MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS 1967-A
DARRELL CHARLES SYMONDS, 106-116 Dowd Street, Welshpool, State of Western Australia, Commonwealth of Australia

hereby apply for the grant of a Standard Patent for an invention entitled "IMPROVEMENTS RELATING TO A TYNE SUPPORT" which is described in the accompanying provisional specification.

For a Convention application—details of basic application(s)—

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For an application made by virtue of section 51—

Original Application No. by request that the Patent may be granted as a Patent of Addition for the Patent applied for on Application No. in the name of.

请求 that the term of the Patent of Addition be the same as that for the main invention or so much of the term of the Patent for the main invention as is unexpired:

My address for service is COLLISON & CO., Patent Attorneys, Savings Bank Building, 87 King William Street, Adelaide, South Australia, 5000.

Dated this 13th day of August 1982

DARRELL CHARLES SYMONDS,
By his Patent Attorneys, COLLISON & CO.

(To be completed where application is made by a person other than the applicant for, or the patentee under, the patent for the main invention.)

I, the applicant for Application No.

the patentee of Patent No.

Dated this day of 19—

To:
THE COMMISSIONER OF PATENTS

This form must be accompanied by either a provisional specification (Form 9 and true copy) or by a complete specification (Form 10 and true copy).
DECLARATION IN SUPPORT OF AN APPLICATION FOR A PATENT

In support of the Application made by DIENE (NO. 1) PROPRIETARY LIMITED for a patent for an invention entitled "IMPROVEMENTS RELATING TO A TYNE SUPPORT"

1. DARRELL CHARLES SYMONDS
   of 13 Linkwater Street, Shelley, State of South Australia, Commonwealth of Australia
   do solemnly and sincerely declare as follows:

   1. I am the applicant for the patent.

   2. I am the actual inventor of the invention.

The applicant company is the assignee of the actual inventor.

Declared at Death this 20th day of December, 1983

THE COMMISSIONER OF PATENTS.

(signature of declarant)

(IMPORTANT—Cross out inapplicable words in the above Form.)

Accordingly, in operation, forward movement of the tyne...
(54) IMPROVEMENTS RELATING TO A TYNE SUPPORT
(75) DARRELL CHARLES SYMONDS
(21) 18013/83 (22) 13.8.82 (23) 15.8.83 (24) 13.8.82
(43) 16.2.84
(51) A01B 23/02
(74) C0
(57) Claim
5. A spring release tyne support assembly including a first bracket and a second bracket, these being adapted to secure themselves and a supported tyne and share with respect to a support bar, the first said bracket including a transverse pivot support arrangement for a tyne holding member, and the second said bracket including an outwardly extending arm adapted to extend upwardly and forwardly with respect to a support bar to which the brackets are to be clamped, and resilient spring means engaging between the said upwardly and outwardly extending arm of the second said bracket and a forwardly extending portion of the tyne support means the arrangement being such that with a tyne supported by the tyne support means, pressure from moving the tyne with an attached share through the ground in a forward direction will result in pressure attempting to extend the resilient spring means.
Complete Specification for the invention entitled:

"Improvements relating to a tyne support"

The following statement is a full description of this invention, including the best method of performing it known to me.
This invention relates to a spring tyne release support assembly of a type adapted to swing back under spring tension when encountering significant obstacles.

It is generally known to provide for a tyne which is of arcuate shape and adapted to provide, with some resiliency, support with respect to a crossbeam, of a share at the lower end of the tyne.

In an assembly using this invention there is a first bracket and a second bracket, adapted to receive themselves and a supported tyne and share with respect to a support bar, the first said bracket including a transverse pivot support arrangement for a tyne holding member, and the second said bracket including an outwardly extending arm adapted to extend upward and forwardly with respect to a cross support bar to which the brackets are to be clamped, and resilient spring means engaging between the said upwardly and outwardly extending arm of the second said bracket and a forwardly extending portion of the tyne support means the arrangement being such that with a tyne supported by the tyne support means, pressure from moving the tyne with an attached share through the ground in a forward direction will result in pressure attempting to extend the resilient spring means.

 Preferably there are means on the upwardly and outwardly extending arm adapted to provide for adjustment of the spring tension and preferably there are two helical springs one to each side of a central alignment aligned in a vertical direction to provide for the spring tension.

The position of the spring support means is limited by means of a stop secured to the first said bracket.
Accordingly, in operation, forward movement of the tyne with an attached share will result in the share engaging in the ground up to a selected pressure.

If this selected pressure is exceeded the share will be caused to move backward relative to its support that is, a cross bar by pivoting of the share about the transverse pivot axis and by reason of an extension of the resilient spring means and the arrangement is such that the pressure will increase the further the share is pushed backwards and upwards to clear the impediment.

A difficulty with such an arrangement is that very significant pressures are involved, so that once a share has cleared a typical obstacle such as a stump or a stone, the share will be forced to return to its lowermost position with considerable force.

Such force will result in high returning speeds and the resulting impact of the tyne support member against the stop and this having resultant impacting forces through the clamping means and the support bar is such that both the bearings in the pivotal support, the stop itself and other members have been all subjected to a high rate of wear.

I have made an extremely surprising discovery. If the transverse bearing providing the pivot support for the tyne support means includes an elastomeric material and in particular a nylon material and further particularly a graphite filled nylon material, then for a reason that is not yet fully understood, the returning speed of the tyne even though subjected to similar forces as has hitherto been the case and with substantially the same tolerances as hitherto used is significantly less.
In a preferred instance, a cylindrical member comprising nylon having ingrained therein graphite, is inserted so as to provide a snug fit with respect to an outer cylindrical support member and an inner axle supporting the tyne support bracket.

There is accordingly as a preferred instance, a break-away force approximately 132 kilograms pressure exerted at the point of the tyne that is at the share location so that by reason of the geometric construction of the support apparatus there is a very high lateral stress on the nylon bearing material.

When the tyne is accordingly drawn back and released, with such a bearing material providing for the bearing, there is a very significant reduction in apparent velocity of the return resulting in much less impact at the end of the movement of the tyne and hence much less damage apparently being caused to the support bearings.

In experimental trials thus far conducted therefore, it has been found that such a material placed in such a position does provide very significant reductions in wear as compared to wear experienced with conventional metal.

The invention perhaps in one form then could be said to reside in the concept of providing for a damped return of a tyne where this is supported for a pivotal movement about an axial support and under spring tension the invention being characterised by the inclusion in such an arrangement of nylon bearings.

Perhaps as a further feature, the bearings include graphite filled nylon bushes.
It is believed that with the forces involved, the nylon is subject to plastic deformation and the recovery rate of such deformation is slower than that which would otherwise be anticipated for other materials such as metal so that the speed of return of the tyne is governed by a limitation of the recovery rate of the deformation shape of the plastic material.

The invention in a further form can reside in the combination of a tyne supported by the arrangement described or by a tyne supported by any pivotal connection providing for spring return where there is such a nylon bearing providing for a limit of return rate as described.

For a better understanding of this invention it will now be described with the assistance of drawings in which:

FIG. 1 is a side elevation of a spring release tyne support assembly according to the preferred embodiment,

FIG. 2 is a cross-sectional view through the bearing support of the tyne as shown in FIGS. 1 and 3, and

FIG. 3 is an end view of the same assembly as shown in FIG. 1.

Referring then to the drawings in detail, there is shown a spring release tyne support assembly 1 which includes a first bracket 2 and second bracket 3 adapted to secure themselves and a supported tyne shown at 4 and a share which is not shown attached, with respect to a support bar at 5.
The second bracket 3 includes an outward and upwardly extending arm 6 and at an upper end of this at 7 is an outwardly extending extension through which two connecting bolts 8 are secured as is particularly shown in FIG. 2 by which two springs 9 are secured to be connected to the outward extension of the first bracket 2 by interconnecting with arm 10.

The first bracket 2 is comprised of two portions which are interconnected through a pivot support which is located to extend in a transverse direction to that in which the tyne would normally be drawn this pivot connection and pivot bolt being shown at 11.

The upper portion of the first bracket 2 shown at 12 has two che.. 13 through which bolt 14 passes with a snug fit.

A cylindrical member 15 is secured to form a part of the second portion of the first bracket 2 the relationship of internal diameter of the cylindrical member 15 as compared to the bolt 14 being approximately as shown in the drawing.

Interspersed between the two is a cylindrical bearing comprised of graphite filled nylon.

The tolerance between the cylindrical bearing 16, the cylindrical outer casing 15 and the pivot bolt 14 is such that there will not be excessive play between the parts but that there be under a no load condition that is without the springs 9 being in place, a reasonably free pivot action between the respective members that is particularly between the nylon filled graphite material 17 and bolt 14.
7.

The tyne 4 is appropriately clamped and bolted by clamp bolts 18 and 19.

The whole of the assembly is arranged so that there is necessarily a significant pressure necessary to cause the tyne to commence pivoting from the normally retained position as shown in FIG. 1 where an upper portion of the cheeks 20 at 21 engage against a shape acting as a stop.

According to a preferred embodiment and a preferred setting of the bolts 8 and the types of spring 9, a break-away pressure of 289 pounds has been arranged and this increases to a full extent of kick-back position where the pressure will reach 480 pounds at the point of the shank of the tyne and in a direction tangential to the pivot support 11.

The result of such a very high force would normally, upon release from the kick back position, have the result of causing the tyne to return with very high velocity but regardless of the velocity, it appears for possibly reasons that cannot be fully understood that such an arrangement causes an extremely high wear of any bearings that have hitherto been used in such an arrangement.

It is stressed that it would normally not be expected that a soft bearing material such as nylon or especially graphite filled nylon would be suitable for the application.

In the extreme conditions of heat and extraordinarily dust filled atmosphere, such bearings would not be in any sense expected to survive any time.
It is therefore with the greatest of surprise that it has been found for a reason not related to the softness of the material, that the incorporation of such material in this application against the total expectation of those familiar with this field, has resulted in very significant improvements in the wear rate and a very significant improvement in the long term durability of such an arrangement in a working condition.

Tests conducted thus far in comparable situations between a tyne support arrangement in which a metal bearing is used as compared to that which is described in the preferred embodiment, have indicated a very obvious reduction in return velocity of the tyne under identical kick-back conditions. It is suspected that under sustained static pressure, some deformation of the nylon might occur causing the very visible reduction in return velocity which is very apparent to the eye in such an arrangement but it is stressed that the exact reason is still not certain.
THE CLAIMS DEFINING THE INVENTION ARE AS FOLLOWS:

1. A spring release tyne support assembly wherein there are provided means to effect a damping of the return of a tyne subsequent to its release from a kick back position.

2. A spring release tyne support assembly including a tyne support member pivotally supported with respect to a bracket, the pivotal connection being such as to effect a damping of the return of a tyne when supported by the tyne support member when released from a kick back position.

3. A spring release tyne support assembly as in the immediately preceding claim wherein the pivot connection includes a member of nylon of a shape and otherwise adapted to provide the aforesaid dampening of the rate of return of the tyne subsequent to release from a kick back position.

4. A spring release tyne support assembly as in the last preceding claim wherein the nylon is graphite filled.

5. A spring release tyne support assembly including a first bracket and a second bracket, these being adapted to secure themselves and a supported tyne and share with respect to a support bar, the first said bracket including a transverse pivot support arrangement for a tyne holding member, and the second said bracket including an outwardly extending arm adapted to extend upwardly and forwardly with respect to a support bar to which the brackets are to be clamped, and resilient spring means engaging between the said upwardly and outwardly extending arm of the second said bracket and a forwardly extending portion
of the tyne support means the arrangement being such that with a tyne supported by the tyne support means, pressure from moving the tyne with an attached share through the ground in a forward direction will result in pressure attempting to extend the resilient spring means.

6. A spring release tyne support assembly as in the last preceding claim wherein the pivot support arrangement for a tyne holding member includes means to effect damping of the rate of return of the tyne when supported by the tyne holding member when released from a kick back position.

7. A spring release tyne support assembly as in the last preceding claim wherein the pivot support arrangement further includes a pivot bolt, a cylindrical housing extending around the bolt, and interposed between the said housing and the bolt, a nylon member of cylindrical shape providing for the damping effect.

8. A spring release tyne support assembly substantially as described in the specification with reference to and as illustrated by the accompanying drawings.

Dated this 15th day of August 1983

BY HIS PATENT ATTORNEYS
COLLISON & CO.
such means, as in support arrangement to effect supported kick in the cylindrical housing and the reference drawings.
END