Innovation, Sciences et Développement économique Canada
Office de la Propriété Intellectuelle du Canada

Innovation, Science and Economic Development Canada
Canadian Intellectual Property Office

CA 3105202 A1 2022/07/07

(21) 3 105 202

(12) DEMANDE DE BREVET CANADIEN
CANADIAN PATENT APPLICATION

(13) A1

(22) Date de dépôt/Filing Date: 2021/01/07

(41) Mise à la disp. pub./Open to Public Insp.: 2022/07/07

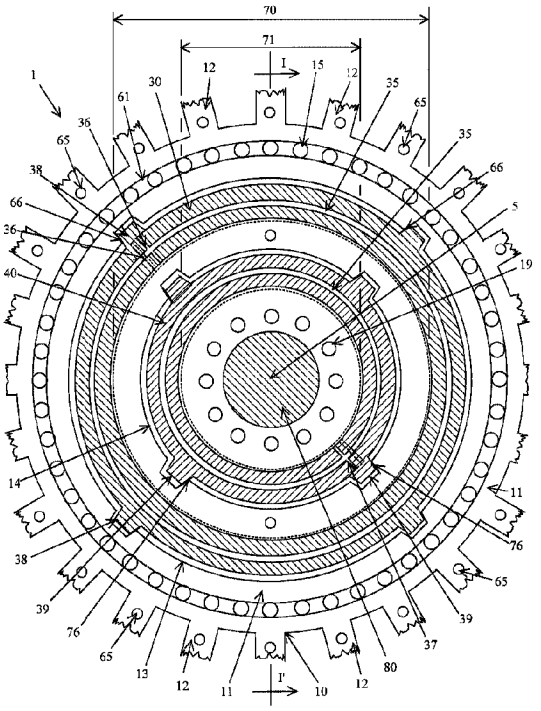
(51) Cl.Int./Int.Cl. *F01D 5/02* (2006.01),
F01D 5/10 (2006.01)

(71) Demandeur/Applicant:
SMITH, MIKE RICHARD JOHN, CA

(72) Inventeur/Inventor:
SMITH, MIKE RICHARD JOHN, CA

(74) Agent: NA

(54) Titre : ENSEMBLE ROTOR ET LOGEMENT DE ROTOR D'UN MOTEUR A TURBINE
(54) Title: A ROTOR ASSEMBLY AND THE ROTOR HOUSING OF A TURBINE ENGINE



(57) Abrégé/Abstract:
Modification of a rotor assembly and corresponding modification of the rotor housing of a turbine engine for better assembly and better cooling includes revising the: rotor, exhaust gas pressure ring assembly, oil ring assembly, and the rotor housing. The rotor having a first limiter hub extension which compliment the fifth extension of the exhaust gas pressure ring and the rotor having a second limiter hub extension which compliment the tenth extension of the oil ring so that the exhaust gas pressure ring and the oil ring does not pop out during installation which retaining effect enables assembly and installation of the exhaust gas pressure ring and oil ring on to the rotor while it is still out from the rotor housing and the hub limiter extensions prevent the rings being ground so thin while the rotor housing is modified to allow more efficient air cooling of the rotor.

ABSTRACT

Modification of a rotor assembly and corresponding modification of the rotor housing of a turbine engine for better assembly and better cooling includes revising the: rotor, exhaust gas pressure ring assembly, oil ring assembly, and the rotor housing. The rotor having a first limiter hub extension which compliment the fifth extension of the exhaust gas pressure ring and the rotor having a second limiter hub extension which compliment the tenth extension of the oil ring so that the exhaust gas pressure ring and the oil ring does not pop out during installation which retaining effect enables assembly and installation of the exhaust gas pressure ring and oil ring on to the rotor while it is still out from the rotor housing and the hub limiter extensions prevent the rings being ground so thin while the rotor housing is modified to allow more efficient air cooling of the rotor.

A ROTOR ASSEMBLY AND THE ROTOR HOUSING OF A TURBINE ENGINE

FIELD OF THE INVENTION

The present invention relates to a rotor assembly and the rotor housing of a turbine engine.

DESCRIPTION OF THE PRIOR ART

The prior art shown turbine engine described in United States Patent number 2,608,058 awarded to L. J. Geeraert, a turbine engine shown in United States Patent number 4,807,440 awarded to Ahmed Salem, and a turbine engine disclosed in United States Patent number 6,298,821 B1 awarded to Alexander Alexandrovich Bolonkin does not extensively explain cooling the hot parts of the turbine engine, while the prior art of a gas-wind turbine engine described in a Canadian Patent application number 3,048,823 filed in July 8, 2019 by Mike Richard John Smith having a rotor housing with less efficient cooling of the rotor hub and the oil ring as well as the exhaust gas pressure ring may need lot of procedures to install them because the pressure of the spring on the oil ring and the pressure of the spring on the exhaust gas pressure ring makes it comparatively more difficult to install on the rotor hub and the life of the oil ring and the exhaust gas pressure ring maybe shortened because the springs may push the rings until it is too thin and breaks apart where the damaged part and the pieces may damage the turbine engine.

SUMMARY OF THE INVENTION

In order to prevent premature damage to the turbine engine and to prevent problems related to the turbine engine I devise some ways to solve some of the problems which in some way prevents an almost chaotic incident to occur on the turbine engine by making an improvement to the gas-wind turbine engine rotor, improvement to the oil ring, improvement to the exhaust gas pressure ring, and improvement to the turbine engine rotor housing. Proof of novelty and inventive step is disclosed in the modification of a rotor assembly and modification of rotor housing for better assembly and cooling, said modification includes revising the: rotor, exhaust gas pressure ring assembly, oil ring assembly, and the rotor housing. The present invention declares that the turbine engine includes a rotor having a

rotor hub with a gas pressure ring limiter extension with corresponding fifth extension of the exhaust gas pressure ring and the rotor having a oil ring limiter extension with corresponding tenth extension of the oil ring so that the exhaust gas pressure ring and the oil ring does not pop out during the ring installation which retaining effect enables assembly and installation of the exhaust gas pressure ring and oil ring on to the rotor while it is still out from the rotor housing and the extensions have a limiting features to prevent the rings being ground to not there anymore situation making these new extensions an improvement which solves the problems which arises for not having these features while the rotor housing is modified to allow more efficient cooling of the rotor. The rotor is additionally modified with a plurality of first hub through air holes on the rotor hub for air to go through to maintain acceptable temperature of said rotor and to improve to a more efficient cooling of the rotor, said rotor housing includes at least two channels which communicates with the hub through air holes, the channels are located adjacent to the known air flow gap of said rotor housing.

DESCRIPTION OF THE DRAWINGS AND SPECIFICATION OF THE INVENTION

Figure 1 shows the first elevation view and partial view of the rotor and rotor housing. Figure 2 shows the rotor as seen along a very thin line between the rotor and the rotor housing and along line I-I' in Figure 1 where said thin line intersects the exhaust gas pressure ring and intersects the oil ring. Figure 3 shows the rotor and the rotor housing along line I-I' in Figure 2, Figure 4 shows the section view along line II-II' in Figure 1. Figure 5 shows the section view along line III-III' of Figure 1. Figure 6 shows the section view along line IV-IV' in Figure 1. Figure 7 is another configuration of the invention showing the first elevation view and partial view of the rotor and rotor housing. Figure 8 shows the rotor as seen along a very thin line between the rotor and the rotor housing and along line I-I' in Figure 7 where said thin line intersects the exhaust gas pressure ring and intersects the oil ring. Figure 9 shows the rotor along line I-I' in Figure 8, Figure 10 shows section along line II-II' of the rotor in Figure 7. Figure 11 shows the section view along line III-III' in Figure 7. Figure 12 shows the section view along line IV-IV' in Figure 7.

DISCLOSURES AND SPECIFICATION

Figure 1, Figure 2, Figure 3, Figure 4, Figure 5, and Figure 6 is referred to with regards to the first disclosure of the present invention which is stated as follows:

1. A rotor assembly 1 and the rotor housing 20 of a turbine engine wherein said rotor assembly 1 includes a rotor 10 and said rotor housing 20 is modified to meet certain criteria for the present invention, said rotor housing includes a known first gap 24 and a known second gap 25, said turbine engine includes a known first fan which generates a known cooling air, said rotor assembly 1 having a shaft 80, said shaft 80 includes a longitudinal axis 5, said rotor 10 is attached to said shaft 80, said rotor 10 includes: a rotor hub 11, a plurality of rotor blade 12, plurality of exhaust gas pressure ring groove 13, a plurality of oil ring groove 14, a plurality of hub through air hole 15, a plurality of hub spring through hole 16, a plurality of first limiter extension 17, a plurality of second limiter extension 18, a plurality of known oil holes 19, a rotor first air groove 61, a rotor second air groove 62, a second diameter 70, an eleventh diameter 71, a plurality of exhaust gas pressure ring 30, a plurality of oil ring 40, a plurality of known bearings, and a plurality of coil spring 50, said shaft 80 is supported by a plurality of known bearings during idle times and said shaft 80 is supported by a plurality of known bearings during rotation along said longitudinal axis 5 of said shaft 80, said plurality of rotor blade 12 are attached to said rotor hub 11, said plurality of rotor blade 12 are modified to have a plurality of rotor blade through air holes 65, said rotor blade through air holes 65 is designed for said known cooling air to go through, said known cooling air is a fast velocity air going though said known first gap 24 of said rotor housing 20 to said known second gap 25 of said rotor housing 20, said exhaust gas pressure ring groove 13 at said rotor hub 11 is adapted for an exhaust gas pressure ring 30, said oil ring groove 14 at said rotor hub 11 adapted for an oil ring 40, said hub through air hole 15 at said rotor 10 are for air cooling said rotor hub 11, said hub through air hole 15 are to be enlarged in diameter for balancing said rotor 10, the balancing of said rotor 10 is preferably done after said exhaust gas pressure rings 30, said oil rings 40, and said coil springs 50 are installed, each of said hub spring through hole 16 is adapted for said coil spring 50, said known oil holes 19 function is to cool said rotor hub 11, said first wall return oil passageway 28 and said second wall return oil passageway 29 communicates with a known oil reservoir, said rotor first air groove 61 having a rotor first air groove center, said rotor first air groove center lies on said longitudinal axis 5 of said shaft 80, said rotor second air groove 62 having a rotor second air groove center, said rotor second air groove center lies on the longitudinal axis 5 of said shaft 80;

wherein the exhaust gas pressure ring 30 as known are made of metals or made of other suitable material with an elastic property to allow said exhaust gas pressure ring 30 to be installed at the exhaust gas pressure ring groove 13 of a rotor hub 11, said exhaust gas pressure ring 30 are to be stiff enough so as to retain its normal operating form and not deform due to the force acting on said exhaust gas pressure ring 30 during operation of the turbine engine, said exhaust gas pressure ring 30 additionally includes a known gas sealing feature which leads to a more efficient exhaust gas pressure sealing system, said exhaust gas pressure ring 30 includes: a fifth extension 31, an exhaust gas pressure ring inner periphery 32, a first diameter 33, a known first extension 38, an exhaust gas pressure ring outer periphery 34, a known ring oil channel 35, a plurality of exhaust gas pressure ring contact surface 66, and a known exhaust gas pressure ring expansion gap 36, said known exhaust gas pressure ring expansion gap 36 allows said exhaust gas pressure ring 30 to be compliant to facilitate installation of said exhaust gas pressure ring 30 on to said exhaust gas pressure ring groove 13 of said rotor hub 11, said exhaust gas pressure ring expansion gap 36 uses the known piston ring gap joint which minimizes leakages of oil or gas pressure to go through, said exhaust gas pressure ring expansion gap 36 preferably uses the exhaust gas pressure ring expansion gap lap joint or other suitable gap joint which is complimented with the known first extension 38, said exhaust gas pressure ring contact surface 66 forms an first angle 67 from a first plane 68, said first plane 68 intersects said exhaust gas pressure ring contact surface 66, said first plane 68 lies along the longitudinal axis 5 of the shaft 80, said first angle 67 is within three degrees to twenty degrees from said first plane 68, said known first extension 38 extends at said exhaust gas pressure ring outer periphery 34 of said exhaust gas pressure ring 30 which allows said exhaust gas pressure ring 30 rotate with the rotor 10, said first diameter 33 of said exhaust gas pressure ring 30 is slightly less than the second diameter 70 of said rotor hub 11 allowing said exhaust gas pressure ring 30 to be in contact at all times with said rotor hub 11 during normal operation of the turbine engine, said fifth extension 31 extends at said exhaust gas pressure ring inner periphery 32, said fifth extension 31 and said exhaust gas pressure ring inner periphery 32 is substantially in contact with said rotor hub 11, said fifth extension 31 when engaged or in contact with the first limiter extension 17 of said rotor hub 11 prevents said exhaust gas pressure ring 30 from moving any farther against the rotor housing 20 which technically stops substantial damage to said exhaust gas pressure ring 30, said fifth extension 31 of said exhaust gas pressure ring 30 and said first limiter extension 17 of said rotor hub 11 prevents said exhaust gas pressure ring 30 from popping out due to the coil spring 50 pressure during installation on to said rotor 10 and during the life of the turbine engine;

wherein said oil ring 40 as known are made of metals or made of other suitable material with an elastic property to allow said oil ring 40 to be installed at the oil ring groove 14 of a rotor hub 11, said oil ring 40 are to be stiff enough so as to retain its normal operating form and not deform due to the forces acting on said oil ring 40 during operation of the turbine engine, said oil ring 40 additionally includes a known oil sealing features which leads to a more efficient oil sealing system, said oil ring 40 includes: a tenth extension 41, an oil ring inner periphery 42, a tenth diameter 43, a known second extension 39, an oil ring outer periphery 45, an oil seal ring 46, an oil seal ring groove 47, a known ring oil channel 35, a plurality of oil ring contact surface 76, and a known oil ring expansion gap 37, said known oil ring expansion gap 37 allows said oil ring 40 to be compliant to facilitate installation of said oil ring 40 on to said oil ring groove 14 of said rotor hub 11, said oil seal ring 46 is substantially in contact with said oil ring groove 14, said oil seal ring 46 fits into said oil seal ring groove 47 of said oil ring 40, said oil seal ring 46 having a oil seal ring gap joint 48 which is similar the known piston ring gap joint, said oil ring expansion gap preferably uses the exhaust gas pressure ring expansion gap lap joint or other suitable gap joint which is complimented with said known second extension 39, said oil ring contact surface 76 forms an second angle 77 from a second plane 78, said second plane 78 lies along the longitudinal axis 5 of the shaft 80, said second plane 78 intersects said oil ring contact surface 76, said second angle 77 is within three degrees to twenty degrees from said second plane 78, said known second extension 39 extends at said oil ring outer periphery 45 of said oil ring 40 which allows said oil ring 40 to rotate with the rotor 10, said tenth diameter 43 of said oil ring 40 is slightly less than the eleventh diameter 71 of said rotor 10 allowing said oil ring 40 to be in contact at all times with said eleventh diameter 71 of said rotor hub 11 during normal operation of the engine, said tenth extension 41 extends at said oil ring inner periphery 42, said tenth extension 41 when engaged or in contact with the second limiter extension 18 of said rotor hub 11 prevents said oil ring 40 from moving any farther against the rotor housing 20 which technically stops substantial damage to said oil ring 40, said tenth extension 41 of the said oil ring 40 and said second limiter extension 18 of said rotor hub 11 prevents said oil ring 40 from popping out due to the coil spring 50 pressure during assembly with said rotor 10 and during the life of the turbine engine;

wherein the rotor housing 20 having a known first wall 21 and a known second wall 22, said rotor housing 20 is modified to have first wall 21 having a first channel 26, a plurality of first wall air hole 81, and a first wall circumferential groove 91, said rotor housing 20 additionally includes a known a first wall return oil passageway 28, said rotor housing 20 is additionally modified to have a second

wall 22 to include: a second channel 27, a plurality of second wall air hole 82, and a second wall circumferential groove 92, said rotor housing 20 additionally includes a known second wall return oil passageway 29, said first channel 26 located adjacent to the known first air flow gap 24 at said first wall 21, said second channel 27 located adjacent to the known second air flow gap 25 at said second wall 22, said first wall circumferential groove 91 having a first wall circumferential groove center, said first wall circumferential groove center lies on the longitudinal axis 5 of the shaft 80, said second wall circumferential groove 92 having a second wall circumferential groove center, said second wall circumferential groove center lies on the longitudinal axis 5 of said shaft 80, said first channel 26, said known first air flow gap 24, said first wall circumferential groove 91, said second channel 27, the rotor first air groove 61, the rotor second air groove 62, said second wall circumferential groove 92, and said known second air flow gap 25 communicates with the hub through air hole 15 which allows cooling air to move through.

Figure 7, Figure 8, Figure 9, Figure 10 Figure 11, and Figure 10 is referred to with regards to the second disclosure of the present invention which is stated as follows:

2. A rotor assembly 1 and the rotor housing 20 of a turbine engine wherein said rotor assembly 1 includes a rotor 10 and said rotor housing 20 is modified to meet certain criteria for the present invention, said rotor housing includes a known first gap 24 and a known second gap 25, said turbine engine includes a known first fan which generates a known cooling air, said rotor assembly 1 having a shaft 80, said shaft 80 includes a longitudinal axis 5, said rotor 10 is attached to said shaft 80, said rotor 10 includes: a rotor hub 11, a plurality of rotor blade 12, plurality of exhaust gas pressure ring groove 13, a plurality of oil ring groove 14, a plurality of hub through air hole 15, a plurality of hub spring through hole 16, a plurality of first limiter extension 17, a plurality of second limiter extension 18, a plurality of known oil holes 19, a rotor first air groove 61, a rotor second air groove 62, a second diameter 70, an eleventh diameter 71, a plurality of exhaust gas pressure ring 30, a plurality of oil ring 40, a plurality of known bearings, and a plurality of coil spring 50, said shaft 80 is supported by a plurality of known bearings during idle times and said shaft 80 is supported by a plurality of known bearings during rotation along said longitudinal axis 5 of said shaft 80, said plurality of rotor blade 12 are attached to said rotor hub 11, said plurality of rotor blade 12 are modified to have a plurality of rotor blade through air holes 65, said rotor blade through air holes 65 is designed for said known

cooling air to go through, said known cooling air is a fast velocity air going though said known first gap of the rotor housing to said known second gap of the rotor housing, said exhaust gas pressure ring groove 13 at said rotor hub 11 is adapted for an exhaust gas pressure ring 30, said oil ring groove 14 at said rotor hub 11 adapted for an oil ring 40, said hub through air hole 15 at said rotor 10 are for air cooling said rotor hub 11, said hub through air hole 15 are to be enlarged in diameter for balancing said rotor 10, the balancing of said rotor 10 is preferably done after said exhaust gas pressure rings 30, said oil rings 40, and said coil springs 50 are installed, each of said hub spring through hole 16 is adapted for said coil spring 50, said known oil holes 19 function is to cool said rotor hub 11, said first wall return oil passageway 28 and said second wall return oil passageway 29 communicates with a known oil reservoir, said rotor first air groove 61 having a rotor first air groove center, said rotor first air groove center lies on said longitudinal axis 5 of said shaft 80, said rotor second air groove 62 having a rotor second air groove center, said rotor second air groove center lies on said longitudinal axis 5 of said shaft 80;

wherein the exhaust gas pressure ring 30 as known are made of metals or made of other suitable material with an elastic property to allow said exhaust gas pressure ring 30 to be installed at the exhaust gas pressure ring groove 13 of a rotor hub 11, said exhaust gas pressure ring 30 are to be stiff enough so as to retain its normal operating form and not deform due to the force acting on said exhaust gas pressure ring 30 during operation of the turbine engine, said exhaust gas pressure ring 30 additionally includes a known gas sealing feature which leads to a more efficient exhaust gas pressure sealing system, said exhaust gas pressure ring 30 includes: a fifth extension 31, an exhaust gas pressure ring inner periphery 32, a first diameter 33, a known first extension 38, an exhaust gas pressure ring outer periphery 34, a known ring oil channel 35, a plurality of exhaust gas pressure ring contact surface 66, and a known exhaust gas pressure ring expansion gap 36, said known exhaust gas pressure ring expansion gap 36 allows said exhaust gas pressure ring 30 to be compliant to facilitate installation of said exhaust gas pressure ring 30 on to said exhaust gas pressure ring groove 13 of said rotor hub 11, said exhaust gas pressure ring expansion gap 36 uses the known piston ring gap joint which minimizes leakages of oil or gas pressure to go through, said exhaust gas pressure ring expansion gap 36 preferably uses the exhaust gas pressure ring expansion gap lap joint or other suitable gap joint which is complimented with the known first extension 38, said exhaust gas pressure ring contact surface 66 forms an first angle 67 from a first plane 68, said first plane 68 intersects said exhaust gas pressure ring contact surface 66, said first plane 68 lies along the longitudinal axis 5 of the shaft 80, said first angle

67 is within three degrees to twenty degrees from said first plane 68, said known first extension 38 extends at said exhaust gas pressure ring outer periphery 34 of said exhaust gas pressure ring 30 which allows said exhaust gas pressure ring 30 rotate with the rotor 10, said first diameter 33 of said exhaust gas pressure ring 30 is slightly less than the second diameter 70 of said rotor hub 11 allowing said exhaust gas pressure ring 30 to be in contact at all times with said rotor hub 11 during normal operation of the turbine engine, said fifth extension 31 extends at said exhaust gas pressure ring inner periphery 32, said fifth extension 31 and said exhaust gas pressure ring inner periphery 32 is substantially in contact with said rotor hub 11, said fifth extension 31 when engaged or in contact with the first limiter extension 17 of said rotor hub 11 prevents said exhaust gas pressure ring 30 from moving any farther against the rotor housing 20 which technically stops substantial damage to said exhaust gas pressure ring 30, said fifth extension 31 of said exhaust gas pressure ring 30 and said first limiter extension 17 of said rotor hub 11 prevents said exhaust gas pressure ring 30 from popping out due to the coil spring 50 pressure during installation on to said rotor 10 and during the life of the turbine engine;

wherein said oil ring 40 as known are made of metals or made of other suitable material with an elastic property to allow said oil ring 40 to be installed at the oil ring groove 14 of a rotor hub 11, said oil ring 40 are to be stiff enough so as to retain its normal operating form and not deform due to the forces acting on said oil ring 40 during operation of the turbine engine, said oil ring 40 additionally includes a known oil sealing features which leads to a more efficient oil sealing system, said oil ring 40 includes: a tenth extension 41, an oil ring inner periphery 42, a tenth diameter 43, a known second extension 39, an oil ring outer periphery 45, an oil seal ring 46, an oil seal ring groove 47, a known ring oil channel 35, a plurality of oil ring contact surface 76, and a known oil ring expansion gap 37, said known oil ring expansion gap 37 allows said oil ring 40 to be compliant to facilitate installation of said oil ring 40 on to said oil ring groove 14 of said rotor hub 11, said oil seal ring 46 is substantially in contact with said oil ring groove 14, said oil seal ring 46 fits into said oil seal ring groove 47 of said oil ring 40, said oil seal ring 46 having a oil seal ring gap joint 48 which is similar the known piston ring gap joint, said oil ring expansion gap preferably uses the exhaust gas pressure ring expansion gap lap joint or other suitable gap joint which is complimented with said known second extension 39, said oil ring contact surface 76 forms an second angle 77 from a second plane 78, said second plane 78 lies along the longitudinal axis 5 of the shaft 80, said second plane 78 intersects said oil ring contact surface 76, said second angle 77 is within three degrees to twenty degrees from said second plane 78, said known second extension 39 extends at said oil ring outer periphery 45 of said oil ring 40 which

allows said oil ring 40 to rotate with the rotor 10, said tenth diameter 43 of said oil ring 40 is slightly less than the eleventh diameter 71 of said rotor 10 allowing said oil ring 40 to be in contact at all times with said eleventh diameter 71 of said rotor hub 11 during normal operation of the engine, said tenth extension 41 extends at said oil ring inner periphery 42, said tenth extension 41 when engaged or in contact with the second limiter extension 18 of said rotor hub 11 prevents said oil ring 40 from moving any farther against the rotor housing 20 which technically stops substantial damage to said oil ring 40, said tenth extension 41 of the said oil ring 40 and said second limiter extension 18 of said rotor hub 11 prevents said oil ring 40 from popping out due to the coil spring 50 pressure during assembly with said rotor 10 and during the life of the turbine engine;

wherein the rotor housing 20 having a known first wall 21with a known first gap 24 and a known second wall 22 with a known second gap 25, said rotor housing 20 is modified to have first wall 21 having a first channel 26, a plurality of first wall air hole 81, and a first wall circumferential groove 91, said rotor housing 20 additionally includes a known a first wall return oil passageway 28, said rotor housing 20 is additionally modified to have a second wall 22 to include: a second channel 27, a plurality of second wall air hole 82, and a second wall circumferential groove 92, said rotor housing 20 additionally includes a known second wall return oil passageway 29, said first channel 26 located adjacent to the known first air flow gap 24 at said first wall 21, said second channel 27 located adjacent to the known second air flow gap 25 at said second wall 22, said first wall circumferential groove 91 having a first wall circumferential groove center, said first wall circumferential groove center lies on the longitudinal axis 5 of the shaft 80, said second wall circumferential groove 92 having a second wall circumferential groove center, said second wall circumferential groove center lies on the longitudinal axis 5 of said shaft 80, said first channel 26, said known first air flow gap 24, said first wall circumferential groove 91, said second channel 27, the rotor first air groove 61, the rotor second air groove 62, said second wall circumferential groove 92, and said known second air flow gap 25 communicates with the hub through air hole 15 which allows cooling air to move through.

wherein the rod 73 having communicating means with the exhaust gas pressure ring 30, said rod 73 having communicating means with the coil spring 50, said rod 73 is preferably of high melting point material so said rod 73 does not melt during the engine operation and preferably with low expansion coefficient so said rod 73 does not expand too much when exposed to high temperature, said rod 73 which is to be hard enough and does not break easily prevents the exhaust gas pressure ring 30 from being misaligned at the exhaust gas pressure ring groove 13 of the rotor 10.

CLAIMS:

1. A rotor assembly and the rotor housing of a turbine engine wherein said rotor assembly includes a rotor and said rotor housing is modified to meet certain criteria for the present invention, said rotor housing includes a known first gap and a known second gap, said turbine engine includes a known first fan which generates a known cooling air, said rotor assembly having a shaft, said shaft includes a longitudinal axis, said rotor is attached to said shaft, said rotor includes: a rotor hub, a plurality of rotor blade, plurality of exhaust gas pressure ring groove, a plurality of oil ring groove, a plurality of hub through air hole, a plurality of hub spring through hole, a plurality of first limiter extension, a plurality of second limiter extension, a plurality of known oil holes, a rotor first air groove, a rotor second air groove, a second diameter, an eleventh diameter, a plurality of exhaust gas pressure ring, a plurality of oil ring, a plurality of known bearings, and a plurality of coil spring, said shaft is supported by a plurality of known bearings during idle times and said shaft is supported by a plurality of known bearings during rotation along said longitudinal axis of said shaft, said plurality of rotor blade are attached to said rotor hub, said plurality of rotor blade are modified to have a plurality of rotor blade through air holes, said rotor blade through air holes is designed for said known cooling air to go through, said known cooling air is a fast velocity air going though said known first gap of said rotor housing to said known second gap of said rotor housing, said exhaust gas pressure ring groove at said rotor hub is adapted for an exhaust gas pressure ring, said oil ring groove at said rotor hub adapted for an oil ring, said hub through air hole at said rotor are for air cooling said rotor hub, said hub through air hole are to be enlarged in diameter for balancing said rotor, the balancing of said rotor is preferably done after said exhaust gas pressure rings, said oil rings, and said coil springs are installed, each of said hub spring through hole is adapted for said coil spring, said known oil holes function is to cool said rotor hub, said first wall return oil passageway and said second wall return oil passageway communicates with a known oil reservoir, said rotor first air groove having a rotor first air groove center, said rotor first air groove center lies on said longitudinal axis of said shaft, said rotor second air groove having a rotor second air groove center, said rotor second air groove center lies on the longitudinal axis of said shaft;

wherein the exhaust gas pressure ring as known are made of metals or made of other suitable material with an elastic property to allow said exhaust gas pressure ring to be installed at the exhaust

gas pressure ring groove of a rotor hub, said exhaust gas pressure ring are to be stiff enough so as to retain its normal operating form and not deform due to the force acting on said exhaust gas pressure ring during operation of the turbine engine, said exhaust gas pressure ring additionally includes a known gas sealing feature which leads to a more efficient exhaust gas pressure sealing system, said exhaust gas pressure ring includes: a fifth extension, an exhaust gas pressure ring inner periphery, a first diameter, a known first extension, an exhaust gas pressure ring outer periphery, a known ring oil channel, a plurality of exhaust gas pressure ring contact surface, and a known exhaust gas pressure ring expansion gap, said known exhaust gas pressure ring expansion gap allows said exhaust gas pressure ring to be compliant to facilitate installation of said exhaust gas pressure ring on to said exhaust gas pressure ring groove of said rotor hub, said exhaust gas pressure ring expansion gap uses the known piston ring gap joint which minimizes leakages of oil or gas pressure to go through, said exhaust gas pressure ring expansion gap preferably uses the exhaust gas pressure ring expansion gap lap joint or other suitable gap joint which is complimented with the known first extension, said exhaust gas pressure ring contact surface forms an first angle from a first plane, said first plane intersects said exhaust gas pressure ring contact surface, said first plane lies along the longitudinal axis of the shaft, said first angle is within three degrees to twenty degrees from said first plane, said known first extension extends at said exhaust gas pressure ring outer periphery of said exhaust gas pressure ring which allows said exhaust gas pressure ring rotate with the rotor, said first diameter of said exhaust gas pressure ring is slightly less than the second diameter of said rotor hub allowing said exhaust gas pressure ring to be in contact at all times with said rotor hub during normal operation of the turbine engine, said fifth extension extends at said exhaust gas pressure ring inner periphery, said fifth extension and said exhaust gas pressure ring inner periphery is substantially in contact with said rotor hub, said fifth extension when engaged or in contact with the first limiter extension of said rotor hub prevents said exhaust gas pressure ring from moving any farther against the rotor housing which technically stops substantial damage to said exhaust gas pressure ring, said fifth extension of said exhaust gas pressure ring and said first limiter extension of said rotor hub prevents said exhaust gas pressure ring from popping out due to the coil spring pressure during installation on to said rotor and during the life of the turbine engine;

wherein said oil ring as known are made of metals or made of other suitable material with an elastic property to allow said oil ring to be installed at the oil ring groove of a rotor hub, said oil ring are to be stiff enough so as to retain its normal operating form and not deform due to the forces acting

on said oil ring during operation of the turbine engine, said oil ring additionally includes: a known oil sealing features which leads to a more efficient oil sealing system, said oil ring includes a tenth extension, an oil ring inner periphery, a tenth diameter, a known second extension, an oil ring outer periphery, an oil seal ring, an oil seal ring groove, a known ring oil channel, a plurality of oil ring contact surface, and a known oil ring expansion gap, said known oil ring expansion gap allows said oil ring to be adjusted to facilitate installation of said oil ring on to said oil ring groove of said rotor hub, said oil seal ring is substantially in contact with said oil ring groove, said oil seal ring fits into said oil seal ring groove of said oil ring, said oil seal ring having a oil seal ring gap joint which is similar the known piston ring gap joint, said oil ring expansion gap preferably uses the exhaust gas pressure ring expansion gap lap joint or other suitable gap joint which is complimented with said known second extension, said oil ring contact surface forms an second angle from a second plane, said second plane lies along the longitudinal axis of the shaft, said second plane intersects said oil ring contact surface, said second angle is within three degrees to twenty degrees from said second plane, said known second extension extends at said oil ring outer periphery of said oil ring which allows said oil ring to rotate with the rotor, said tenth diameter of said oil ring is slightly less than the eleventh diameter of said rotor allowing said oil ring to be in contact at all times with said eleventh diameter of said rotor hub during normal operation of the engine, said tenth extension extends at said oil ring inner periphery, said tenth extension when engaged or in contact with the second limiter extension of said rotor hub prevents said oil ring from moving any farther against the rotor housing which technically stops substantial damage to said oil ring, said tenth extension of the said oil ring and said second limiter extension of said rotor hub prevents said oil ring from popping out due to the coil spring pressure during assembly with said rotor and during the life of the turbine engine;

wherein the rotor housing having a known first wall and a known second wall, said rotor housing is modified to have first wall having a first channel, a plurality of first wall air hole, and a first wall circumferential groove, said rotor housing additionally includes a known a first wall return oil passageway, said rotor housing is additionally modified to include: a second wall having a second channel, a plurality of second wall air hole, and a second wall circumferential groove, said rotor housing additionally includes a known second wall return oil passageway, said first channel located adjacent to the known first air flow gap at said first wall, said second channel located adjacent to the known second air flow gap at said second wall, said first wall circumferential groove having a first wall circumferential groove center, said first wall circumferential groove center lies on the longitudinal

axis of the shaft, said second wall circumferential groove having a second wall circumferential groove center, said second wall circumferential groove center lies on the longitudinal axis of said shaft, said first channel, said known first air flow gap, said first wall circumferential groove, said second channel, the rotor first air groove, the rotor second air groove, said second wall circumferential groove, and said known second air flow gap communicates with the hub through air hole s which allows cooling air to move through.

2. A rotor assembly and the rotor housing of a turbine engine wherein said rotor assembly includes a rotor and said rotor housing is modified to meet certain criteria for the present invention, said rotor housing includes a known first gap and a known second gap, said turbine engine includes a known first fan which generates a known cooling air, said rotor assembly having a shaft, said shaft includes a longitudinal axis, said rotor is attached to said shaft, said rotor includes: a rotor hub, a plurality of rotor blade, plurality of exhaust gas pressure ring groove, a plurality of oil ring groove, a plurality of hub through air hole, a plurality of hub spring through hole, a plurality of first limiter extension, a plurality of second limiter extension, a plurality of known oil holes, a rotor first air groove, a rotor second air groove, a second diameter, an eleventh diameter, a plurality of rod, a plurality of exhaust gas pressure ring, a plurality of oil ring, a plurality of known bearings, and a plurality of coil spring, said shaft is supported by a plurality of known bearings during idle times and said shaft is supported by a plurality of known bearings during rotation along said longitudinal axis of said shaft, said plurality of rotor blade are attached to said rotor hub, said plurality of rotor blade are modified to have a plurality of rotor blade through air holes, said rotor blade through air holes is designed for said known cooling air to go through, said known cooling air is a fast velocity air going though said known first gap of said rotor housing to said known second gap of said rotor housing, said exhaust gas pressure ring groove at said rotor hub is adapted for an exhaust gas pressure ring, said oil ring groove at said rotor hub adapted for an oil ring, said hub through air hole at said rotor are for air cooling said rotor hub, said hub through air hole are to be enlarged in diameter for balancing said rotor, the balancing of said rotor is preferably done after said exhaust gas pressure rings, said oil rings, and said coil springs are installed, each of said hub spring through hole is adapted for said coil spring, said known oil holes function is to cool said rotor hub, said first wall return oil passageway and said second wall return oil passageway communicates with a known oil reservoir, said rotor first air groove having a rotor first air groove center, said rotor first air groove center lies on said longitudinal axis of said shaft, said rotor second air

groove having a rotor second air groove center, said rotor second air groove center lies on said longitudinal axis of said shaft;

wherein the exhaust gas pressure ring as known are made of metals or made of other suitable material with an elastic property to allow said exhaust gas pressure ring to be installed at the exhaust gas pressure ring groove of a rotor hub, said exhaust gas pressure ring are to be stiff enough so as to retain its normal operating form and not deform due to the force acting on said exhaust gas pressure ring during operation of the turbine engine, said exhaust gas pressure ring additionally includes a known gas sealing feature which leads to a more efficient exhaust gas pressure sealing system, said exhaust gas pressure ring includes: a fifth extension, an exhaust gas pressure ring inner periphery, a first diameter, a known first extension, an exhaust gas pressure ring outer periphery, a known ring oil channel, a plurality of exhaust gas pressure ring contact surface, and a known exhaust gas pressure ring expansion gap, said known exhaust gas pressure ring expansion gap allows said exhaust gas pressure ring to be adjusted to facilitate installation of said exhaust gas pressure ring on to said exhaust gas pressure ring groove of said rotor hub, said exhaust gas pressure ring expansion gap uses the known piston ring gap joint which minimizes leakages of oil or gas pressure to go through, said exhaust gas pressure ring expansion gap preferably uses the exhaust gas pressure ring expansion gap lap joint or other suitable gap joint which is complimented with the known first extension, said exhaust gas pressure ring contact surface forms an first angle from a first plane, said first plane intersects said exhaust gas pressure ring contact surface, said first plane lies along the longitudinal axis of the shaft, said first angle is within three degrees to twenty degrees from said first plane, said known first extension extends at said exhaust gas pressure ring outer periphery of said exhaust gas pressure ring which allows said exhaust gas pressure ring rotate with the rotor, said first diameter of said exhaust gas pressure ring is slightly less than the second diameter of said rotor hub allowing said exhaust gas pressure ring to be in contact at all times with said rotor hub during normal operation of the turbine engine, said fifth extension extends at said exhaust gas pressure ring inner periphery, said fifth extension and said exhaust gas pressure ring inner periphery is substantially in contact with said rotor hub, said fifth extension when engaged or in contact with the first limiter extension of said rotor hub prevents said exhaust gas pressure ring from moving any farther against the rotor housing which technically stops substantial damage to said exhaust gas pressure ring, said fifth extension of said exhaust gas pressure ring and said first limiter extension of said rotor hub prevents said exhaust gas

pressure ring from popping out due to the coil spring pressure during installation on to said rotor and during the life of the turbine engine;

wherein said oil ring as known are made of metals or made of other suitable material with an elastic property to allow said oil ring to be installed at the oil ring groove of a rotor hub, said oil ring are to be stiff enough so as to retain its normal operating form and not deform due to the forces acting on said oil ring during operation of the turbine engine, said oil ring additionally includes a known oil sealing features which leads to a more efficient oil sealing system, said oil ring includes: a tenth extension, an oil ring inner periphery, a tenth diameter, a known second extension, an oil ring outer periphery, an oil seal ring, an oil seal ring groove, a known ring oil channel, a plurality of oil ring contact surface, and a known oil ring expansion gap, said known oil ring expansion gap allows said oil ring to be adjusted to facilitate installation of said oil ring on to said oil ring groove of said rotor hub, said oil seal ring is substantially in contact with said oil ring groove, said oil seal ring 46 fits into said oil seal ring groove of said oil ring, said oil seal ring having a oil seal ring gap joint which is similar the known piston ring gap joint, said oil ring expansion gap preferably uses the exhaust gas pressure ring expansion gap lap joint or other suitable gap joint which is complimented with said known second extension, said oil ring contact surface forms an second angle from a second plane, said second plane lies along the longitudinal axis of the shaft, said second plane intersects said oil ring contact surface, said second angle is within three degrees to twenty degrees from said second plane, said known second extension extends at said oil ring outer periphery of said oil ring which allows said oil ring to rotate with the rotor, said tenth diameter of said oil ring is slightly less than the eleventh diameter of said rotor allowing said oil ring to be in contact at all times with said eleventh diameter of said rotor hub during normal operation of the engine, said tenth extension extends at said oil ring inner periphery, said tenth extension when engaged or in contact with the second limiter extension of said rotor hub prevents said oil ring 40 from moving any farther against the rotor housing which technically stops substantial damage to said oil ring, said tenth extension of the said oil ring and said second limiter extension of said rotor hub prevents said oil ring from popping out due to the coil spring pressure during assembly with said rotor and during the life of the turbine engine;

wherein the rotor housing having a known first wall and a known second wall, said rotor housing is modified to have first wall having a first channel, a plurality of first wall air hole, and a first wall circumferential groove, said rotor housing additionally includes a known a first wall return oil passageway, said rotor housing is additionally modified to include: a second wall having a second

channel, a plurality of second wall air hole, and a second wall circumferential groove, said rotor housing additionally includes a known second wall return oil passageway, said first channel located adjacent to the known first air flow gap at said first wall, said second channel located adjacent to the known second air flow gap at said second wall, said first wall circumferential groove having a first wall circumferential groove center, said first wall circumferential groove center lies on the longitudinal axis of the shaft, said second wall circumferential groove having a second wall circumferential groove center, said second wall circumferential groove center lies on the longitudinal axis of said shaft, said first channel, said known first air flow gap, said first wall circumferential groove, said second channel, the rotor first air groove, the rotor second air groove, said second wall circumferential groove, and said known second air flow gap communicates with the hub through air hole which allows cooling air to move through.

wherein the rod having communicating means with the exhaust gas pressure ring, said rod having communicating means with the coil spring, said rod is preferably of high melting point material so said rod does not melt during the engine operation and preferably with low expansion coefficient so said rod does not expand too much when exposed to high temperature, said rod which is to be hard enough and does not break easily prevents the exhaust gas pressure ring from being misaligned at the exhaust gas pressure ring groove of the rotor.

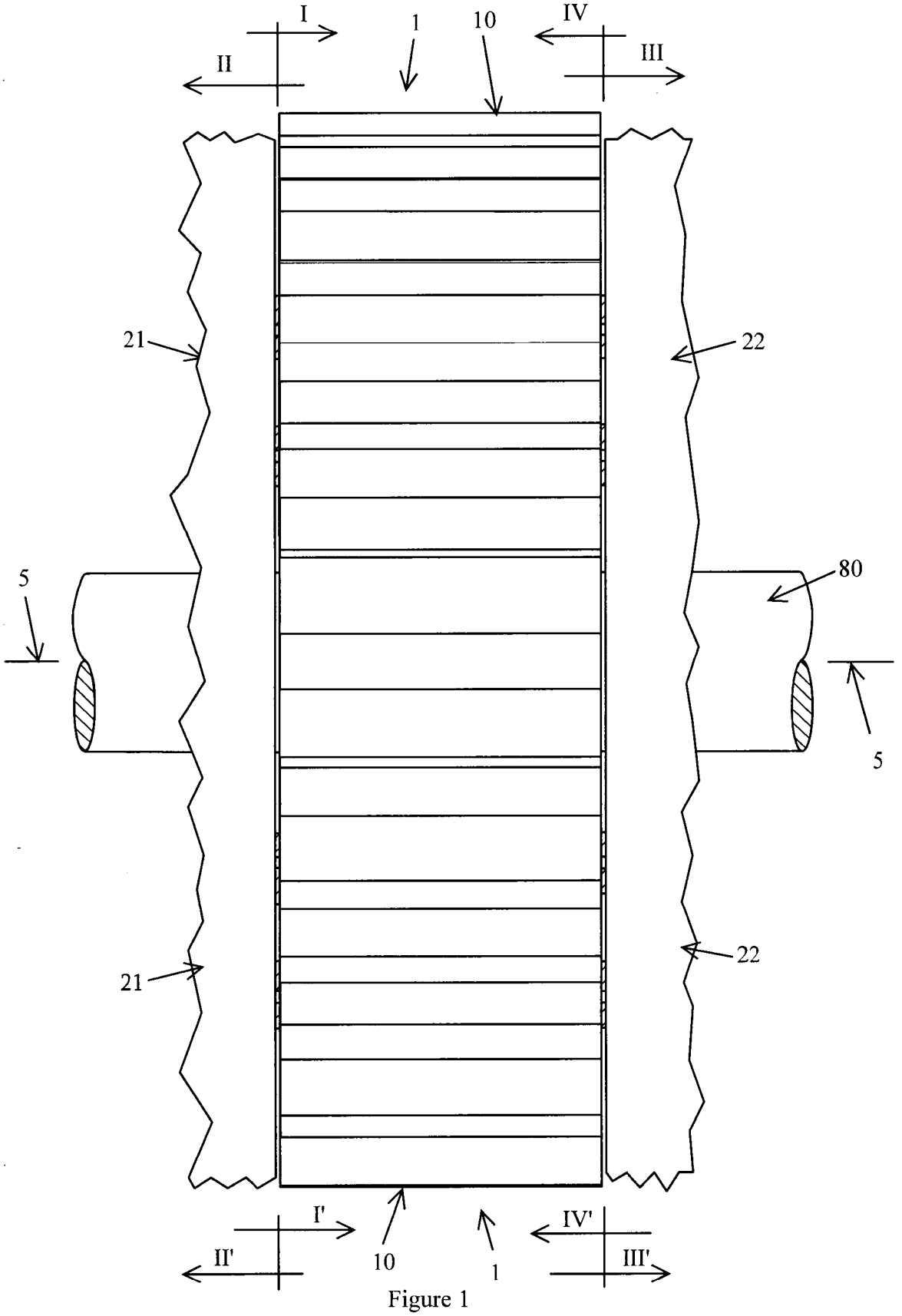


Figure 1

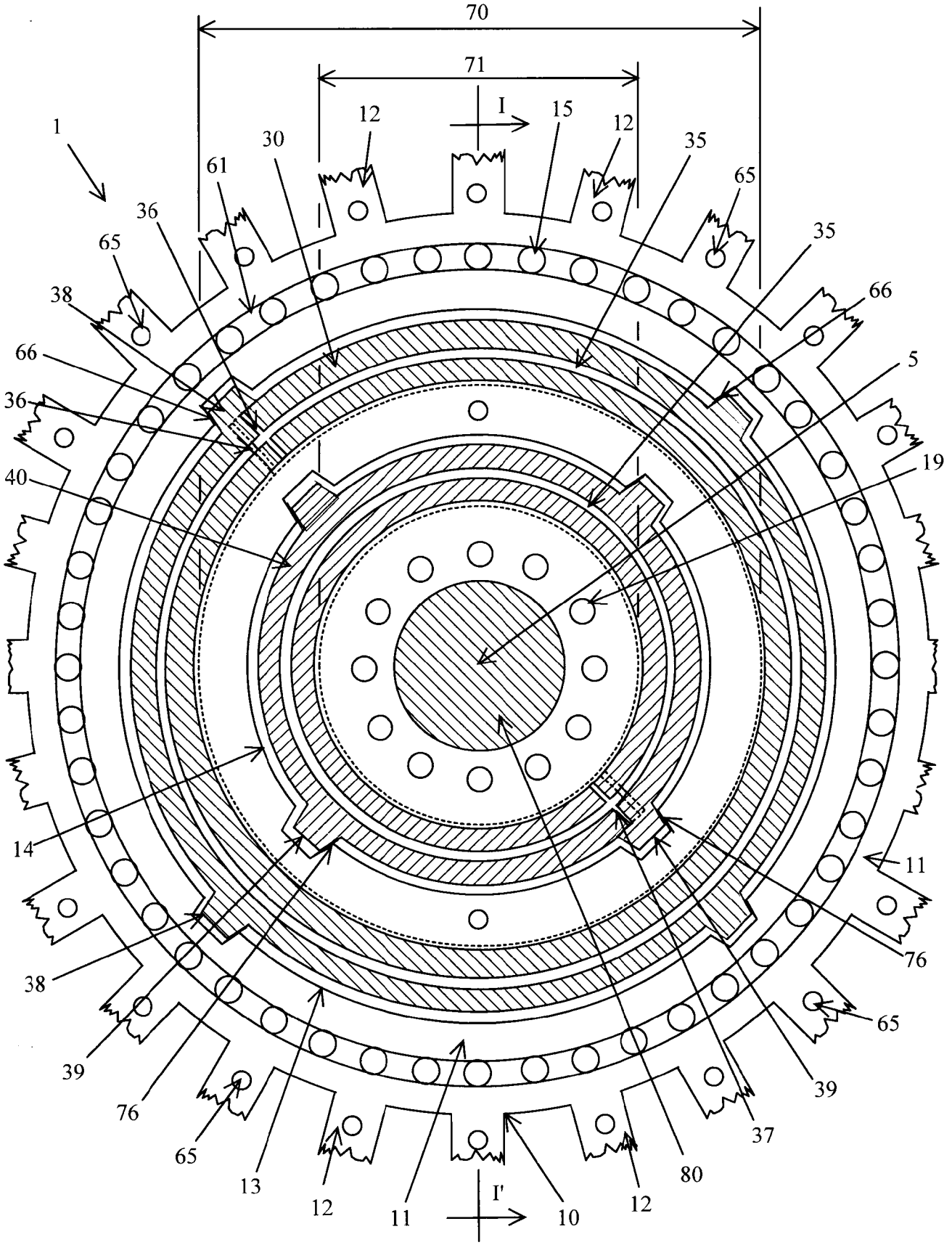


Figure 2

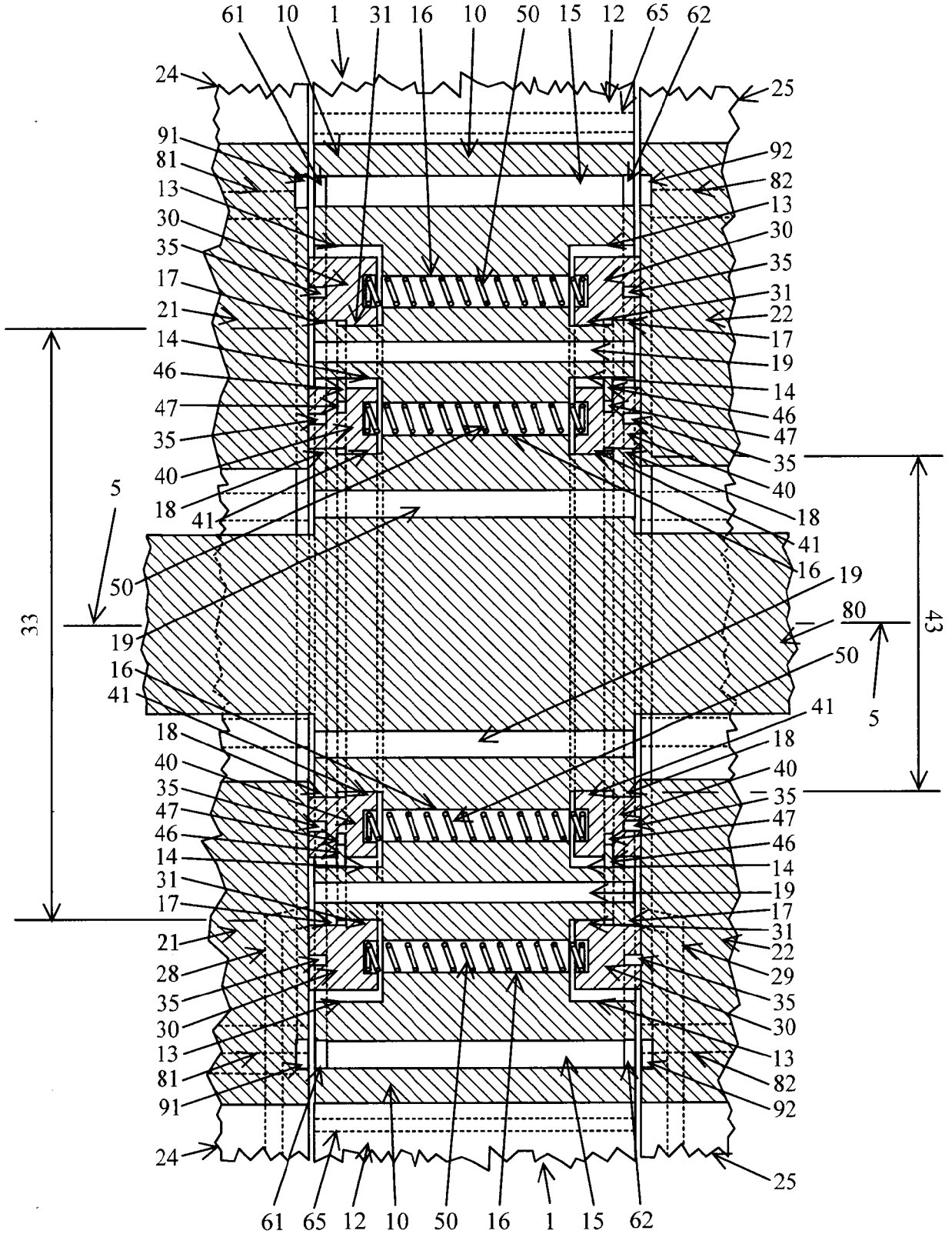

61 10 1 31 16 10 50 15 12 65 62
24
25
91
81
13
30
35
17
21
14
46
47
35
40
18
41
50
19
16
41
18
40
35
47
46
14
31
17
21
28
35
30
13
81
91
24
92
82
13
30
35
31
22
17
19
14
46
47
35
40
18
41
16
19
80
50
41
18
40
35
47
46
14
19
17
31
22
29
35
30
13
82
92
25
5
33
43
5
61 65 12 10 50 16 1 15 62

Figure 3

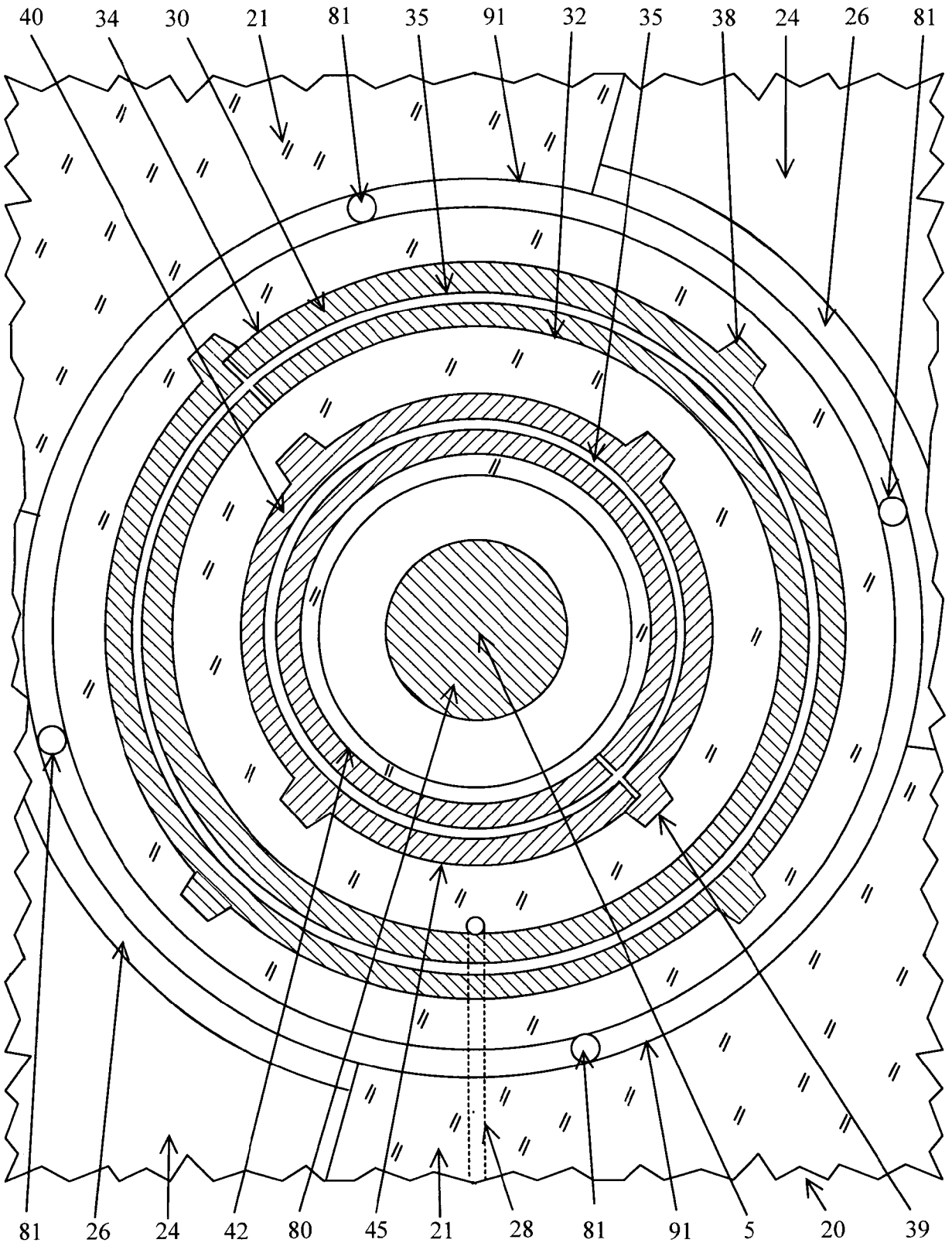

40
34
30
21
81
35
91
32
35
38
24
26
81
81
26
24
42
80
45
21
28
81
91
5
20
39

Figure 4

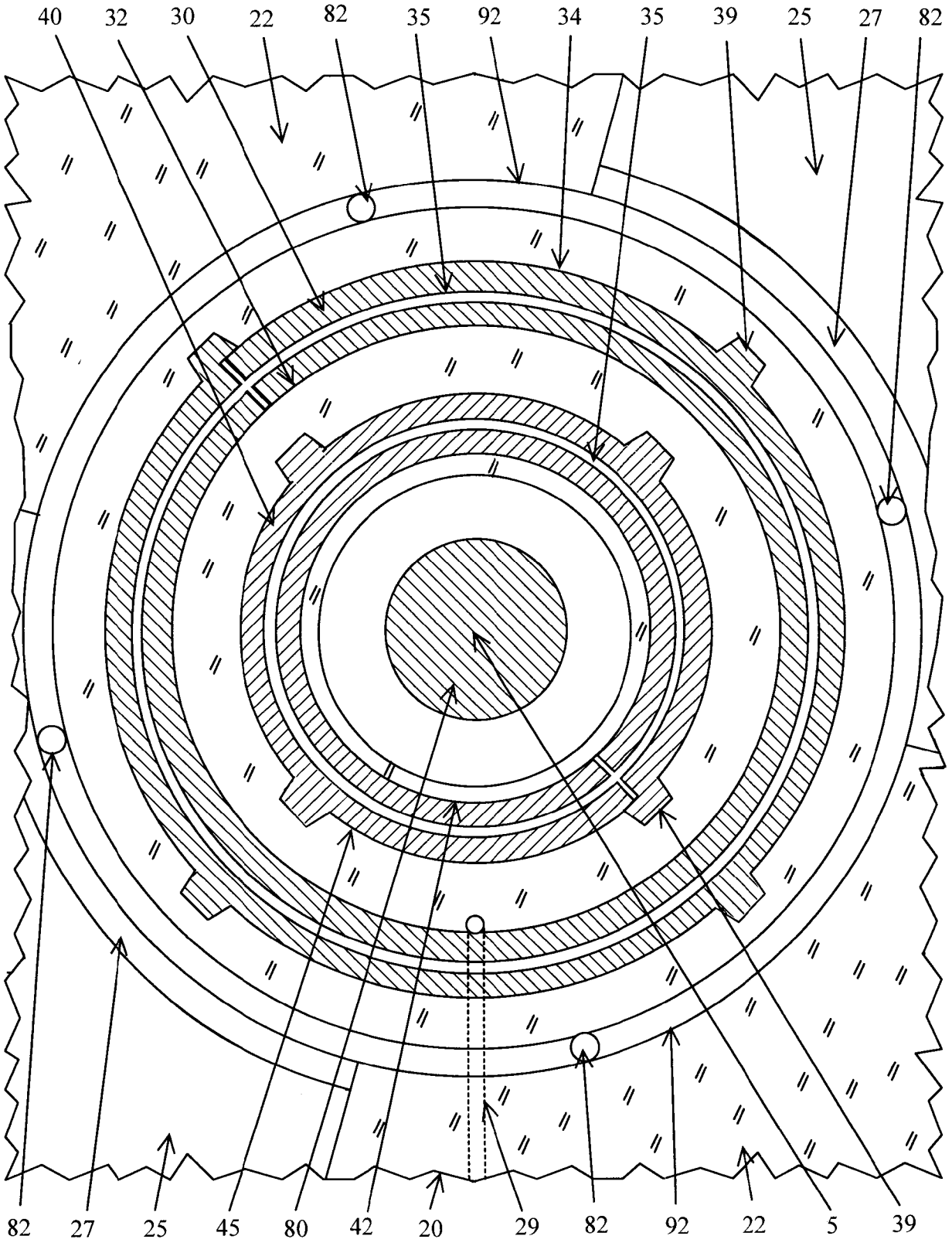

40
32
30
22
82
35
92
34
35
39
25
27
82
82
27
25
45
80
42
20
29
82
92
22
5
39

Figure 5

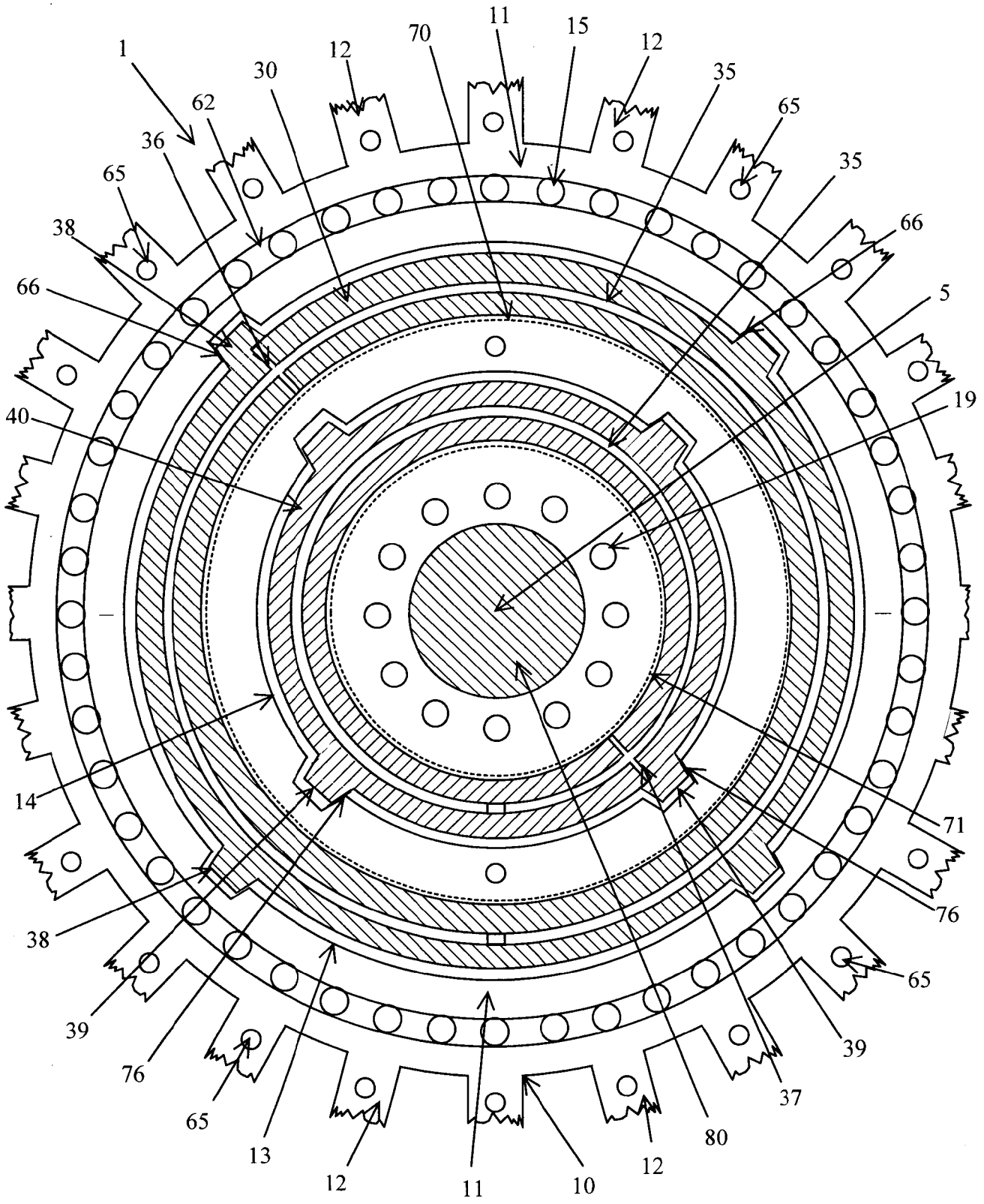

1
62
36
65
38
66
40
14
38
39
76
65
13
12
11
10
12
80
37
39
65
76
71
19
5
66
35
65
12
15
11
70
12
30

Figure 6

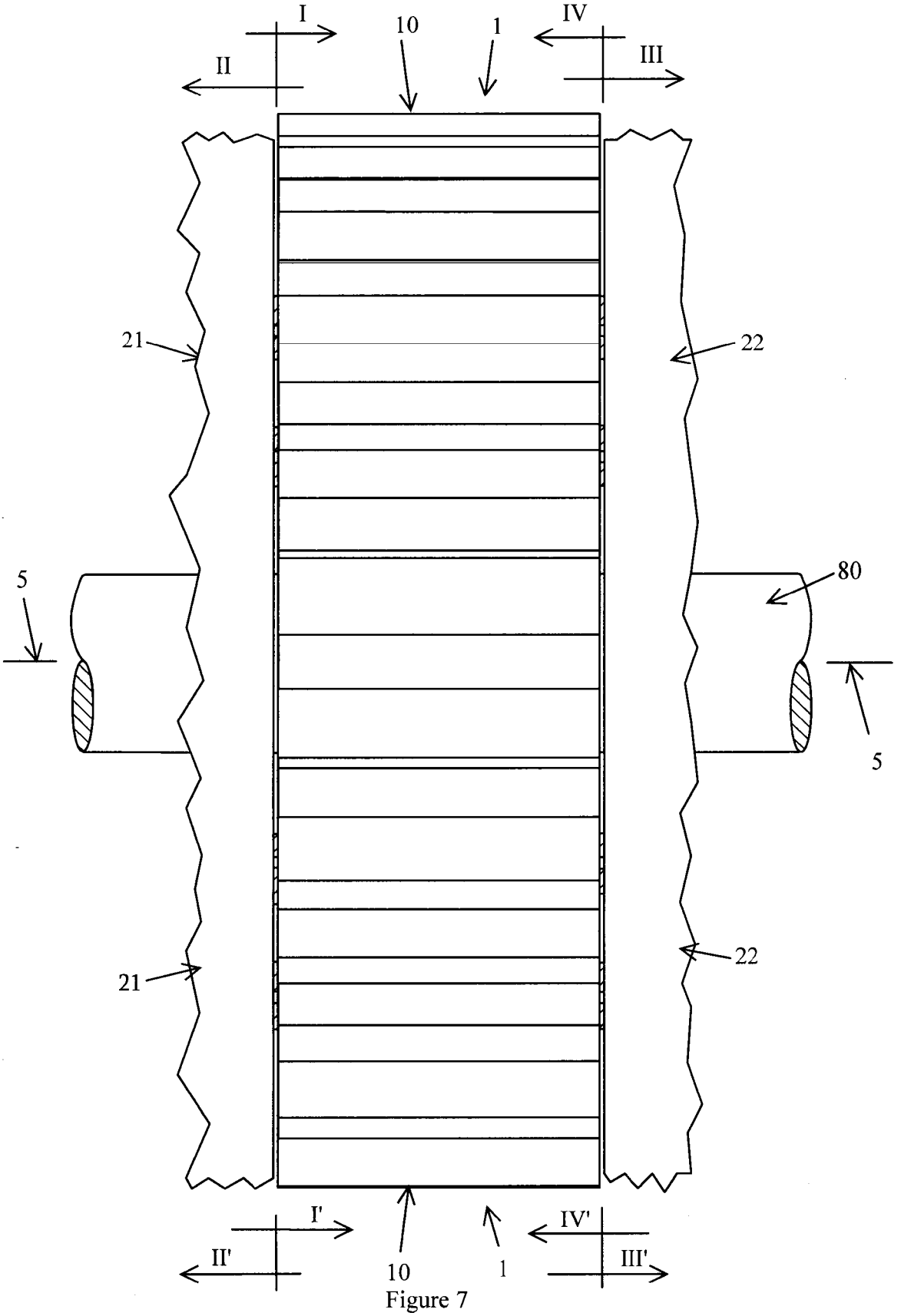


Figure 7

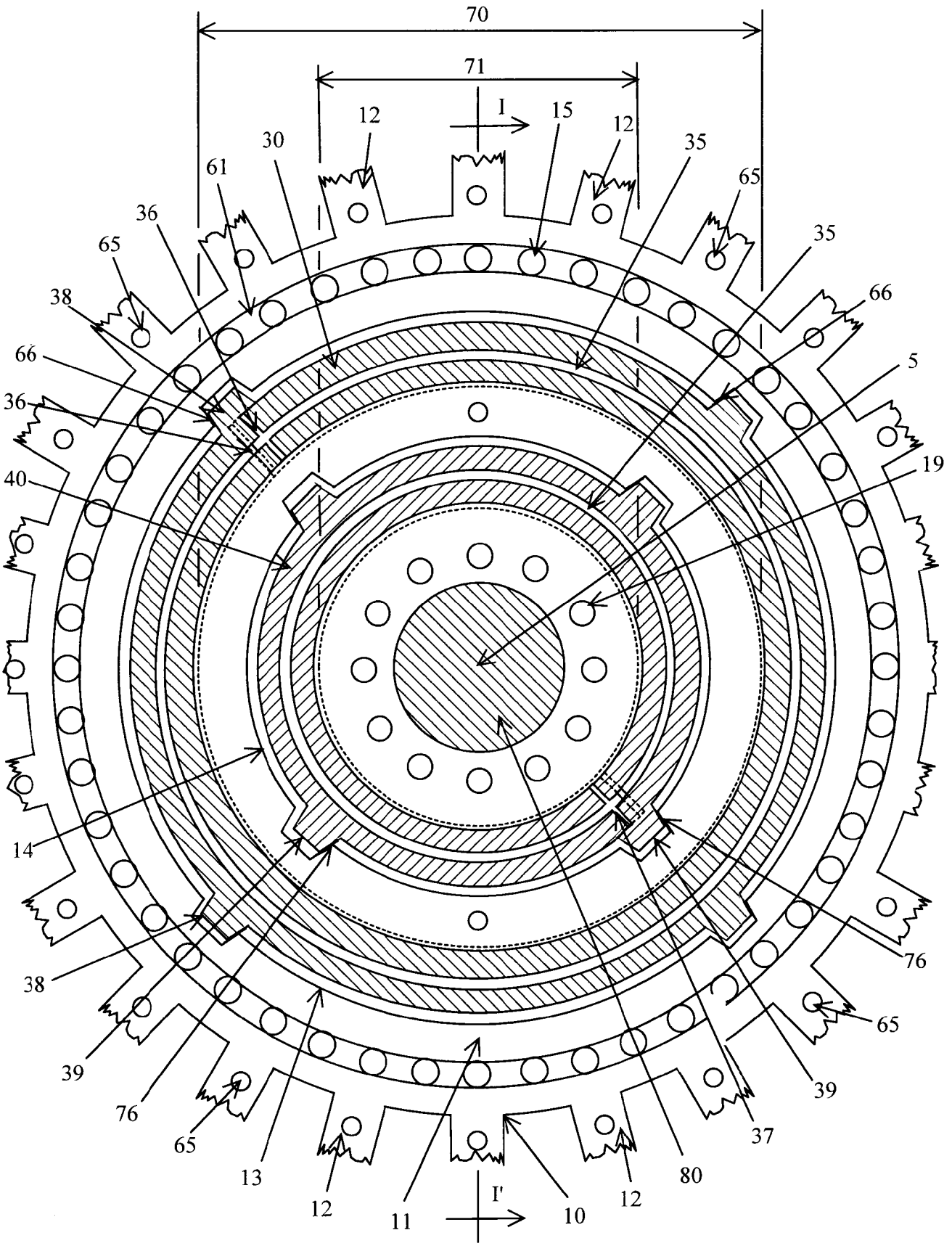


Figure 8

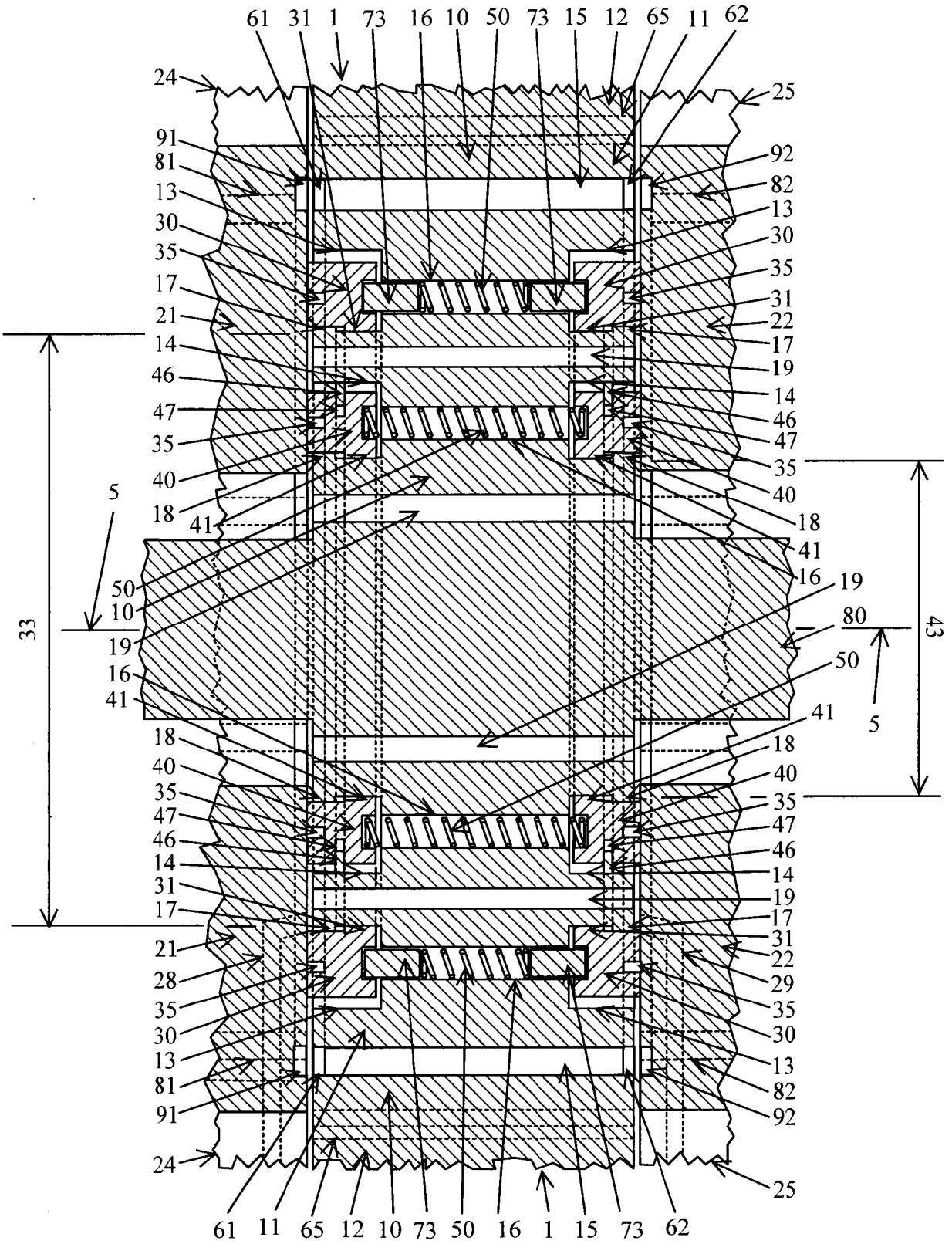

61 31 1 73 16 10 50 73 15 12 65 11 62
24
25
91
81
13
30
35
17
21
14
46
47
35
40
18
41
92
82
13
30
35
31
22
17
19
14
46
47
35
40
18
41
16
19
80
50
5
43
33
5
50
10
19
16
41
18
40
35
47
46
14
31
17
21
28
35
30
13
81
91
24
61 11 65 12 10 73 50 16 1 15 73 62
25

Figure 9

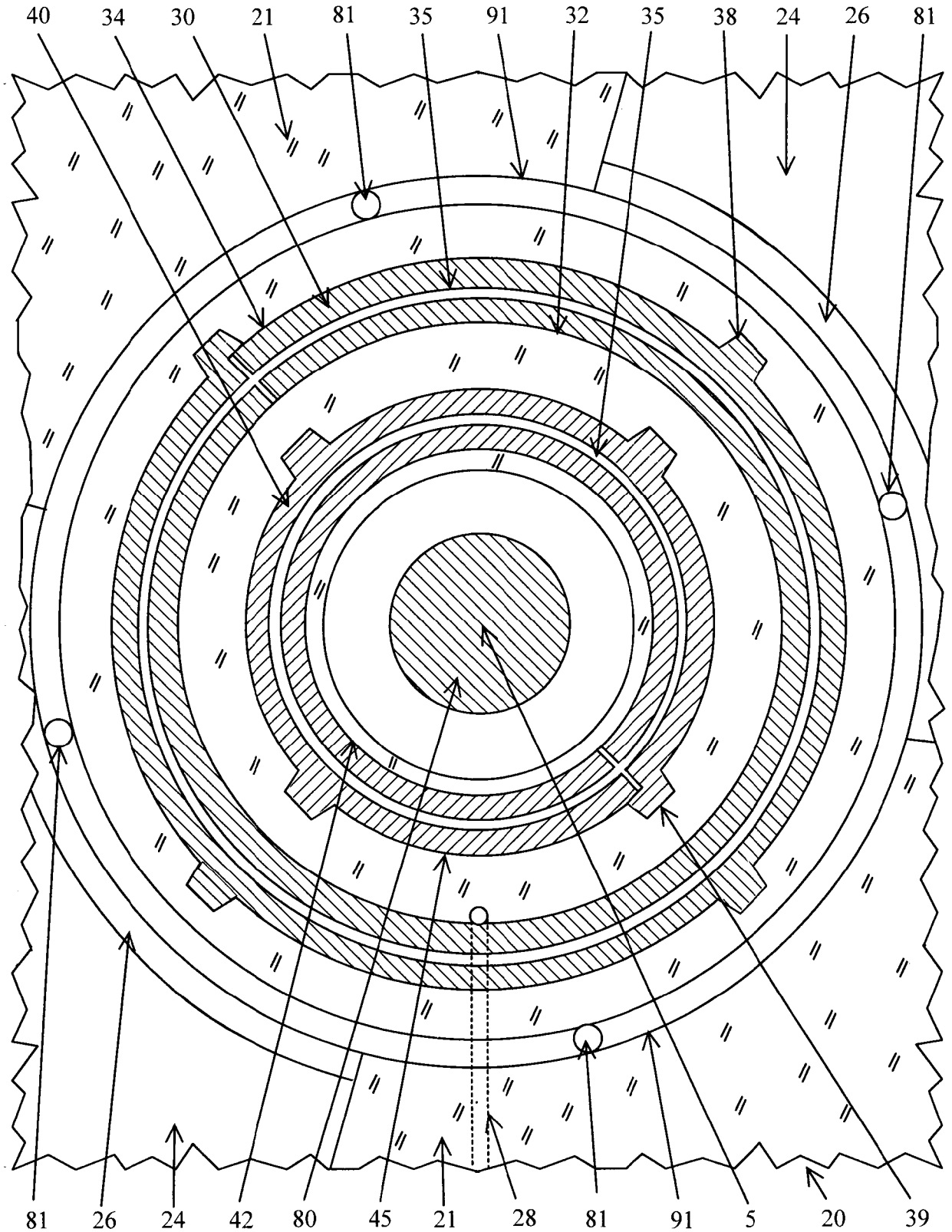

40
34
30
21
81
35
91
32
35
38
24
26
81
81
26
24
42
80
45
21
28
81
91
5
20
39

Figure10

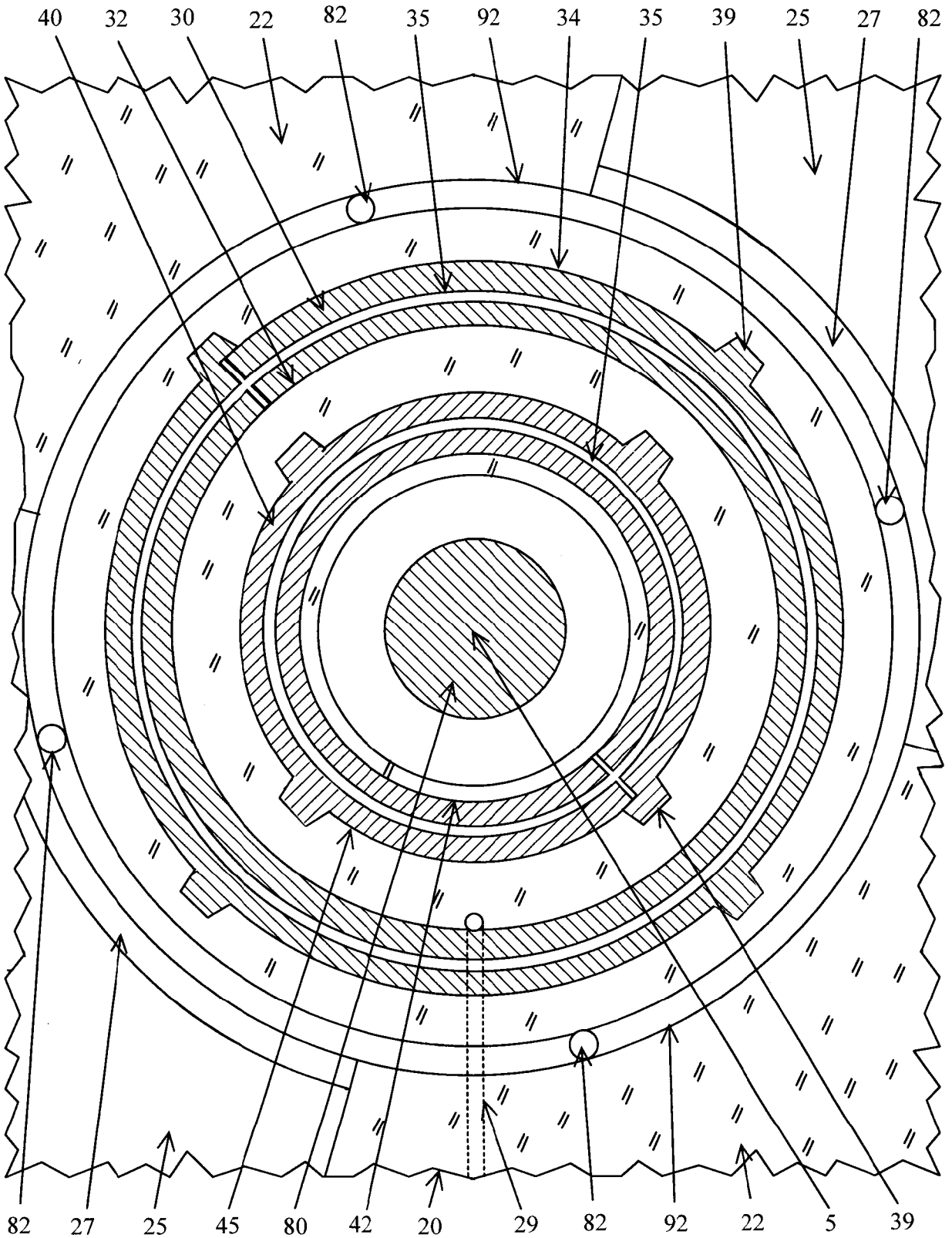

40
32
30
22
82
35
92
34
35
39
25
27
82
82
27
25
45
80
42
20
29
82
92
22
5
39

Figure 11

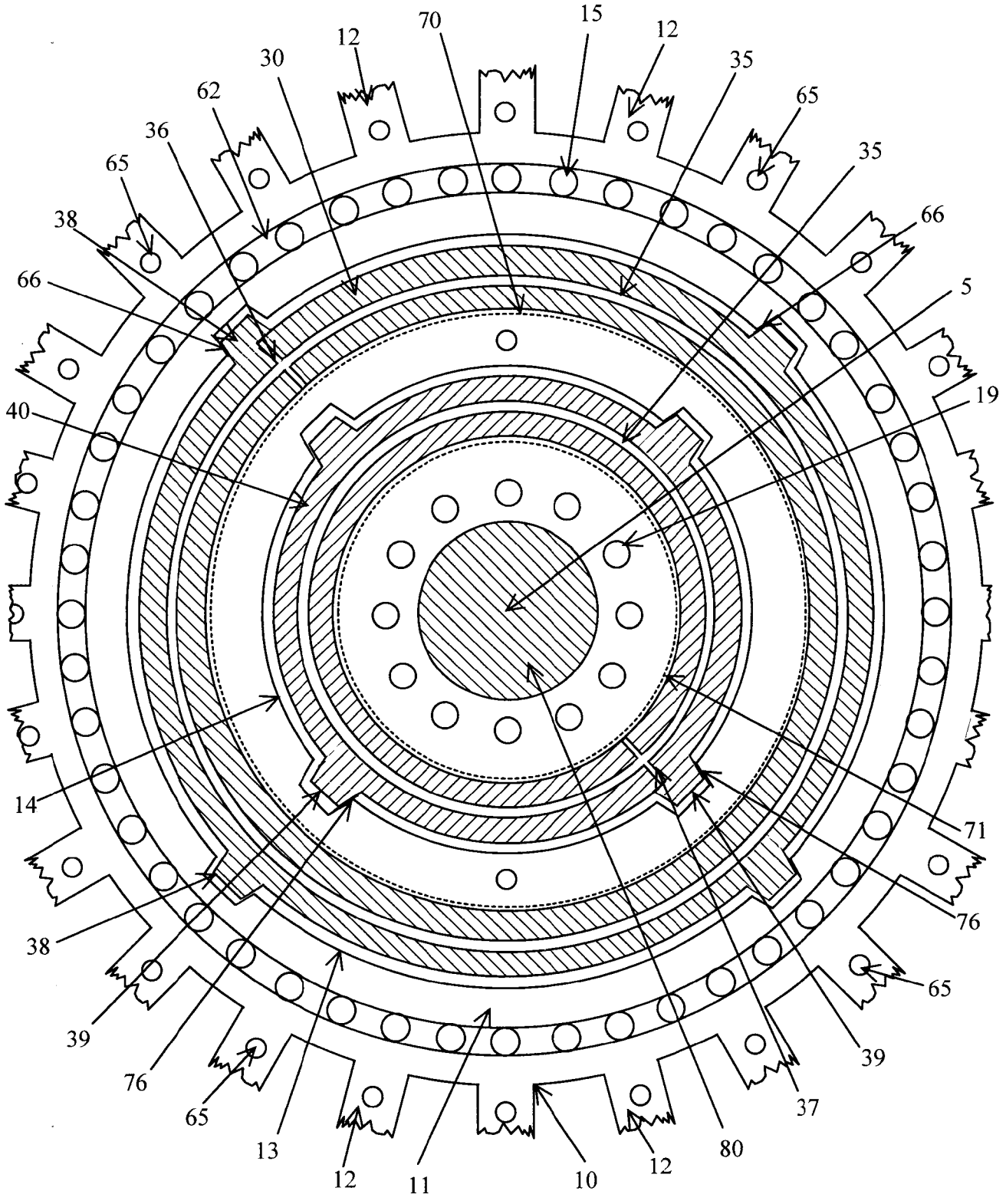

70
15
12
12
30
35
62
65
36
65
35
38
66
66
5
19
40
14
71
76
38
65
39
39
76
65
37
13
80
12
12
11
10

Figure12

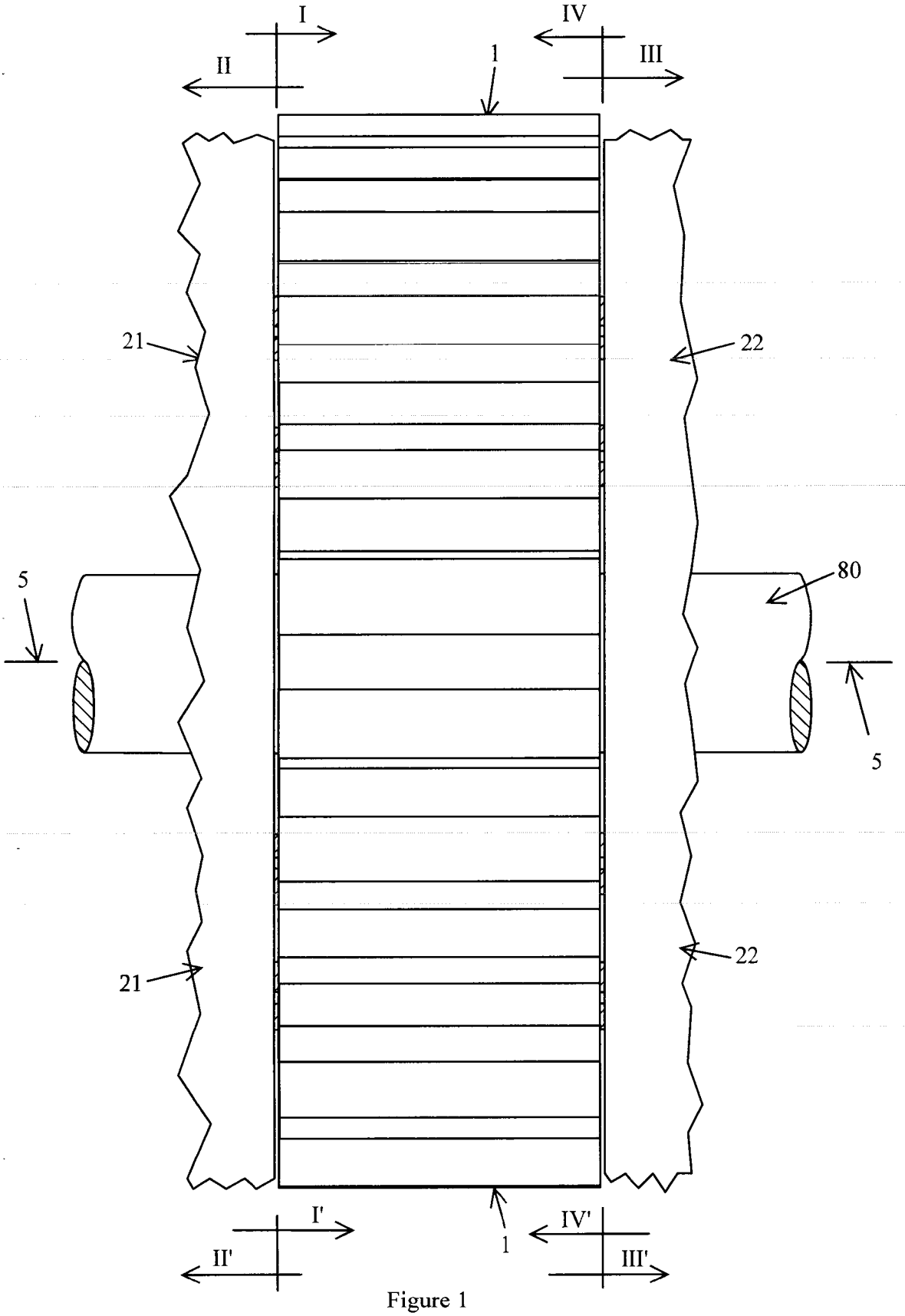


Figure 1

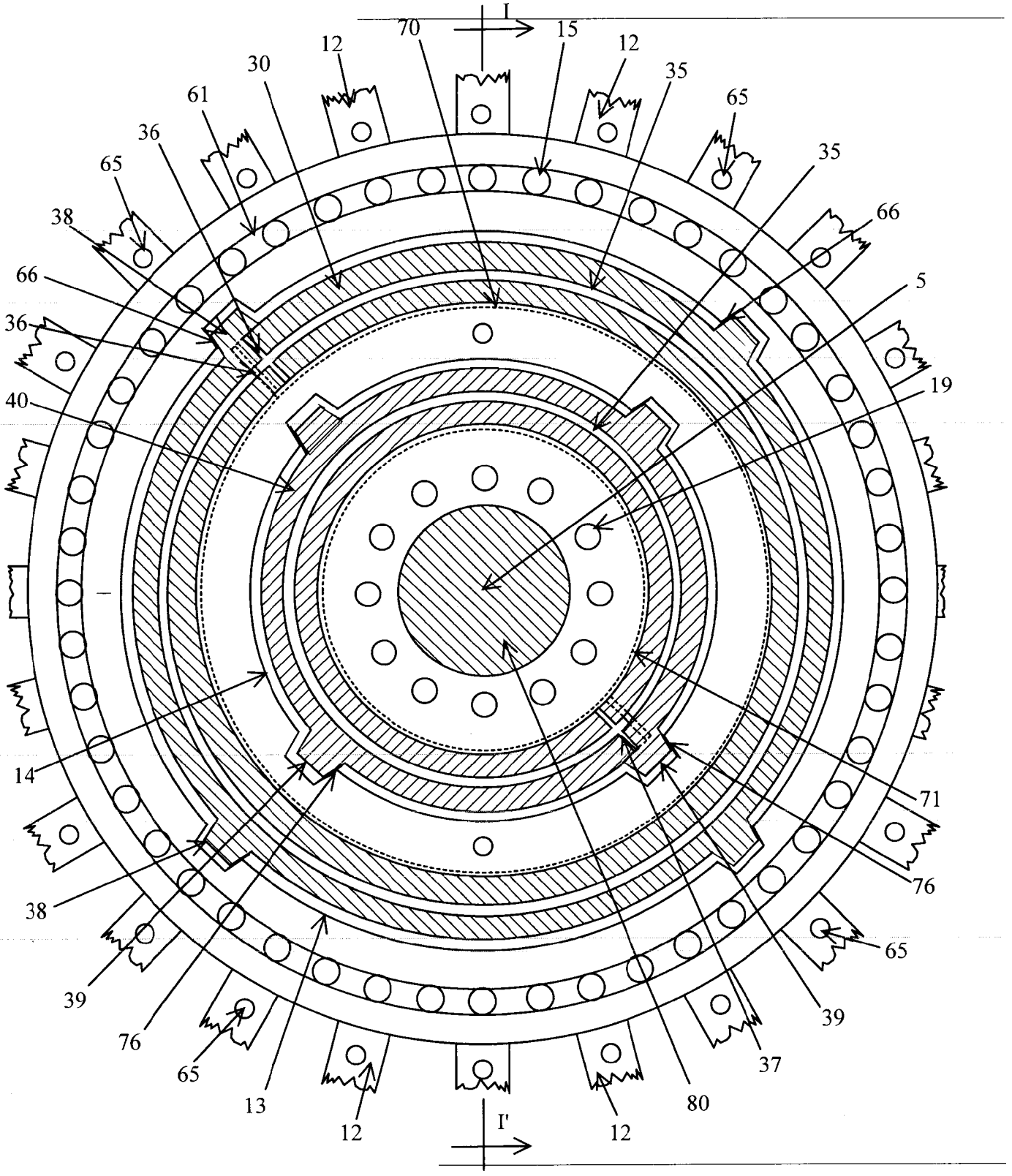

I
70
15
12
12
30
35
61
65
36
65
35
38
66
66
5
36
19
40
14
71
76
38
65
39
39
76
65
37
13
80
12
12
I'

Figure 2

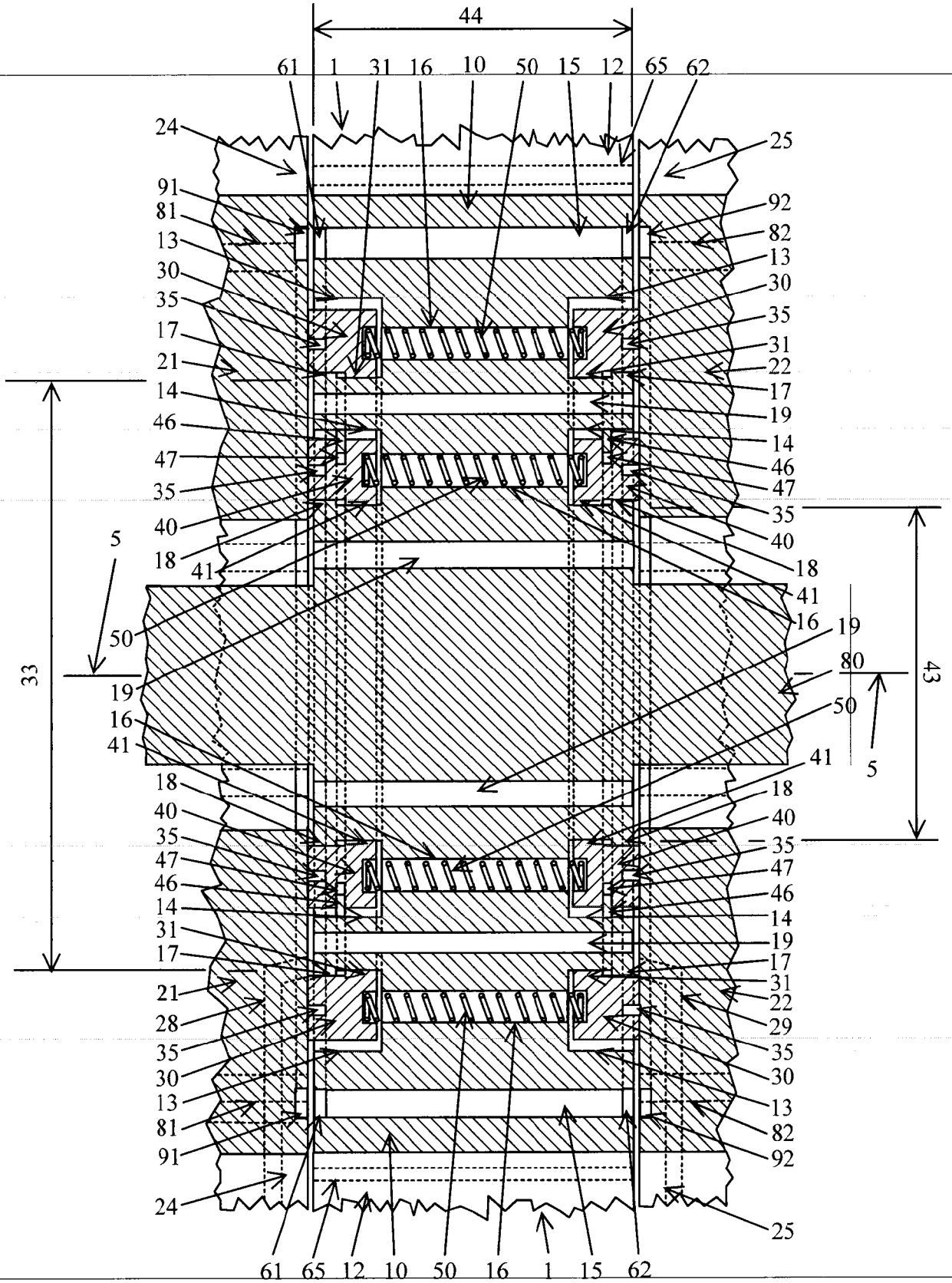

44
61
1
31
16
10
50
15
12
65
62
24
25
91
92
81
82
13
30
35
17
21
14
46
47
40
18
41
5
50
19
16
33
43
80
22
29
28

Figure 3

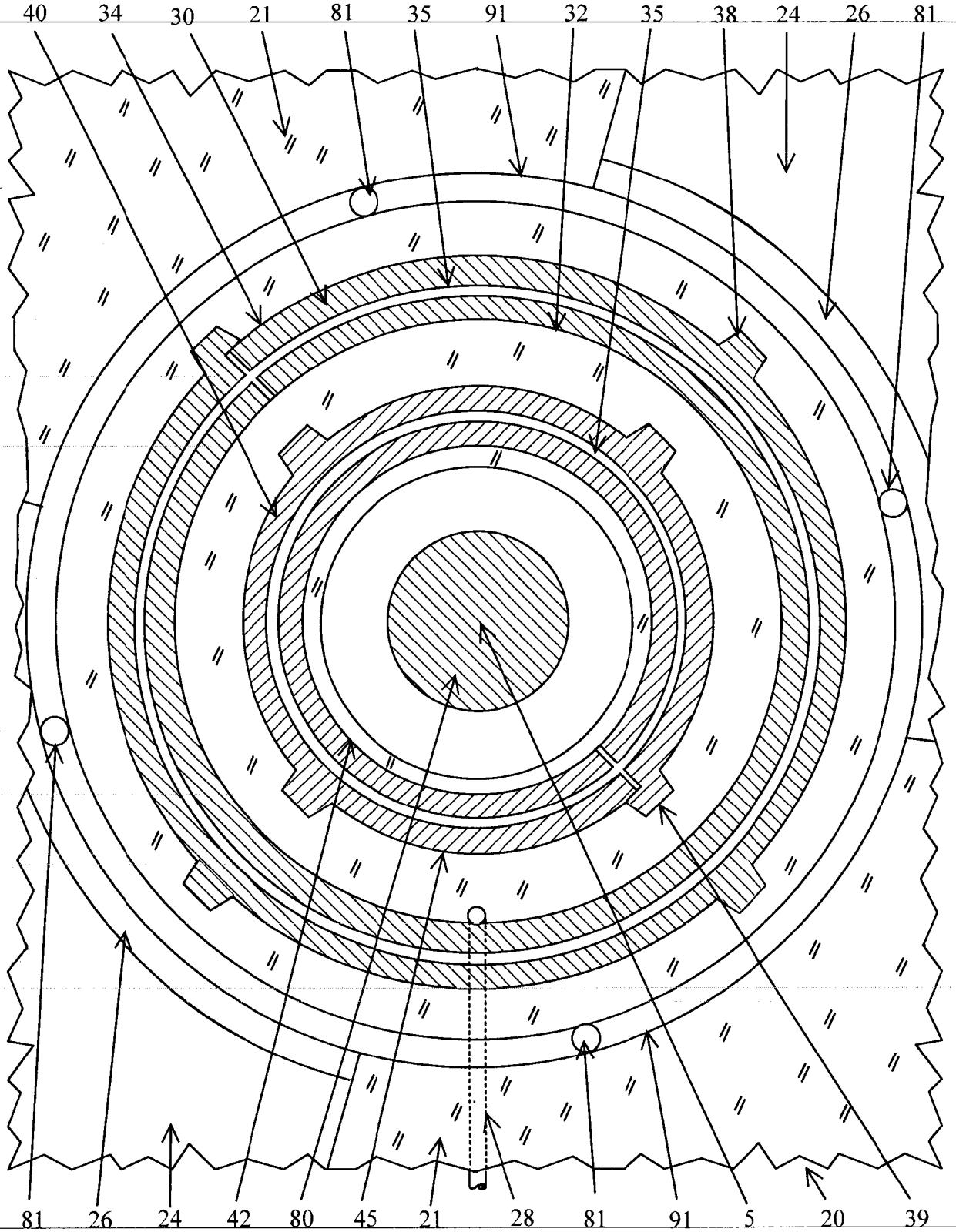

40
34
30
21
81
35
91
32
35
38
24
26
81
81
26
24
42
80
45
21
28
81
91
5
20
39

Figure 4

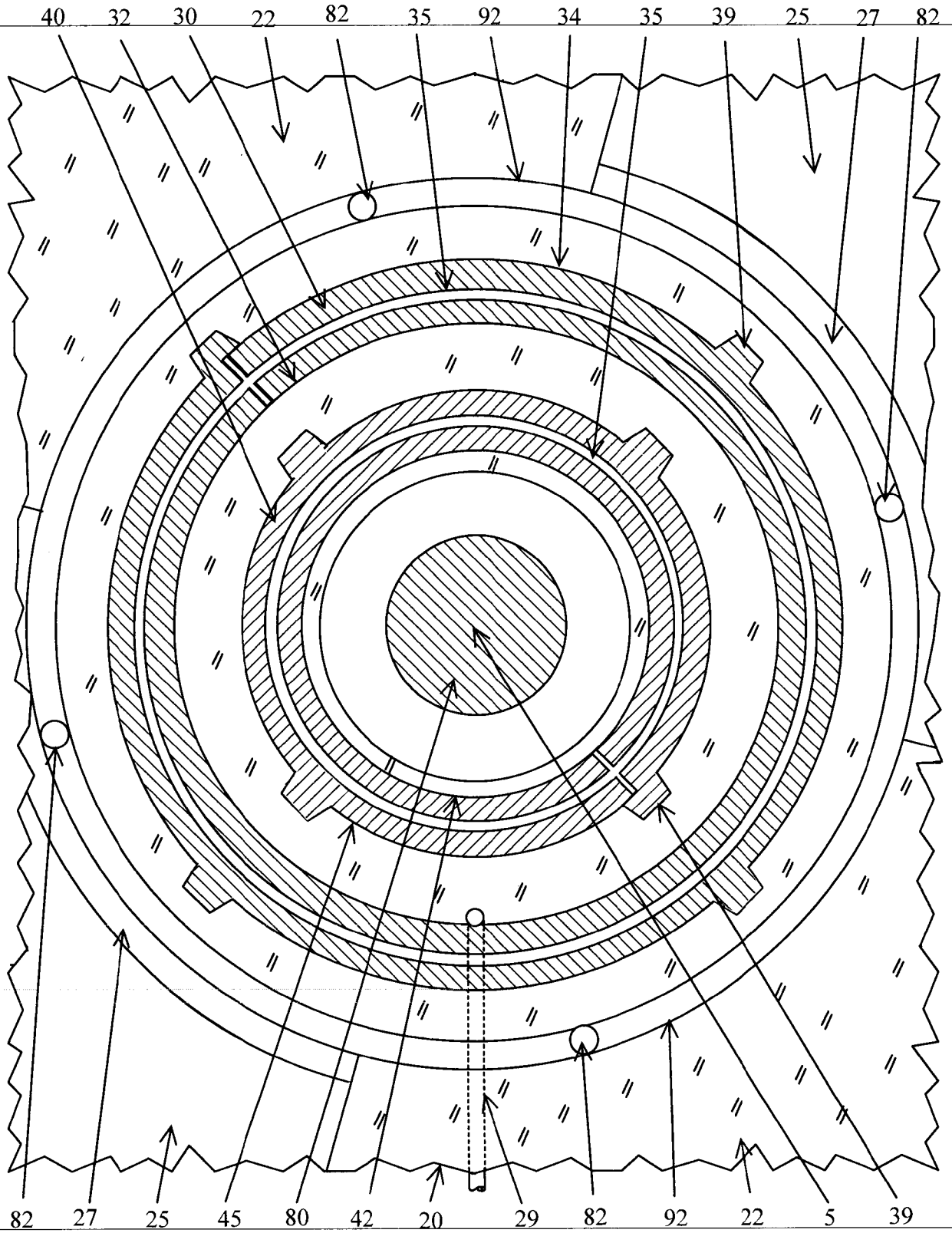

40
32
30
22
82
35
92
34
35
39
25
27
82
82
27
25
45
80
42
20
29
82
92
22
5
39

Figure 5

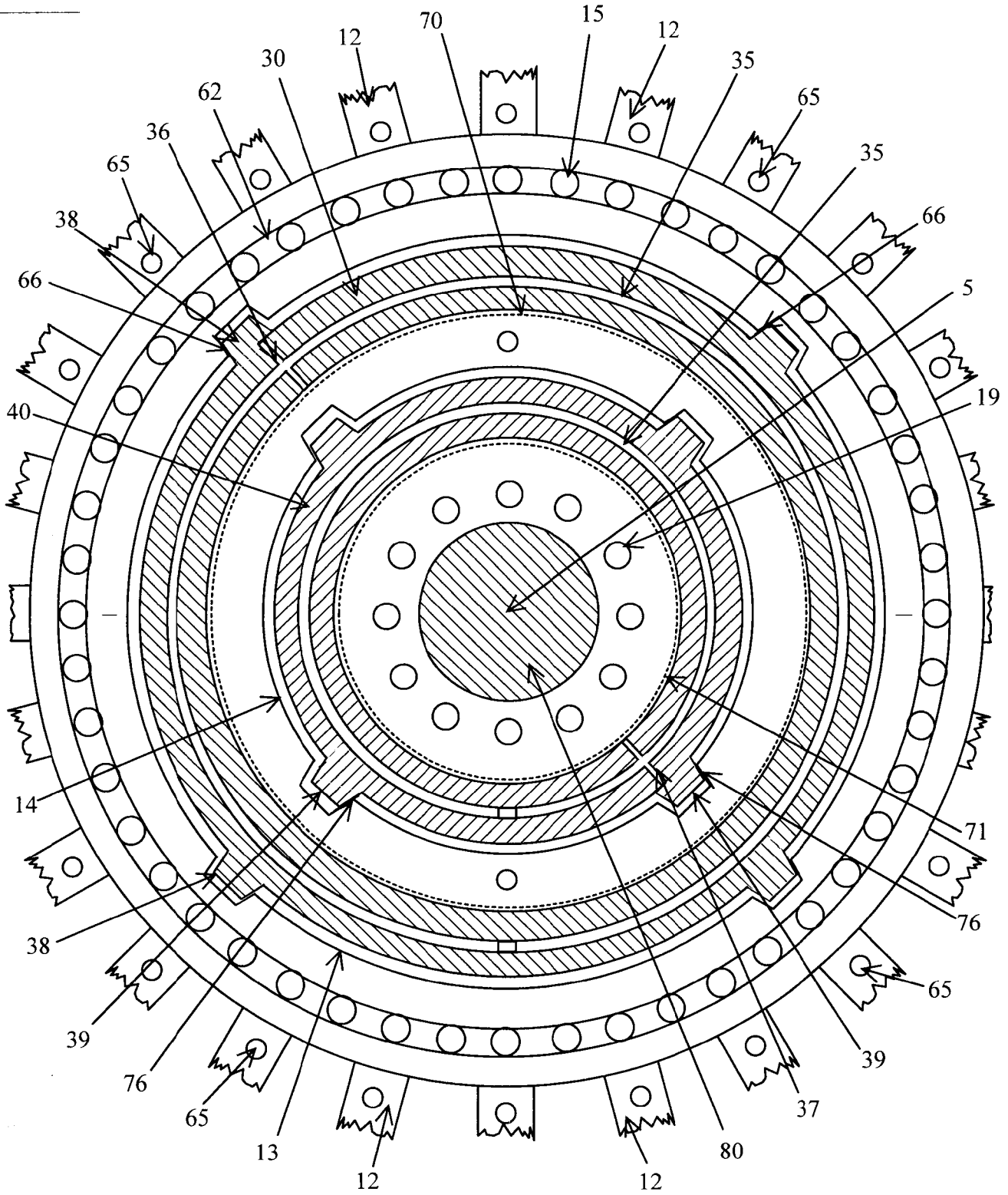
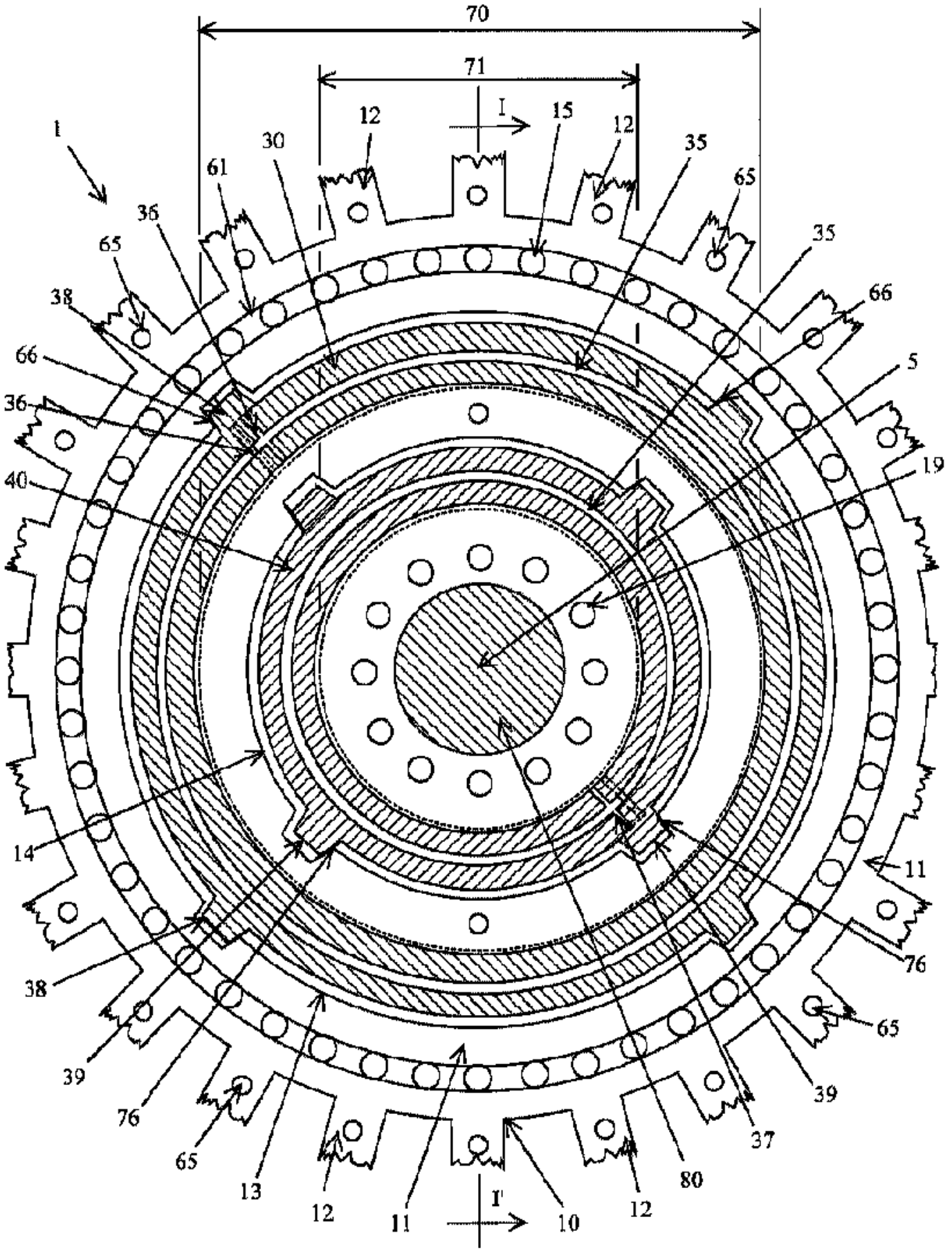

70
15
12
12
30
35
62
65
36
65
35
38
66
66
5
19
40
14
71
76
38
65
39
39
76
65
37
13
80
12
12

Figure 6


70
71
I
I'
1
12
15
12
30
61
35
65
36
65
35
38
66
66
5
36
19
40
14
11
76
38
65
39
39
76
37
65
80
13
12
11
10
12