the mouthpiece **26** and a forwardly directed shoulder formed in the barrel **3** is a compression spring **27** which constantly urges the barrel in a rearward direction. The adjacent co-operating ends of the parts **9** and **9***b* are adapted to be connected to one another by a simple complementary joint which consists of a hook portion **9***c* formed on the cooperating end of each part **9** and **9***b* so as to be capable of engaging one another. The joint ensures that both parts are joined securely and able to move as one piece in both of the longitudinal directions which the slider is required to make. If the part **9***b* is not retained in the groove **1***e* by the flash shield **17**, **18** the said part **9***b* is automatically separated from the part **9** due to the action of its own weight, as is illustrated in FIG. 3*d*. In this case, it is no longer possible to cock the device under normal conditions, and firing is prevented. In order to permit firing and to keep the front part **9***b* of

the slider in its place, it is necessary for the protective shield **17**, **18** to be mounted on the bearing portion **1***c* of the body, as illustrated in FIGS. 1 and 2.

In addition, a safety lever **15** is pivotably mounted between two bosses **1***f* of the body **1**, on either side of the groove **1***e*. A spring **16** constantly urges the lever **15** into the position illustrated in FIG. 1. In this position, the front end of the lever **15** abuts against a heel portion **9***d* of the slide **9**, which prevents longitudinal rearward movement of the slide and cocking of the gun. The gun can be cocked only by pivoting the lever **15** in opposition to the spring **16**, i.e. in a clockwise direction. Consequently, the operator will normally have to use both hands in order to hold the gun, release the slider by pivoting the lever **15** and press the trigger **13**. It will therefore be most difficult for the operator to carry out any other irregular operation. It should also be stressed that the lever **15** has another safety effect in that if the tool by accident falls to the ground and the impact produced thereby urges the slider rearwardly to cock the gun, the slider **9**, **9***b* remains locked in its uncocked position (FIG. 1) by the lever **15**. It is thus not possible in these circumstances for the gun to be cocked and fired unexpectedly.

The flash shield is constructed (as shown particularly in FIGS. 3*a*–3*d*, 4 and 5), in two main parts **17** and **18** so that it can be modified optionally in order to cover a wide circular surface about the barrel (see FIG. 4) when there is no obstacle or projection in the immediate area around the point in the surface S into which the pin is to be driven, or in order to cover a segment-shaped surface (see FIG. 5) when there is an obstacle or projection in the immediate area around the point in the surface S into which the pin is to be driven. It is possible to change from one arrangement of the shield parts to the other almost immediately without having to remove and refit the shield parts.

A first flash shield part **17** (see FIG. 3*a*) comprises an apertured bearing portion **17***a* adapted to be mounted for sliding movement about the cylindrical bearing portion **1***c* of the body **1**, and also a protective cup portion **17***b*, which in end view is substantially in the shape of a sector, and which is formed with an arcuate rim and open sides.

The second shield part **18** in end view is substantially segment-shaped forming a cup portion **18***a*, the arcuate rim of which, together with the rim of the cup portion **17***b* forms substantially 360°. A partition or chord member **18***b* interconnects the ends of the arcuate portion of the rim of the cup portion **18***a*. The external diameter of the cup portion **18***a* corresponds substantially, taking into account the necessary clearance, to the internal diameter of the cup portion **17***b*, so as to permit relative movement of the shield parts to the various positions selected.

The shield parts **17** and **18** are assembled by each being mounted on a common flanged ring **19**. Connection can be effected by a simple coupling, or by any other means if desired. Various means can be used for fixing the angular positions of the shield parts relative to one another, but in the embodiment illustrated in the drawings, a spring and ball system **20** is housed in a recess in the bearing portion **17***a*, the ball being arranged to cooperate with angular positioning recesses **18***c* formed in a base portion **18***d* of the cup portion **18***a* of the shield part **18**, the said portion **18***d* being formed with a circular stepped recess for mounting the part **18** on the ring **19**.

It will readily be appreciated how easy it is to change the shield parts from one position to another without dismantling the shield. Moreover, the flash shield **17**, **18** constitutes another safety factor in the use of the tool, owing to the fact that the wide dimensions of the area over which the elements **17** and **18** bear, oblige the operator to press the shield firmly against the surface S and in a direction perpendicular to the said surface. If the shield is not applied perpendicularly to the surface (in which position it fully protects the user), and even a small angle remains, even if that angle is approximately 7° for example, between the plane in which the forwardmost edge of the rim of the shield lies and the surface S, the slide **9**, **9***b* cannot be moved rearwardly by a sufficient distance, and the device cannot be cocked. This prevents a badly directed driving operation and the formation and the possible ejection of splinters from the surface S.

In order to attain the maximum efficiency from the cartridges and to ensure that the emplosive thrust is fully applied to the pins, it is important that the parts of the gun which are in alignment with the direction of firing or substantially in alignment therewith, i.e. mainly: the barrel **3**, the magazine cylinder **2** and the element carrying the firing pin **12**, should be firmly and securely in abutment with one another at the time of firing, without the least possibility of play and leakage of gas. On the other hand it is necessary to have a sufficient clearance between these parts when firing is not taking place, particularly when it is desired to move the magazine cylinder angularly or withdraw it from the pin driving device, despite the swelling of the cartridges which take place once they have been fired.

For this purpose, the part in which the firing pin **12** is slidably mounted is a breech cylinder **21** which is recessed to allow for the longitudinal movement of the firing pin **12** and its shoulder **12***a*. The pressure spring **22**, which is compressed at the time of cocking, is lodged in the breech **21** and exerts a pressure against the shoulder **12***a* by means of a ring **28**, the displacement of which is limited against a shoulder **21***e* in the bore of the cylinder **21** so that the firing pin **12** continues its travel owing to its own inertia at the time of firing. A relatively weaker spring **23** is mounted in the breech **21** forwardly of the shoulder **12***a* in order to ensure reliable return in the rearward direction, over a very short distance, of the firing pin **12** after firing. This return is not opposed by the spring **22** since the action of the said spring **22** is limited by the arresting of the ring **28** against the shoulder **21***e*.

It should be stressed that the spring **23** constitutes another safety factor, opposing accidental displacement of the firing pin **12**, and consequently, accidental firing of the cartridge, if, for example, the tool were to be dropped on the ground. The striker rod is also normally retained by the sear **10** in the case of impact due to a fall.

The breech cylinder **21** is mounted with the necessary clearance in a corresponding bore **1***g* in the rear portion of the body **1** and co-axially with the barrel **3**. The rear end of the cylinder **21** is formed with a screw-threaded portion **21***a* which co-operates with a corresponding screwthread in the rear portion of the bore **1***g* of the body. The screw thread is given a pitch appropriately chosen to give the necessary axial displacement when it is desired to urge the cylinder **21** into abutment against the magazine cylinder **2**, or in order to release the cylinder sufficiently from such abutment.

A lever **24** (FIGS. 7, 9, 10 and 12) makes it possible for the breech cylinder **21** to be displaced angularly to bring it into or out of abutment with the cylinder **2**. An end of this lever is fixed diametrally in the rear portion of the cylinder **21**. The rear portion of the body **1** is formed with an angular recess **1***h* which is sufficiently wide to permit the necessary angular movement of the lever **24** and thus the movement of the breech cylinder **21** (FIGURES 9 and 10).

In the drawings, the lever **24** has a simple round section and includes a portion **24***a* which is formed with two flats about which a corresponding slot **25***a* engages the slot **25***a* being formed diametrally in a part **25** which is engaged slidably in the rear end of the bore of the breech cylinder **21**. The part **25** gives support to the pressure spring **22** and also slidably guides in an axially formed hole the rear end of the firing pin **12**.

The slot 25*a* opens into a diametrically formed hole 25*b* which is of the diameter of the lever 24 disregarding the flats of portion 24*a* and which permits slidable mounting of the lever 24 therein. Owing to this construction, the lever 24 and the part 25 are mutually self-positioned and are mounted in position relative to one another under the pressure of the spring 22. Dismantling can also be effected quickly by displacing the part 25 in opposition to the spring 22 until the lever is coaxial with the hole 25*b*. It is easy to withdraw the lever 24 by a simple sliding action.

Thus, it is possible to obtain sufficient angular displacement of the lever 24 and consequently of the breech cylinder 21, to produce an axial displacement of, for example, a distance *x* (see FIG. 7) which is necessary for disengaging the cylinder 21 from its abutment or frictional lock with the cylinder 2.

In order to permit the cocking operation and to allow the passage of the nose portion 10*a* of the sear, the breech 21 is formed with an aperture 21*b* (FIG. 10) which is shown in development in FIG. 13. A narrow portion 21*c* of the aperture permits only short movement of the nose portion 10*a* in the position wherein the breech is unlocked (FIG. 7) while a long portion 21*d* of the aperture permits the longitudinal displacement of the nose portion 10*a* which urges the firing pin rearwardly for cocking (see also FIGS. 8 and 11). A centering stud 29 (FIG. 1) is secured to the slide 9 and co-operates with projections 2*c* uniformly spaced over the periphery of the magazine cylinder 2, in order to center each chamber of the said cylinder co-axially with the barrel for each firing operation.

Consequently, if the breech cylinder 21 is not in the locked position for firing, i.e. urged into frictional engagement with the magazine cylinder 2, it is not possible to cock the device by displacing the slide 9, the sear 10 and the striker, since the nose portion 10*a* of the sear is not opposite the long portion 21*d* of the aperture 21*b*. Consequently, firing is impossible under unfavorable and dangerous conditions where the operator has omitted or forgotten to lock the breech cylinder 21 against the magazine cylinder 2. This is a further safety factor in addition to those safety factors previously mentioned.

In the alternative construction illustrated in FIGS. 14 to 20 it is proposed to arrange a collar 30 which is pivotably mounted for free rotation at the front of the device between on the one hand the front end of the bridge portion 1*b* and on the other hand the rear end of the parts 17 and 18 of the flash shield. Externally, this collar comprises an operating lever 30*d* while internally the said collar comprises a cylindrical bearing portion 30*a* centered about a corresponding bearing portion 1*j* at the front of the body 1. A pin 31, fixed radially in the collar 30, enters the bearing portion 30*a* and passes through one of the recesses 1*k* provided for the discharge of the thrust exerting gases in the bearing portion 1*j* of the body. The pin 31 is formed at its inner end with a reduced diameter portion 31*a* which engages one of a number of splines 3*d* formed in a bearing portion 3*c* of the barrel 3, which is screwed into the front part of the body 1.

According to this arrangement, it will be understood that the angular displacement of the collar 30 automatically moves the barrel 3 by the same angular displacement, which has the result of longitudinal displacement of the said barrel, since the latter is screwed in the body 1. The barrel which, in a sense, acts as a further locking breech, is in alignment with the cartridge chambers 2*b* which are formed in the magazine cylinder 2. This longitudinal displacement of the barrel results either, in one angular direction in the frictional engagement by the barrel, without any possibility of play, against the magazine cylinder 2 so as to take up the play E which in the unlocked position of the barrel exists between the cylinder 2 and

the body of the device, or by opposite movement in the release of the cylinder 2 in order to enable it to be rotated freely.

The formation of the plurality of splines 3*d* (six in the embodiment illustrated in FIGS. 15 and 16) on the bearing portion 3*c* makes it possible to provide many precise settings which can ensure the most effective bearing contact, in fluid-tight manner, between the barrel and the magazine cylinder, despite the machining irregularities of the cartridges.

It is also to be noted that the angular movement of the collar 30 extends over an arc of 60 to 70° which is bounded by the opening of the laterally formed recesses 1*k* in the bearing portion 1*j* of the body 1. Consequently, the pitch of the screwthreaded portion of the barrel will be determined so as to give the rectilinear displacements of the said barrel the necessary amplitude to permit of effective locking and rapid release of the magazine cylinder 2.

Additionally, it is also proposed to co-ordinate the angular movement of the collar 30 with a safety arrangement which renders firing impossible in cases where the barrel and the revolver cylinder are not in the sealing-tight locking position which is most advantageous for obtaining the best efficiency from the device and for the maximum security.

For this purpose there is positioned at the rear of the front part 9*b* of the cocking slider, which is made in two parts, a stud 9*e* which projects from the lower surface of the slider part 9*b* and enters an arcuate recess 30*b* formed in the collar 30 along the entire axial width thereof. A second arcuate recess 30*c* forms an extension of the recess 30*b* laterally, but only extends along part of the axial width of the collar so as to leave a shoulder 30*e* (FIG. 17) against which the stud 9*e* is arranged to abut. In fact, it will be noted that according to the orientation of the movable collar, the stud 9*e* enters either into the recess 30*b* (FIG. 15) or into the recess 30*c* (FIG. 16).

When the stud 9*e* of the cocking slider part 9*b* enters the recess 30*b* it is possible for longitudinal movement of the slider to take place, and consequently cocking and firing are permitted. On the other hand, if the stud 9*e* enters the recess 30*c* no longitudinal movement of the cocking slider is possible since the stud 9*e* abuts the shoulder 30*e* and it is impossible to cock or fire the gun (see FIGS. 16 and 17).

This safety arrangement is also constructed so that, in the cocked position, just before firing (FIG. 15) the barrel locks the magazine cylinder so that firing is effected under full safety conditions and with the requisite efficiency. Whereas when the device is not being fired the magazine cylinder 2 is released by appropriate angular movement of the collar which is then in its safety position and the stud 9*e* of the cocking slider part 9*b* is in abutment with the shoulder 30*e*, and cocking is impossible since the appropriate inter-relation of the parts is not attained.

It will be seen that the embodiment described with regard to FIGS. 14 and 20 improves the efficiency and safety of the device in use by providing additional means for obtaining sealing-tight locking of the barrel against the magazine cylinder 2, also obliging the operator, before he can fire the device, to orientate those parts of the device for attaining this locking action which provides greater safety.

In operation, the magazine cylinder 2 is removed from the body 1 and fresh cartridges are inserted into the cartridge chambers, after which shaft 5 is inserted into sleeve 7 and retained in body 1. The cylinder 2 can then be rotated around shaft 5 to index the cartridge chambers with the breech cylinder and barrel 3. The centering stud 29 serves to center each chamber in exact coaxial alignment with the barrel for each firing operation.

I claim:

1. A dowel driving device comprising

a body member having a forward portion and a rear portion,

a barrel member defining a bore and being mounted in said forward portion of said body member,

a magazine defining a plurality of parallel and axial chambers adapted to accommodate cartridges for firing dowels from the device, the chambers being arranged for successive axial alignment with said bore of said barrel member,

means for rotatably mounting said magazine in said body member,

a breech member mounted for selective forward and rearward axial movement in said rear portion of said body member proximate the magazine for effecting, in said forward axial movement, frictional engagement between said breech member and said magazine so as to secure the magazine in position for firing the device, and in said rearward axial movement, movement of said breech member away from said magazine,

trigger means mounted on said body member,

a firing pin mounted for longitudinal movement in and relative to, said breech member, and arranged in axial alignment with said barrel member for firing cartridges in the magazine chambers,

a cocking slider mounted for longitudinal displacement relative to said body member, and

a sear mounted on said cocking slider and arranged for releasable engagement with said trigger means and said firing pin.

2. A dowel driving device comprising

a body member having a forward portion and a rear portion, the rear portion defining a bore having a portion thereof formed with a screwthreaded surface,

a barrel member defining a bore and being mounted in said forward portion of said body member,

a magazine defining a plurality of parallel and axial chambers adapted to accommodate cartridges for firing dowels from the device the chambers being arranged for successive axial alignment with said bore of said barrel member,

means for rotatably mounting said magazine in said body,

a breech member formed with an external screwthreaded portion and mounted for selective forward and rearward axial movement in said bore of said rear portion of said body member proximate the magazine for effecting, in said forward axial movement, frictional engagement between said breech member and said magazine so as to secure the magazine in position for firing the device, and in said rearward axial movement, movement of said breech member away from said maagzine,

trigger means mounted on said body member,

a firing pin mounted for longitudinal movement in, and relative to, said breech member, and arranged in axial alignment with said barrel member for firing cartridges in the magazine chambers,

a cocking slider mounted for longitudinal displacement relative to said body member, and

a sear mounted on said cocking slider and arranged for releasable engagement with said trigger means and said firing pin.

3. A dowel driving device comprising

a body member having a forward portion and a rear portion, the rear portion defining a bore having a portion thereof formed with a screwthreaded surface,

a barrel member defining a bore and being mounted in said forward portion of said body member,

a magazine defining a plurality of parallel and axial chambers adapted to accommodate cartridges for

firing dowels from the device the chambers being arranged for successive axial alignment with said bore of said barrel member,

means for rotatably mounting said magazine in said body,

a breech member formed with an external screwthreaded portion and mounted for selective forward and rearward axial movement in said bore of said rear portion of said body member proximate the magazine for effecting, in said forward axial movement, frictional engagement between said breech member and said magazine so as to secure the magazine in position for firing the device, and in said rearward axial movement, movement of said breech member away from said magazine,

trigger means mounted on said body member,

a firing pin mounted for longitudinal movement in, and relative to, said breech member, and arranged in axial alignment with said barrel member for firing cartridges in the magazine chambers,

spring means mounted in said breech member and arranged to constantly urge said firing pin in a direction towards said magazine,

support means mounted in said breech member, for supporting said spring means,

a cocking slider mounted for longitudinal displacement relative to said body member, and

a sear mounted on said cocking slider and arranged for releasable engagement with said trigger means and said firing pin.

4. A device according to claim 3, wherein lever means is detachably mounted in said breech member for effecting angular movement of said breech member, said lever means releasably engaging said support means.

5. A device according to claim 4, wherein said support member is provided with means for guiding a portion of said firing pin during the movement of the firing pin relative to said breech member.

6. A dowel driving device comprising

a body member having a forward portion and a rear portion, the rear portion defining a bore having a portion thereof formed with a screwthreaded surface,

a barrel member defining a bore and being mounted in said forward portion of said body member,

a magazine defining a plurality of parallel and axial chambers adapted to accommodate cartridges for firing dowels from the device, the chambers being arranged for successive axial alignment with said bore of said barrel member,

means for rotatably mounted said magazine in said body,

a breech member formed with an external screwthreaded portion and mounted for selective forward and rearward axial movement in said bore of said rear portion of said body member proximate the magazine for effecting, in said forward axial movement, frictional engagement between said breech member and said magazine so as to secure the magazine in position for firing the device, and in said rearward axial movement, movement of said breech member away from said magazine, said breech member having a diametrically disposed bore,

trigger means mounted on said body member,

a firing pin mounted for longitudinal movement in, and relative to, said breech member, and arranged in axial alignment with said barrel member for firing cartridges in the magazine chambers,

spring means arranged to constantly urge said firing pin in a direction towards said magazine,

support means mounted in said breech member for supporting said spring means and defining a diametrically disposed bore in registry with said diametrically disposed bore of said breech member,

lever means mounted in said diametrically disposed bore of said breech member and in said diametrically disposed bore of said support means,

a cocking slider mounted for longitudinal displacement relative to said body member, and

a sear mounted on said cocking slider and arranged for releasable engagement with said trigger means and said firing pin.

7. A device according to claim 6, wherein said support member is provided with means for guiding a portion of said firing pin during the movement of the firing pin relative to said breech member.

8. A dowel driving device comprising

a body member having a forward portion,

a barrel member defining a bore and being mounted in said forward portion of said body member,

a magazine defining a plurality of parallel and axial chambers adapted to accommodate cartridges for firing dowels from the device, the chambers being arranged for successive axial alignment with said bore of said barrel member,

means for rotatably mounting said magazine in said body member,

barrel-engaging means mounted on said forward portion of said body member and arranged to impart selective angular movement to said barrel member, and

means for effecting axial longitudinal movement of said barrel member upon angular movement being imparted to said barrel member, the barrel member being proximate said magazine,

whereby angular movement of said barrel member in one direction causes the barrel member to be displaced axially rearwardly a sufficient distance so as to frictionally engage said magazine, angular movement of the barrel member in a direction opposite to said one direction causing the barrel member to be displaced axially forwardly away from said magazine.

9. A dowel driving device comprising

a body member having a forward portion and a rear portion,

a barrel member defining a bore and being mounted in said forward portion of said body portion,

a magazine defining a plurality of parallel and axial chambers adapted to accommodate cartridges for firing dowels from the device, the chambers being arranged for successive axial alignment with said bore of said barrel member, means for rotatably mounting said magazine in said body member,

a breech member mounted for selective forward and rearward axial movement in said rear portion of said body member proximate the magazine for effecting, in said forward axial movement, frictional engagement between said breech member and said magazine so as to secure the magazine in position for firing the device, and in said rearward axial movement, movement of said breech member away from said magazine,

trigger means mounted on said body member,

a firing pin mounted for longitudinal movement in, and relative to, said breech member, and arranged in axial alignment with said barrel member for firing cartridges in the magazine chambers,

a cocking slider mounted for longitudinal displacement relative to said body member,

a sear mounted on said cocking slider and arranged for releasable engagement with said trigger means and said firing pin,

barrel-engaging means mounted on said forward portion of said body member and arranged to impart selective angular movement to said barrel member, and

means for effecting axial longitudinal movement of said barrel member upon angular movement being imparted to said barrel member, the barrel member being proximate said magazine,

whereby angular movement of said barrel member in one direction causes the barrel member to be displaced axially rearwardly a sufficient distance so as to frictionally engage said magazine, angular movement of the barrel member in a direction opposite to said one direction causing the barrel member to be displaced axially forwardly away from said magazine.

10. A device according to claim 9, wherein said barrel-engaging means defines an axially and arcuately disposed groove formed in an internal surface of said barrel-engaging means, said cocking slider having a projection arranged to extend into said groove of said barrel-engaging means, whereby, when said barrel member is moved angularly in said opposite direction, said cocking slider projection engages said groove of said barrel-engaging means and prevents longitudinal displacement of the cocking slider necessary for cocking the device, angular movement of said barrel member in said one direction causing said projection to move into a position wherein the slider is free to move longitudinally relative to said body member.

11. A dowel driving device comprising

a body member having a forward portion,

a barrel member defining a bore and being mounted in said forward portion of said body member,

a magazine defining a plurality of parallel and axial chambers adapted to accommodate cartridges for firing dowels from the device, the cartridges being arranged for successive axial alignment with said bore of said barrel member,

means for rotatably mounting said magazine in said body member,

an annular collar mounted on, and for angular movement about, an external bearing surface of said forward portion of said body member and arranged to impart selective angular movement of said barrel member, and

means for effecting axial longitudinal movement of said barrel member upon angular movement being imparted to said barrel member, the barrel member being proximate said magazine,

whereby angular movement of said barrel member in one direction causes the barrel member to be displaced axially rearwardly a sufficient distance so as to frictionally engage said magazine, angular movement of the barrel member in a direction opposite to said one direction causing the barrel member to be displaced axially forwardly away from said magazine.

12. A dowel driving device comprising

a body member having a forward portion defining a bore having an internal screw threaded portion,

a barrel member defining a bore and having an external screw threaded portion which engages the internal screw threaded portion of said bore of said forward portion of said body member,

a magazine defining a plurality of parallel and axial chambers adapted to accommodate cartridges for firing dowels from the device, the chambers being arranged for successive axial alignment with said bore of said barrel member,

means for rotatably mounting said magazine in said body member, and

collar means mounted on, and for angular movement about, an external bearing surface of said forward portion of said body member, and arranged to impart selective angular movement to said barrel member, the barrel member being proximate said magazine,

whereby angular movement of said barrel member in one direction causes the barrel member to be displaced axially rearwardly a sufficient distance so as

to frictionally engage said magazine, angular movement of the barrel member in a direction opposite to said one direction causing the barrel member to be displaced axially forwardly away from the magazine.

13. A device according to claim 12, wherein said collar means is provided with radially inwardly extending spigot means which is arranged to engage an external surface of said barrel member so that angular movement of said collar means will cause said barrel member also to move angularly.

14. A dowel driving device comprising

a body member having a forward portion and a rear portion,

a barrel member defining a bore and being mounted in said forward portion of said body member,

a magazine defining a plurality of parallel and axial chambers adapted to accommodate cartridges for firing dowels from the device, each chamber being formed with a frusto-conical rear portion for receiving correspondingly shaped cartridge supports therein, the diameter of said frusto-conical rear portion being greater than the remainder of the magazine chamber, the chambers being arranged for successive axial alignment with said bore of said barrel member,

means for rotatably mounting said magazine in said body member,

a breech member mounted for selective forward and rearward axial movement in said rear portion of said body member proximate said magazine for effecting, in said forward axial movement, frictional engagement between said breech member and said magazine so as to secure the magazine in position for firing the device, and in said rearward axial movement, movement of said breech member away from said magazine,

trigger means mounted on said body member,

a firing pin mounted for longitudinal movement in, and relative to, said breech member, and arranged in axial alignment with said barrel member for firing cartridges in the magazine chambers,

a cocking slider mounted for longitudinal displacement relative to said body member, and

a sear mounted on said cocking slider and arranged for releasable engagement with said trigger means and said firing pin.

15. A dowel driving device comprising

a body member having a forward portion and a rear portion,

a barrel member defining a bore and being mounted in said forward portion of said body member,

a magazine defining a plurality of parallel and axial chambers adapted to accommodate cartridges for firing dowels from the device, the chambers being arranged for successive axial alignment with said bore of said barrel member,

means for rotatably mounting said magazine in said body member,

a breech member mounted for selective forward and rearward axial movement in said rear portion of said body member proximate said magazine for effecting, in said forward axial movement, frictional engagement between said breech member and said magazine so as to secure the magazine in position for firing the device, and in said rearward axial movement, movement of said breech member away from said magazine,

trigger means mounted on said body member,

a firing pin mounted for longitudinal movement in, and relative to, said breech member, and arranged in axial alignment with said barrel member for firing cartridges in the magazine chambers,

a first cocking slider element mounted for longitudinal displacement relative to said body member,

a second cocking slider element mounted forwardly of said first cocking slider element and for longitudinal displacement relative to said body member together with said first cocking slider element, means for releasably interengaging said first and said second cocking slider elements, and

a sear mounted on said cocking slider and arranged for releasable engagement with said trigger means and said firing pin.

16. A dowel driving device comprising

a body member having a forward portion and a rear portion,

a barrel member defining a bore and being mounted in said forward portion of said body member,

a magazine defining a plurality of parallel and axial chambers adapted to accommodate cartridges for firing dowels from the device, the chambers being arranged for successive axial alignment with said bore of said barrel member,

means for rotatably mounting said magazine in said body member,

a breech member mounted for selective forward and rearward axial movement in said rear portion of said body member proximate said magazine for effecting, in said forward axial movement, frictional engagement between said breech member and said magazine so as to secure the magazine in position for firing the device, and in said rearward axial movement, movement of said breech member away from said magazine,

trigger means mountetd on said body member,

a firing pin mounted for longitudinal movement in, and relative to, said breech member, and arranged in axial alignment with said barrel member for firing cartridges in the magazine chambers,

a first cocking slider element mounted for longitudinal displacement relative to said body member,

a second cocking slider element mounted forwardly of said first cocking slider element and for longitudinal displacement relative to said body member together with said first cocking slider element,

means for releasably interengaging said first and said second cocking slider elements,

means mounted externally on said forward portion of said body member and arranged to retain in position said second cocking slider element so as to allow said second cocking slider element to move longitudinally relative to said body member, and whereby removal of said shield means from said forward portion of said body member permits disengagement of said second cocking slider element from said first cocking slider element, and

a sear mounted on said cocking slider and arranged for releasable engagement with said trigger means and said firing pin.

17. A device according to claim 16 wherein said shield means comprises two shield parts which, when mounted on said forward portion of said body member, are movable angular relative to one another, the shape of the shield parts being such that in one position relative to one another, they extend over a circular area of 360°.

18. A dowel driving device comprising

a body member having a forward portion and a rear portion,

a barrel member defining a bore and being mounted in said forward portion of said body member,

a magazine defining a plurality of parallel and axial chambers adapted to accommodate cartridges for firing dowels from the device, the chambers being arranged for successive axial alignment with said bore of said barrel member,

means for rotatably mounting said magazine in said body member,

a breech member mounted for selective forward and rearward axial movement in said rear portion of said

body member proximate said magazine for effecting, in said forward axial movement, frictional engagement between said breech member and said magazine so as to secure the magazine in position for firing the device, and in said rearward axial movement, movement of said breech member away from said magazine,

trigger means mounted on said body member,

a firing pin mounted for longitudinal movement in, and relative to, said breech member, and arranged in axial alignment with said barrel member for firing cartridges in the magazine chambers,

a first cocking slider element mounted for longitudinal displacement relative to said body member,

a second cocking slider element mounted forwardly of said first cocking slider element and for longitudinal displacement relative to said body member together with said first cocking slider element,

means for releasably interengaging said first and said second cocking slider elements,

mouth-piece means mounted at a forward end of said cocking slider for engagement with a surface into which a dowel is to be driven, the mouth-piece defining a bore which is arranged in axial alignment with said bore of said barrel member, said mouth-piece also defining a rearwardly directed recess,

spring means mounted in said recess of said mouth-piece means for constantly urging said cocking slider forwardly, and

a sear mounted on said cocking slider and arranged for releasable engagement with said trigger means and said firing pin.

No references cited.

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