



H-1001-0-WO

PCT/CA2007/001717  
05 May 2008 05-05-2008**ABSTRACT OF THE DISCLOSURE**

Disclosed is (i) a molding-material handling component (8) of a metal molding system (100), (ii) a metal molding system (100) having a molding-material handling component (8), and (iii) a method, and (iv) a hot runner (30) having a molding-material handling component (8). The molding-material handling component (8), includes a component body (9) constructed of an alloy, the alloy being contactable, at least in part, against a molten metallic molding material (52) to be processed, the alloy improves, at least in part, high-temperature creep resistance of the component body (9), the alloy includes: from about 0.05 to about 0.12, in weight percent, of C, from about 9.8 to about 11.2, in weight percent, of Cr, from about 5 to about 7, in weight percent, of Co, from about 0.5 to about 1.0, in weight percent, of Mo, from about less than 0.7, in weight percent, of W, from about 0.1 to about 0.4, in weight percent, of V, from about 0.2 to about 0.5, in weight percent, of Nb, from about 0.005 to about 0.0015, in weight percent, of B, from about 0.1 to about 0.8, in weight percent, of Si, from about 0.3 to about 1.3, in weight percent, of Mn, from about less than, in weight percent, 0.035 of N, from about less than, in weight percent, 0.025 of P, from about less than, in weight percent, 0.015 of S, and from about, in weight percent, 0.2 to 1.2 of Ni.

**COMPONENT OF METAL MOLDING SYSTEM****TECHNICAL FIELD**

5 The present invention generally relates to, but is not limited to, molding systems, and more specifically the present invention relates to, but is not limited to, (i) a component of a molding system, (ii) a molding system having a component, and/or (iii) a method, etc.

**BACKGROUND OF THE INVENTION**

10

Examples of known molding systems are (amongst others): (i) the HyPET™ Molding System, (ii) the Quadloc™ Molding System, (iii) the Hylectric™ Molding System, and (iv) the HyMet™ Molding System, all manufactured by Husky Injection Molding Systems Limited (Location: Bolton, Ontario, Canada; [www.husky.ca](http://www.husky.ca)).

15

Generally, the processing (handling) of a molten metallic molding material imposes challenges on materials used in components of known metal molding systems, such as: (i) high heat that causes reduction in mechanical properties (of components of the molding system, etc), and/or (ii) corrosive attack by the molten molding material on the components of the metal molding system. It is generally known to use a combination of two or more layers in a barrel (generally known as a conduit or the component of the metal molding system). More specifically, known barrels for molding systems configured for processing magnesium alloys, etc, have a body that includes two materials: (i) an Inconel 718 outer shell that provides high-temperature strength and creep resistance, and (ii) a Stellite 12 inner liner that provides corrosion resistance and wear resistance.

25

United States Patent Number 4,089,466 (Inventor: Lomax et al; Published: 5/16/1978) discloses a lining alloy for bimetallic cylinders; more specifically, this patent appears to disclose a wear and corrosion resistant alloy for lining cylinders used in extrusion and injection molding machines comprises tantalum carbide admixed with a nickel-cobalt base alloy. The cylinder lining is preferably prepared by placing a quantity of the alloy in the cylinder and capping the ends of the cylinder. The cylinder is then heated above the melting point of the alloy and spun at a high rate of speed to centrifugally coat the inner surface of the cylinder. The cylinder's end caps are then removed and the lining finished to the correct internal diameter and finish by conventional lathe and hone means. The tantalum carbide added to the base alloy has an affinity for carbon and tends to reduce the free carbon

30

**H-1001-0-WO**PCT/CA2007/001717  
05 May 2008 05-05-2008

in the final matrix producing a lining which has desirable hardness and corrosion resistance throughout the thickness of the lining.

5 United States Patent Number 4,399,198 (Inventor: Lomax et al; Published: 8/16/1983) discloses a lining alloy for bimetallic cylinders; more specifically, this patent appears to disclose a wear and corrosion resistant alloy for lining cylinders used in extrusion and injection molding machines comprises at least two carbides admixed with a nickel-cobalt base alloy. The cylinder lining is preferably prepared by placing a quantity of the alloy in the cylinder and capping the ends of the cylinder. The cylinder is then heated above the melting point of the alloy and spun at a high rate of  
10 speed to centrifugally coat the inner surface of the cylinder. The cylinder's end caps are then removed and the lining finished to the correct internal diameter and finish by conventional lathe and hone means. The carbide mixture is evenly dispersed in the lining and produces a lining having desirable hardness and corrosion resistance throughout the thickness of the lining.

15 United States patent Number 4,863,661 (Inventor: Maddy; Published: 9/9/1989) discloses a resin molding process employing a nickel-based alloy liner; more specifically, this patent appears to disclose a method of producing cylindrical objects with one or more lobes in which the bore surfaces are completely protected by a surface layer of abrasion resistant and/or corrosion resistant alloy and which protective layer is free of any contamination by the metal of the substrate. A hard, wear  
20 resistant, and corrosion resistant nickel-based alloy is especially suitable as lining material for surface of cylindrical products, such as housings or shells used in extrusion and injection molding devices for processing halogenated resins or rubbers. The alloys will preferably also contain 0.5 to 5% silicon and 1 to 4% boron. Also disclosed is a method of producing cylindrical objects with one or more lobes in which the bore surfaces are completely protected by a surface layer of abrasion resistant  
25 and/or corrosion resistant alloy, such as the above-described metal-based alloy.

United States Patent Number 5,185,162 (Inventor: Chou; Published: 2/9/1993) discloses a corrosion and wear resistant bimetallic cylinder; more specifically, this patent appears to disclose a bimetallic cylinder of steel having an alloy inlay which includes chromium boride in a matrix of iron alloy  
30 containing carbon, silicon, nickel and copper. The chromium boride imparts wear resistance to the inlay and relatively high contents of chromium, nickel and silicon and the presence of molybdenum and copper in the alloy make it resistant to corrosion. The cylinder is useful for injection molding and extrusion of plastics.

**H-1001-0-WO**PCT/CA2007/001717  
05 May 2008 05-05-2008

United States Patent Number US 5,565,277 (Inventor: Cox et al; Published: 10/15/1996) discloses injection molding and extrusion barrels and alloy compositions thereof. More specifically, this patent appears to disclose a bimetallic barrel for use in injection molding and extrusion. The barrel is formed of a backing steel and a metal inlay liner. The backing steel is selected from the group consisting of micro-alloyed steels, carbon steel 1045 and carbon steel 1060. The metal inlay liner is formed of an alloy selected from the group consisting of alloys.

United States Patent Number 5,711,366 (Inventor: Mihelich et al; Published: 01/27/1998) discloses processing corrosive molten or semi-molten metallic material in an apparatus having contact surfaces of niobium-based alloy; more specifically, this patent appears to disclose an apparatus for processing materials which are highly corrosive while in a thixotropic state (for example, aluminum). The apparatus includes a barrel which is adapted to receive the material through an inlet. In the barrel, the material is heated and subjected to shearing, forming a highly corrosive, semi-solid slurry which is discharged from the barrel through a nozzle. The barrel is constructed with an outer layer of a first material and an inner layer of a Nb-based alloy which is bonded to the outer layer. Positioned within the passageway of the barrel is a screw, the rotation of which operates to subject the material to shearing and move the material through the barrel. The screw is constructed with an outer layer of the Nb-based alloy that is molecularly bonded to an inner core of a different material. The Nb-based alloy is resistant to the corrosive effects of the material being processed.

United States Patent Number 5,752,770 (Inventor: Kawaguchi et al; Published: 5/19/1998) discloses a barrel for a twin screw extruder with an abrasion resistant layer; more specifically, this patent appears to disclose a barrel for a twin screw extruder having a pair of helical screws has a barrel body provided with a pair of partly overlapping cylindrical bores, and the pair of helical screws are rotatably supported in the pair of cylindrical bores of the barrel to mix and extrude a molding material. An abrasion resistant layer is formed in at least portions of the surfaces of the pair of cylindrical bores extending in the vicinity of at least one of the two lines of intersection of the pair of partly overlapping cylindrical bores. The abrasion resistance of the abrasion resistant layer has a maximum in a portion thereof around the line of intersection of the pair of cylindrical bores and decreases gradually with distance from the line of intersection. The abrasion resistant layer is formed by depositing a material containing a hard substance by build-up welding, and the hard substance content of the material in the abrasion resistant layer is varied with distance from the line of intersection. The abrasion resistant layer is formed by depositing a material consisting of a corrosion resistant base alloy and a hard substance. The abrasion resistant layer may be formed on a corrosion resistant layer formed over the entire surfaces of the pair of cylindrical bores.

**H-1001-0-WO**PCT/CA2007/001717  
05 May 2008 05-05-2008

United States Patent Number 5,996,679 (Inventor: Pinnow et al; Published: 12/07/1999) discloses powder metallurgical, fully dense cobalt-based articles with high hardness, having good wear and corrosion resistance for use as nozzles, barrels, barrel liners and piston rings in molding systems for molding semi-solid metals (such as magnesium alloys, etc).

European Patent Number 1,203,831 (Inventor: Antony et al; Published: 05/08/2002) discloses articles including stainless steels having high thermal fatigue resistance, high hot hardness, high impact strength, and low thermal expansion properties. The stainless steels include, for example, die casting dies for production of parts from molten aluminum, zinc, magnesium, and brass, as well as other articles that may undergo thermal stress through high temperature cycling.

United States Patent Number 2006/0196626 (Inventor: Vining et al; Published: 9/7/2006) discloses semisolid metal injection molding machine components; more specifically, this patent appears to disclose an alloy for components of semi-solid injection molding machinery. In particular, the alloy is an inter-metallic-hardened steel, known as a Maraging steel alloy. The Maraging steel alloy includes Cr, Co, Mo, and about 0.15% or less by weight C.

United State Patent Application 2004/0057862 (Inventor: Horiuchi et al; Published: 2004-03-25) discloses a heat-resistant martensite alloy used in high-temperature creep rapture strength and ductility, and process for producing the same; more specifically, this patent application appears to disclose a martensitic heat resistant alloy having a composition that includes, % by weight: 0.03 to 0.15% of C; 0.01 to 0.9% of Si; 0.01 to 1.5% of Mn; 8.0 to 13.0% of Cr; 0.0005 to 0.015% of Al; no more than 2.0% of Mo; no more than 4.0% of W; 0.05 to 0.5% of V; 0.01 to 0.2% of Nb; 0.1 to 5.0% of Co; 0.008 to 0.03% of B; less than 0.005% of N; and Fe and inevitable impurities as the remainder, wherein (B) the contents (% by weight) of Mo, W, B and N satisfy the following formulas  $(B-0.772N>0.007)$  and  $(W+1.916Mo-16.99B>2.0)$ . The martensitic heat resistant alloy has excellent oxidation resistance, hot workability and ductility and exhibits high creep rupture strength in a range of relatively long rupture time at a high temperature.

### SUMMARY OF THE INVENTION

According to a first aspect of the present invention, there is provided a molding-material handling component (8), including: a component body (9) constructed of an alloy, the alloy being contactable, at least in part, against a molten metallic molding material (52) to be processed, the alloy improves, at

H-1001-0-WO

PCT/CA2007/001717  
05 May 2008 05-05-2008

least in part, high-temperature creep resistance of the component body (9), the alloy includes: from about 0.05 to about 0.12, in weight percent, of C, from about 9.8 to about 11.2, in weight percent, of Cr, from about 5 to about 7, in weight percent, of Co, from about 0.5 to about 1.0, in weight percent, of Mo, from about less than 0.7, in weight percent, of W, from about 0.1 to about 0.4, in weight percent, of V, from about 0.2 to about 0.5, in weight percent, of Nb, from about 0.005 to about 0.0015, in weight percent, of B, from about 0.1 to about 0.8, in weight percent, of Si, from about 0.3 to about 1.3, in weight percent, of Mn, from about less than, in weight percent, 0.035 of N, from about less than, in weight percent, 0.025 of P, from about less than, in weight percent, 0.015 of S, and from about, in weight percent, 0.2 to 1.2 of Ni.

According to a second aspect of the present invention, there is provided a molding-material handling component (8), including an alloy including: from about 0.05 to about 0.12, in weight percent, of C, from about 9.8 to about 11.2, in weight percent, of Cr, from about 5 to about 7, in weight percent, of Co, from about 0.5 to about 1.0, in weight percent, of Mo, from about less than 0.7, in weight percent, of W, from about 0.1 to about 0.4, in weight percent, of V, from about 0.2 to about 0.5, in weight percent, of Nb, from about 0.005 to about 0.0015, in weight percent, of B, from about 0.1 to about 0.8, in weight percent, of Si, from about 0.3 to about 1.3, in weight percent, of Mn, from about less than, in weight percent, 0.035 of N, and from about less than, in weight percent, 0.025 of P, from about less than, in weight percent, 0.015 of S, and from about, in weight percent, 0.2 to 1.2 of Ni, the alloy being included in a component body (9), the component body (9) includes, at least in part, a conduit (11), the alloy being contactable, at least in part, against a molten metallic molding material (52) to be processed, the molten metallic molding material (52) includes a molten alloy of magnesium.

According to a third aspect of the present invention, there is provided a hot runner (30) of a metal molding system (100), the hot runner (30) including a molding-material handling component (8), including: a component body (9) constructed of an alloy, the molding-material handling component (8) including: a hot-runner component, the alloy being contactable, at least in part, against a molten metallic molding material (52) to be processed by the hot runner (30), the alloy improves, at least in part, high-temperature creep resistance of the component body (9), the alloy includes: from about 0.05 to about 0.12, in weight percent, of C, from about 9.8 to about 11.2, in weight percent, of Cr, from about 5 to about 7, in weight percent, of Co, from about 0.5 to about 1.0, in weight percent, of Mo, from about less than 0.7, in weight percent, of W, from about 0.1 to about 0.4, in weight percent, of V, from about 0.2 to about 0.5, in weight percent, of Nb, from about 0.005 to about 0.0015, in weight percent, of B, from about 0.1 to about 0.8, in weight percent, of Si, from about 0.3 to about

**H-1001-0-WO**PCT/CA2007/001717  
05 May 2008 05-05-2008

1.3, in weight percent, of Mn, from about less than, in weight percent, 0.035 of N, from about less than, in weight percent, 0.025 of P, from about less than, in weight percent, 0.015 of S, and from about, in weight percent, 0.2 to 1.2 of Ni.

- 5 The aspects of the present invention mitigate the known art by providing the following technical effect (or effects): a molding-material handling component of a metal molding system has a simplified structure, reduced manufacturing costs and/or reduced maintenance costs, etc.

### **BRIEF DESCRIPTION OF THE DRAWINGS**

10

A better understanding of the exemplary embodiments of the present invention (including alternatives and/or variations thereof) may be obtained with reference to the detailed description of the exemplary embodiments of the present invention along with the following drawings, in which:

- 15 FIG. 1 is a schematic representation of a molding-material handling component of a metal molding system according to a first exemplary embodiment (which is the preferred embodiment); and  
FIG. 2 is a schematic representation of a molding-material handling component of a metal molding system according to a second exemplary embodiment.

- 20 The drawings are not necessarily to scale and are sometimes illustrated by phantom lines, diagrammatic representations and fragmentary views. In certain instances, details that are not necessary for an understanding of the embodiments or that render other details difficult to perceive may have been omitted.

25

### **DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT(S)**

- FIG. 1 is a schematic representation of a molding-material handling component 8 (hereafter referred to as the "component 8") of a metal molding system 100 (hereafter referred to as the "system 100") according to the first exemplary embodiment. An example of a metal molding system is described in  
30 United States Patent Application Number 2006/0196626. The system 100 is, preferably, an injection molding system. The component 8 includes a component body 9 that is constructed of an alloy; the alloy is contactable, at least in part, against a molten metallic molding material 52 (hereafter referred to as the "material" 52). The material 52 is to be processed by the system 100. The alloy improves, at least in part, high-temperature creep resistance of the component body 9 by at least 20 times over  
35 known alloys that are used today in known metal molding systems. The component 8 of the system

100 is used to handle (convey) the material 52 that is processed by the system 100. The material 52 is corrosive against components of the system 100. The system 100 is used to mold a metal alloy (preferably, magnesium, or aluminum or zinc, etc) to form a molded article 54; specifically, the material 52 includes a molten alloy of magnesium, such as AZ91D. Preferably, the alloy improves (i) 5 high-temperature strength, (ii) creep resistance, (iii) corrosion resistance and/or (iv) wear resistance of the component body 9. The alloy withstands: (i) heat attacks and/or (ii) corrosive attacks from the material 52 (that is, either in a liquid state or a semi-molten state of the material 52).

Preferably or specifically, the alloy includes: (i) from about 0.05 to 0.12, in weight percent, of C, (ii) 10 from about 9.8 to 11.2, in weight percent, of Cr, (iii) from about 5 to 7, in weight percent, of Co, (iv) from about 0.5 to 1.0, in weight percent, of Mo, (v) from about less than 0.7, in weight percent, of W, (vi) from about 0.1 to 0.4, in weight percent, of V, (vii) from about 0.2 to 0.5, in weight percent, of Nb, (viii) from about 0.005 to 0.0015, in weight percent, of B, (ix) from about 0.1 to 0.8, in weight percent, of Si, (x) from about 0.3 to 1.3, in weight percent, of Mn, and (xi) from about less than, in 15 weight percent, 0.035 of N, from about less than, in weight percent, 0.025 of P, from about less than, in weight percent, 0.015 of S, and from about, in weight percent, 0.2 to 1.2 of Ni. It is understood that: C is carbon, Cr is chromium, Co is cobalt, Mo is molybdenum, W is tungsten, V is vanadium, Nb is niobium, B is boron, Si is silicon, Mn is manganese, N is nitrogen, P is Phosphorus, S is Sulfur and Ni is Nickel.

20

More preferably, the alloy includes amounts entirely within the ranges as identified above. Equivalents of the alloy are, preferably, those alloys that comply with DIN (Deutsches Institut für Normung) Standard 1.4911. Former names for the DIN 1.4911 standard are: (i) SV-RNOD Co, (ii) DIN Type (Code Number): X8CrCoNiM0106, or (iii) EN 1032, WL.

25

The system 100 includes a hopper 10 that is connected to an extruder 12. The hopper 10 is used or is configured to receive granules or particles of moldable molding material 50 (hereafter referred to as the "material 50"). The extruder 12 includes a barrel 18 (which is an example of a conduit 11). The barrel 18 receives the material 50 from the hopper 10. A screw 14 is located in the barrel 18, and the 30 screw 14 is used to process (or convert) the material 50 to make the injectable material 52 (the details of this conversion process is known to those skilled in the art and therefore the details will not be described here). The screw 14 is connected to an actuator 16 that is used to actuate movement of the screw 14. The barrel 18 includes a barrel head 19 (which is another example of the conduit 11) that is mounted to an end of the barrel 18. A machine nozzle 20 (which is also another example of the 35 conduit 11) is attached to the barrel head 19. The machine nozzle 20 is attached to a stationary mold

**H-1001-0-WO**PCT/CA2007/001717  
05 May 2008 05-05-2008

portion 22 (sometimes referred to as the "mold portion") of a mold 21. The machine nozzle 20 passes through a stationary platen 26. The machine nozzle 20 is used to convey the material 52 from the extruder 12 to the mold 21. The mold 21 also includes a movable mold portion 24 (sometimes referred to as the "mold portion") that is movable relative to the stationary mold portion 22. The stationary mold portion 22 is attached to the stationary platen 26. The movable mold portion 24 is attached to (or is supported by) a movable platen 28. The extruder 12 pushes or injects the material 52 into the mold 21 to mold the molded article 54. The component body 9 includes, at least in part, any one or more of: the conduit 11, the barrel 18, the barrel head 19, the machine nozzle 20, the mold 21 and/or the mold portions 22, 24.

According to a variant, the component body 9 (implemented as barrel 18 or as the barrel head 19 for example) includes a combination of (i) an outer shell made of the alloy and (ii) an inner liner that is made of the alloy. According to another variant, the component body 9 includes a combination of (i) an inner liner that is made of the alloy and (ii) an outer shell not made of the alloy.

Preferably, the system 100 further includes (but is not limited to), amongst other things, tangible subsystems, components, sub-assemblies, etc, that are known to persons skilled in the art; these items are not depicted and not described in detail since they are known. Such items are described in *Injection Molding Handbook* (Edited by Osswald/Turng/Gramann; ISBN: 3-446-21669-3; Published by HANSER Publishers, Munich, Germany). These items may include (for example): (i) tie bars (not depicted) that operatively couple the platens 26, 28 together, and/or (ii) a clamping mechanism (not depicted) coupled to the tie bars and used to generate a clamping force that is transmitted to the platens 26, 28 via the tie bars (so that the mold 21 may be forced to remain together while the material 52 is injected into the mold 21). These other things may include: (iii) a mold break force actuator (not depicted) coupled to the tie bars and used to generate a mold break force that is transmitted to the platens 26, 28 via the tie bars (so as to break apart the mold 21 once the molded article 54 has been molded in the mold 21), and/or (iv) a platen stroking actuator (not depicted) coupled to the movable platen 28 and is used to move the movable platen 28 away from the stationary platen 26 so that the molded article 54 may be removed from the mold 21, and (vi) hydraulic and/or electrical control equipment, etc.

FIG. 2 is a schematic representation of a molding-material handling component of a metal molding system according to a second exemplary embodiment. The component body 9 includes, at least in part, a hot runner nozzle 34 (which is an example of a hot-runner component 32) of a hot runner 30. The alloy of the component 8 is used in hardened and tempered state. To provide sufficient wear

**H-1001-0-WO**PCT/CA2007/001717  
05 May 2008 05-05-2008

resistance at high temperatures, various surface treatments may be applied. The surface improvements may involve thermal diffusion treatments such as nitriding, carburizing and nitrocarburizing. As a second method of surface improvement a ceramic coating may be applied. The third method may involve a combination of thermal diffusion and coatings.

5

The description of the exemplary embodiments provides examples of the present invention, and these examples do not limit the scope of the present invention. It is understood that the scope of the present invention is limited by the claims. The exemplary embodiments described above may be adapted for specific conditions and/or functions, and may be further extended to a variety of other applications that are within the scope of the present invention. Having thus described the exemplary embodiments, it will be apparent that modifications and enhancements are possible without departing from the concepts as described. It is to be understood that the exemplary embodiments illustrate the aspects of the invention. Reference herein to details of the illustrated embodiments is not intended to limit the scope of the claims. The claims themselves recite those features regarded as essential to the present invention. Preferable embodiments of the present invention are subject of the dependent claims. Therefore, what is to be protected by way of letters patent are limited only by the scope of the following claims:

10

15

H-1001-0-WO

PCT/CA2007/001717  
05 May 2008 05-05-2008**WHAT IS CLAIMED IS:**

## 1. A molding-material handling component (8), comprising:

a component body (9) constructed of an alloy, the alloy being contactable, at least in part,  
5 against a molten metallic molding material (52) to be processed, the alloy improves, at least in  
part, high-temperature creep resistance of the component body (9), the alloy including:

from about 0.05 to about 0.12, in weight percent, of C,  
from about 9.8 to about 11.2, in weight percent, of Cr,  
from about 5 to about 7, in weight percent, of Co,  
10 from about 0.5 to about 1.0, in weight percent, of Mo,  
from about less than 0.7, in weight percent, of W,  
from about 0.1 to about 0.4, in weight percent, of V,  
from about 0.2 to about 0.5, in weight percent, of Nb,  
from about 0.005 to about 0.0015, in weight percent, of B,  
15 from about 0.1 to about 0.8, in weight percent, of Si,  
from about 0.3 to about 1.3, in weight percent, of Mn,  
from about less than, in weight percent, 0.035 of N,  
from about less than, in weight percent, 0.025 of P,  
from about less than, in weight percent, 0.015 of S, and  
20 from about, in weight percent, 0.2 to 1.2 of Ni.

## 2. The molding-material handling component (8) of claim 1, wherein:

the component body (9) includes:

a combination of (i) an inner liner that is made of the alloy and (ii) an outer shell  
25 not made of the alloy.

## 3. The molding-material handling component (8) of claim 1, wherein:

the component body (9) includes, at least in part, a selected one of a barrel (18), a barrel  
head (19), a machine nozzle (20), a hot runner nozzle (34), a mold (21), a mold portion (22, 24)  
30 of the mold (21) and a screw (14).

## 4. A molding-material handling component (8), comprising:

an alloy including:

from about 0.05 to about 0.12, in weight percent, of C,  
35 from about 9.8 to about 11.2, in weight percent, of Cr,

H-1001-0-WO

PCT/CA2007/001717  
05 May 2008 05-05-2008

from about 5 to about 7, in weight percent, of Co,  
 from about 0.5 to about 1.0, in weight percent, of Mo,  
 from about less than 0.7, in weight percent, of W,  
 from about 0.1 to about 0.4, in weight percent, of V,  
 5 from about 0.2 to about 0.5, in weight percent, of Nb,  
 from about 0.005 to about 0.0015, in weight percent, of B,  
 from about 0.1 to about 0.8, in weight percent, of Si,  
 from about 0.3 to about 1.3, in weight percent, of Mn,  
 from about less than, in weight percent, 0.035 of N, and  
 10 from about less than, in weight percent, 0.025 of P, from about less than, in  
 weight percent, 0.015 of S, and from about, in weight percent, 0.2 to 1.2 of Ni,  
 the alloy being included in a component body (9), the component body (9) includes, at  
 least in part, a conduit (11), the alloy being contactable, at least in part, against a molten  
 metallic molding material (52) to be processed, the molten metallic molding material (52)  
 15 includes a molten alloy of magnesium.

5. A metal molding system (100) including the molding-material handling component (8) of claim 4.

6. A hot runner (30) of a metal molding system (100), the hot runner (30) comprising:

20 a molding-material handling component (8), including:

a component body (9) constructed of an alloy, the molding-material handling  
 component (8) including:

a hot-runner component (32), the alloy being contactable, at least in part,  
 against a molten metallic molding material (52) to be processed by the hot runner  
 25 (30), the alloy improves, at least in part, high-temperature creep resistance of the  
 component body (9),

the alloy includes:

from about 0.05 to about 0.12, in weight percent, of C,  
 from about 9.8 to about 11.2, in weight percent, of Cr,  
 30 from about 5 to about 7, in weight percent, of Co,  
 from about 0.5 to about 1.0, in weight percent, of Mo,  
 from about less than 0.7, in weight percent, of W,  
 from about 0.1 to about 0.4, in weight percent, of V,  
 from about 0.2 to about 0.5, in weight percent, of Nb,  
 35 from about 0.005 to about 0.0015, in weight percent, of B,

H-1001-0-WO

PCT/CA2007/001717  
05 May 2008 05-05-2008

5 from about 0.1 to about 0.8, in weight percent, of Si,  
from about 0.3 to about 1.3, in weight percent, of Mn,  
from about less than, in weight percent, 0.035 of N,  
from about less than, in weight percent, 0.025 of P,  
from about less than, in weight percent, 0.015 of S, and  
from about, in weight percent, 0.2 to 1.2 of Ni.

7. A method, comprising:

10 constructing a molding-material handling component (8) of a metal molding system  
(100), the molding-material handling component (8) having an alloy, the molding-material  
handling component (8) including a component body (9) constructed of the alloy, the alloy  
being contactable, at least in part, against a molten metallic molding material (52) to be  
processed by the metal molding system (100), the alloy improves, at least in part, high-  
temperature creep resistance of the component body (9),

15 the alloy includes:

from about 0.05 to about 0.12, in weight percent, of C,  
from about 9.8 to about 11.2, in weight percent, of Cr,  
from about 5 to about 7, in weight percent, of Co,  
from about 0.5 to about 1.0, in weight percent, of Mo,  
20 from about less than 0.7, in weight percent, of W,  
from about 0.1 to about 0.4, in weight percent, of V,  
from about 0.2 to about 0.5, in weight percent, of Nb,  
from about 0.005 to about 0.0015, in weight percent, of B,  
from about 0.1 to about 0.8, in weight percent, of Si,  
25 from about 0.3 to about 1.3, in weight percent, of Mn,  
from about less than, in weight percent, 0.035 of N,  
from about less than, in weight percent, 0.025 of P,  
from about less than, in weight percent, 0.015 of S, and  
from about, in weight percent, 0.2 to 1.2 of Ni.

30 8. The method of claim 7, wherein:

the component body (9) includes, at least in part, a selected one of a barrel (18), a barrel  
head (19), a machine nozzle (20), a hot runner nozzle (34), a mold (21), a mold portion (22, 24)  
of the mold (21) and a screw (14).

35

**H-1001-0-WO**

PCT/CA2007/001717  
05 May 2008 05-05-2008

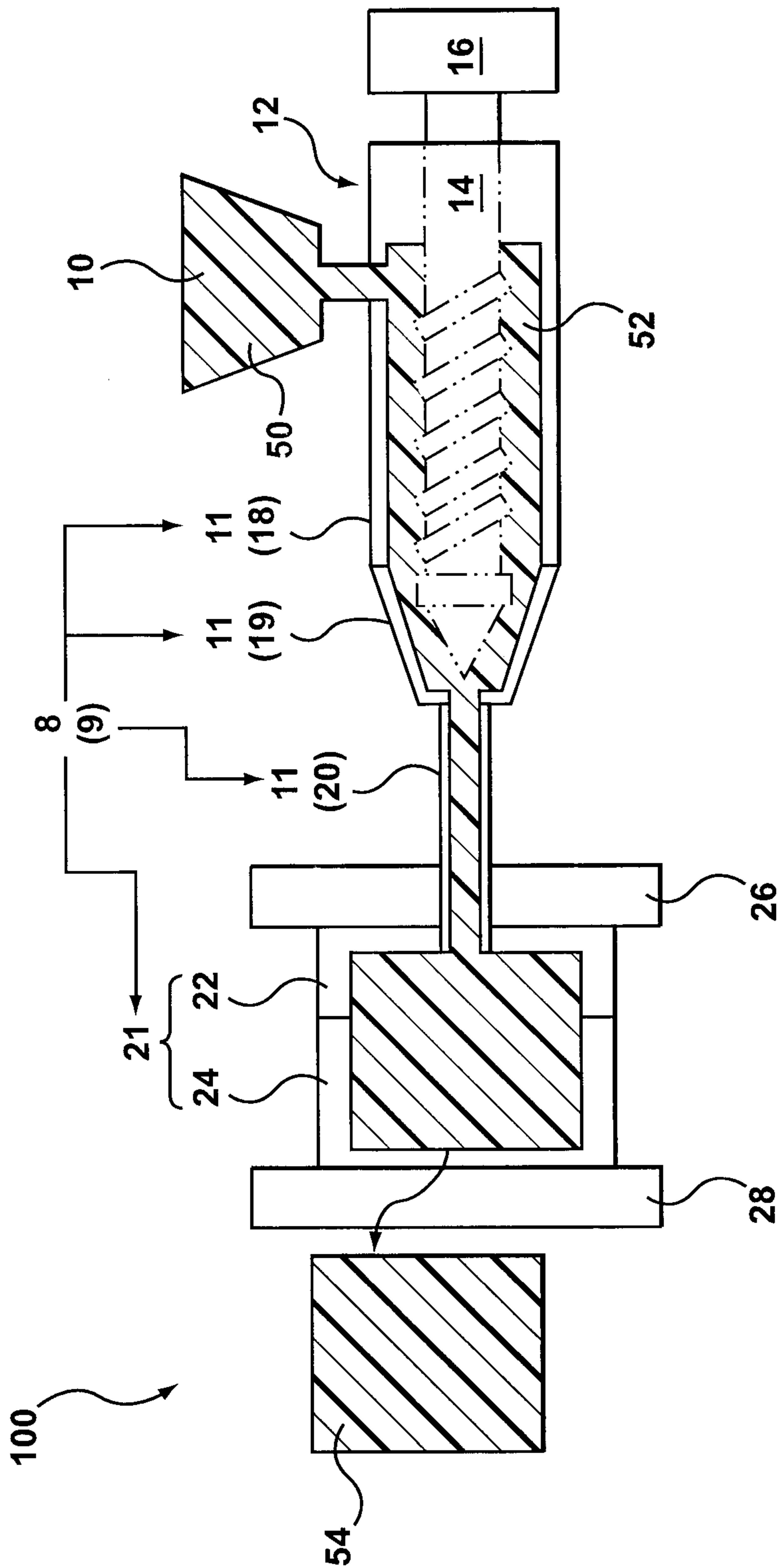
9. The method of claim 7, further comprising:

applying a surface treatment to the alloy, the surface treatment providing sufficient wear resistance at high temperatures, the surface treatment includes application of a ceramic coating.

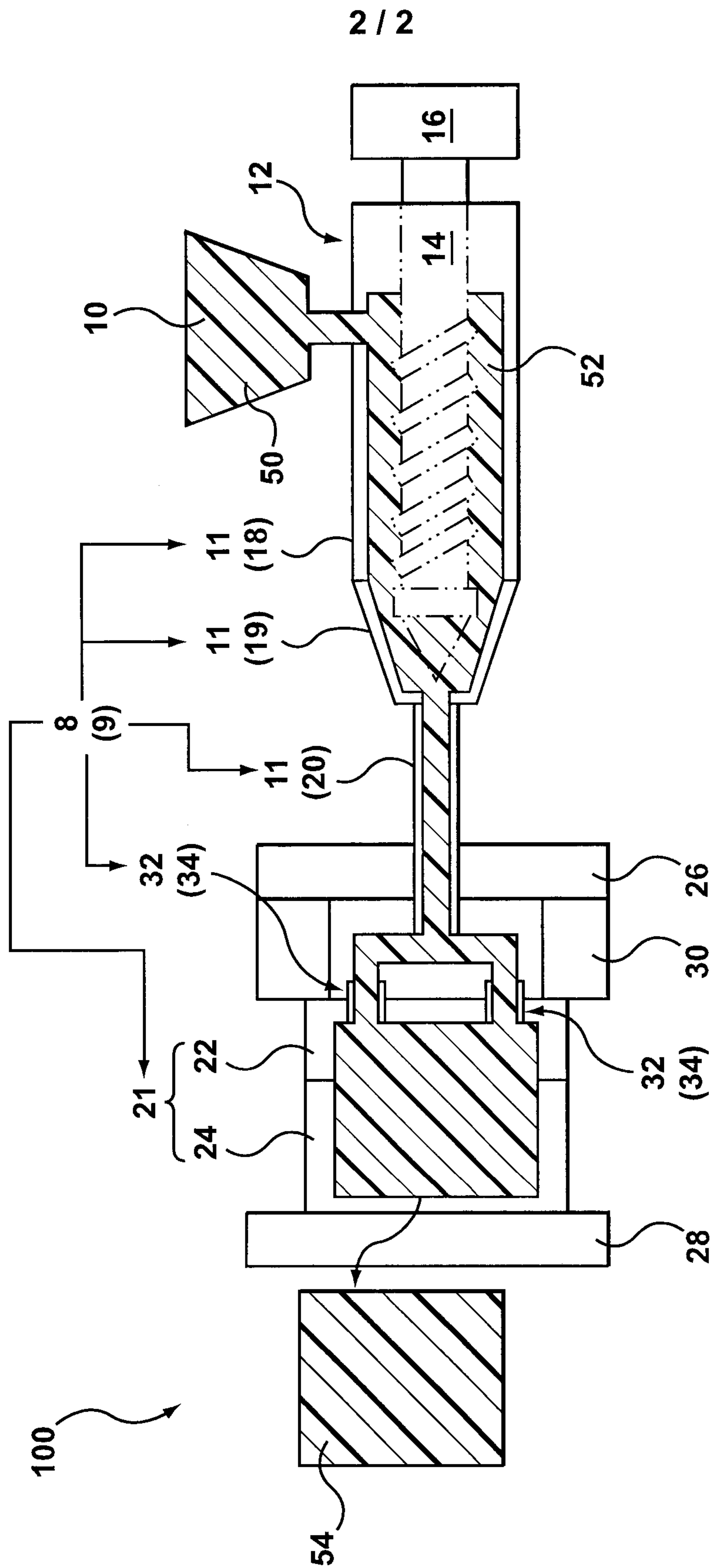
5 10. The method of claim 7, further comprising:

applying a surface treatment to the alloy, the surface treatment providing sufficient wear resistance at high temperatures, the surface treatment includes a combination of thermal diffusion and application of a coating.

1 / 2



**FIG. 1**



**FIG. 2**

