## University of Groningen

# Comprehensive Patent Data of the German Democratic Republic 1949-1990—Technical Report and Dataset Overview 

Hipp, Ann; Fritsch, M.; Greve, Maria; Günther, Jutta; Lange, Marcel; Liutik, Christian; Pfeifer, Beate; Shkolnykova, Mariia; Wyrwich, Michael

IMPORTANT NOTE: You are advised to consult the publisher's version (publisher's PDF) if you wish to cite from
it. Please check the document version below.
Document Version
Publisher's PDF, also known as Version of record

## Publication date

2022

Link to publication in University of Groningen/UMCG research database

Citation for published version (APA):
Hipp, A., Fritsch, M., Greve, M., Günther, J., Lange, M., Liutik, C., Pfeifer, B., Shkolnykova, M., \& Wyrwich, M. (2022). Comprehensive Patent Data of the German Democratic Republic 1949-1990—Technical Report and Dataset Overview. (SOM Research Reports; Vol. 2022011-I\&O). University of Groningen, SOM research school

## Copyright

Other than for strictly personal use, it is not permitted to download or to forward/distribute the text or part of it without the consent of the author(s) and/or copyright holder(s), unless the work is under an open content license (like Creative Commons).

The publication may also be distributed here under the terms of Article 25fa of the Dutch Copyright Act, indicated by the "Taverne" license. More information can be found on the University of Groningen website: https://www.rug.nl/library/open-access/self-archiving-pure/taverneamendment.

## Take-down policy

If you believe that this document breaches copyright please contact us providing details, and we will remove access to the work immediately and investigate your claim. number of authors shown on this cover page is limited to 10 maximum.

## 2022011-I\&0

# Comprehensive Patent Data of the German Democratic Republic 1949-1990-Technical Report and Dataset Overview 

September 2022
Ann Hipp
Michael Fritsch
Maria Greve
Jutta Günther
Marcel Lange
Christian Liutik
Beate Pfeifer
Mariia Shkolnykova
Michael Wyrwich

SOM is the research institute of the Faculty of Economics \& Business at the University of Groningen. SOM has seven programmes:

- Accounting
- Economics, Econometrics and Finance
- Global Economics \& Management
- Innovation \& Organization
- Marketing
- Operations Management \& Operations Research
- Organizational Behaviour

Research Institute SOM
Faculty of Economics \& Business
University of Groningen
Visiting address:
Nettelbosje 2
9747 AE Groningen
The Netherlands
Postal address:
P.O. Box 800

9700 AV Groningen
The Netherlands
T +31 50363 9090/7068/3815
www.rug.nl/feb/research

# Comprehensive Patent Data of the German Democratic Republic 1949-1990—Technical Report and Dataset Overview 

Ann Hipp<br>University of Bremen, Germany<br>Michael Fritsch<br>Friedrich Schiller University, Jena, Germany<br>Maria Greve<br>University of Groningen, Faculty of Economics and Business, Department of Innovation Management \& Strategy, and Friedrich Schiller University, Jena, Germany<br>Jutta Günther<br>University of Bremen, Germany<br>Marcel Lange<br>University of Bremen, Germany<br>Christian Liutik<br>Friedrich Schiller University, Jena, Germany<br>Beate Pfeifer<br>Friedrich Schiller University, Jena, Germany<br>Maria Shkolnykova<br>University of Bremen, Germany<br>Michael Wyrwich<br>University of Groningen, Faculty of Economics and Business, Faculty of Economics and Business, Department of Innovation Management \& Strategy, and Friedrich Schiller University, Jena, Germany<br>m.wyrwich@rug.nl

# Comprehensive Patent Data of the German Democratic Republic 1949-1990-technical report and dataset overview 

Ann Hipp ${ }^{\text {a }}$, Michael Fritsch ${ }^{\text {b }}$, Maria Greve ${ }^{\text {b, },}$, Jutta Günther ${ }^{\text {a }}$, Marcel Lange ${ }^{\text {a }}$, Christian Liutik ${ }^{\text {b }}$, Beate Pfeifer ${ }^{\text {b }}$, Mariia Shkolnykova ${ }^{\text {a }}$ and Michael Wyrwich ${ }^{\text {b, }}$

August 2022


#### Abstract

This paper documents the generation and the content of the Comprehensive Patent Database (CPDB) of the German Democratic Republic (GDR) (1949-1990), Version 1.1, which is freely available at GESIS https://doi.org/10.7802/2423. The database contains all patents granted in the GDR and published by the Office of Inventions and Patents (AfEP, later: German Patent and Trade Mark Office/DPMA) in the period between 1 January 1939 (application before but granted in the GDR) and 29 June 2006 (application in but granted after the GDR). The core database covers the years 1950 to 1990 and contains 24 variables with manually cleaned and processed information on a total of 261,822 unique patents of the GDR. The data was collected and prepared for the purpose of research on innovation activity in the GDR.


Keywords: Patent data, German Democratic Republic (GDR), invention
JEL classification: O31, O33, P29, P39, B24
a) University of Bremen, Germany, b) Friedrich Schiller University Jena, Germany, c) University of Groningen, The Netherlands

## 1. Purpose

Patent data are a key source for analyzing innovation activity (Acs et al. 2002). Accordingly, patents play a key role in most studies of innovation and technological developments in the communist East German State, the German Democratic Republic (GDR), which existed from 1949 till 1990. ${ }^{1}$ However, the patent data used in these studies are often rather incomplete ${ }^{2}$, and it is unclear to what extent these data have been subject to plausibility checks and data cleaning.

In order to provide a solid empirical basis for further analyses of innovation activities in the GDR, we compiled a Comprehensive Patent Database (CPDB) as part of a collaborative research project funded by the Federal Ministry of Education and Research in Germany (2018-2023) ${ }^{3}$. The database is freely accessible at GESIS, Leibniz Institute for Social Sciences
(https://doi.org/10.7802/2423). Compared to other sources of GDR patents, our database has three main advantages. First, it is much more comprehensive than any other available source. ${ }^{4}$ Second, erroneously detected data was manually verified and, if necessary, corrected or completed. ${ }^{5}$ Third, the data contains information that allows for a meaningful assignment of inventive activity to certain locations at the organizational level (for details, see Section 6).

We begin this technical report and overview with a brief description of the GDR patent system (Section 2) and then explain the informational content of

[^0]GDR patents (Section 3). Section 4 informs about the methods applied in gathering and preparing the data, and in Section 5 the data is described in some detail. Finally, we explain the generation of regional identifiers for 17,772 patents of the years 1989 and 1990 (Section 6).

## 2. Patenting in the GDR

After the foundation of the GDR, a patent law based on the Soviet-type model was established (Wiessner 2015). Based on the GDR Patent Act of 1950, the Office for Inventions and Patents (AfEP) in Berlin, subordinated to the Ministry of Planning, was responsible for all issues connected with patenting. The GDR joined the World Intellectual Property Organization (WIPO) in 1968, only one year after the WIPO's foundation. This ensured uniform international standards for filing patents-i.e., the degree of novelty, the inventive level, and the technical applicability (WIPO 1970). Despite the similarities in the dynamics of filing and granting patents, the comparability of the GDR patent data with those of the Federal Republic of Germany (FRG) remains highly controversial (see Fritsch et al. 2022; Günther et al. 2020; Grupp et al. 2005; Kogut \& Zander 2000).

There were two types of patents in the GDR: the "exclusive patent" (Ausschließungspatent) and the "economic patent" (Wirtschaftspatent). The exclusive patent guaranteed the patent holder the right to exploit the invention and was very similar to the FRG patent. This type of patent was mainly effective for foreign applicants, especially from Western countries, who were granted exclusive rights for 18 years to use the registered invention in the GDR (Wiessner 2015). Figure 1 shows an example of an exclusive patent from the year 1972. The patent contains, among other things, the following information: identification number, file number, filing and publication date, name of inventor and owner, main bibliographic class, title, and description of the patent.


## Abdichtung für ein Wälzlager

1
Die Erfindung betrifft eine Abdichtung für ein Wälzlager insbesondere für ein Zwischenwellenlager eines unterteilten Gelenkwellenstranges, mit je einer benachbart dem Wälzk\&̈rperkranz angeordneten Lippendichtung, einer nach außen abdichtenden Labyrinthdichtung und einer in den Zwischenraum zwischen der Lippendichtung und der Labyrinthdichtung eingebrachten Fettfüllung auf jeder Seite des Wälzkörperkranzes.
Ein Zwischenwellenlager für einen unterteilten Gelenkwellenstrang, der zur Obertragung der Leistung eines vorn liegenden Antriebsmotors auf die Hinterräder des Fahrzeuges eingesetzt wird, soll heute in viclen Fallen völlig wartungsfrei gestaltet selin. Das Zwischenwellenlager soll also ohne jegliche Abschmierung über die ganze Lebensdauer des Gelenkwellenstranges Iaufen. Auch Wälzlager für andere Anwendungszwecke sollen heute häufig eine Lebensdauer-Abdichtung aufweisen.
Es ist bereits eine Abdichtung mit den eingangs genannten Merkmalen für ein Zwischenwellenlager vorgeschlagen, bei der der Zwischenraum der Labyrinthdichtung und der Lippendichtung, deren Dichtlippe an der äußeren Umfangsfläche des Lagerinnenrings anliegt. ousschließlich mit Fett gefüllt ist und die Dichtkörper von parallelen Blechschelben gebildet sind, die im wesentlichen und insbesondere mit ihren freien Enden radial ausgerichtet sind. Durch die Dichtspalten der Labyrinthdichtung und durch einen sich infolge von Zentrifugalwirkung bildenden Ringspalt an der radial inne ren Seite der Fettfüllung kann bei der bekannten Ab dichtung im Betrieb Staub und Wasser eindringen, wo-
$s$ ragt. Durch die dem Lagerinnenring zugeordnete Scheibe
wird die Fettfullung bis auf einen zwischen der Scheibe wird die Fettfüllung bis auf einen zwischen der Scheibe und der Nabe bzw. dem inneren Dichtkörper der Labyrinthdichtung radial außen verbleibenden Spalt geteilt. Wenn daher im Betrieb infolge einer Zentrifugalwirkung das Fett nach außen gedruckt wird und radial wirkung das Fett nach außen gedrulkt wird und radial
innen ein Hohlraum entsteht, können evtl. in diesen Hohlraum eindringende Teilchen nicht bis zum Lager vordringen, sondern werden durch die dem Lagerinnenring zugeordnete Scheibe zurückgehalten. Da die ring zugeordnete Scheibe zurückgehalten. Da die
Scheibe auch bei hoher Drehzahl radial auBen stets von Fett umgeben ist, können Fremdteilchen die Scheibe radial nicht passieren. Die ouf diese Weise verbesserte Abdichtung gewährleistet also einen absoluten Schutz vor dem Eindringen von Fremdteilchen über die gesamte Lebensdauer des Lagers.
Eine zusātzliche Verbesserung des Lagers wird dadurch
Eine zusātzliche Verbesserung des Lagers wird dadurch erzielt, daB jeder mit der Nabe feste, innere Dichtkörper der Labyrinthdichtung ein in eine Bohrung der Nabe eingeschobener Kunststoffring ist, der auf seiner nach außen weisenden Stirnfläche mit einer umlaufenden Aussparung verschen ist, und daß jeder āußere, mit der Welle umlaufende Dichtkörper an seinem radial äuBeren 3) Endbereich parallel der Aussparung verformt ist. Zwecknenrings eine Schelbe angeardnet ist, die radial nach gs eine Scheibe angeordnet ist, die radial nach Ben in den mit Fett gefüllten Zwischenraum hinein. von Fett umgeben ist, können Fremdteilchen die Scheibe

2
durch die Lagerloufbahnen zerstört werden.
Zur Vermeidung dieses Nachteils ist nach der Erfindung vorgesehen, daß benachbart jeder Seite des Lagerin-
96101.

Figure 1: Example of an exclusive patent

The dominant type of GDR patent was the "economic patent", which was assigned to the respective inventor but did not grant him or her any exploitation rights for the invention; the right of use was instead transferred to the entire
economy of the GDR, and the usage was allowed after the responsible central authority had been notified. All inventors who successfully applied for a patent as employees of a state-owned enterprise (VEB), research institute, or other public institution received an economic patent, which recognized him or her as the intellectual source. In case that the patented invention generated economic benefits, the inventor received some remuneration (Wiessner 2015). The remuneration was based on the criteria of "benefit for the society", which were: 1) saving of current or initial expenses; 2) improvement of use characteristics and production of new products; 3) improvement of working and living conditions; 4) saving of jobs; 5) increase of production or services; 6) increase of exports, decrease of imports. ${ }^{6}$ Figure 2 shows an example of an economic patent, which has a similar structure as an exclusive patent.

[^1]

Vordruck-Leitreerlag Berlin, Ag 300/70/DDR -(52) 7003

Figure 2: Example of an economic patent

## 3. Structure of a GDR patent

The structure of the patent specification in the GDR changed over the years. In earlier years the patent specifications (see Figures 1 and 2 in Chapter 2) did not entail identification numbers, so-called INID codes, which were later on placed in front of each piece of bibliographic data. Figures 3 and 4 below show examples of
patent specifications from the late 1970s and the 1980s that entail such an INID code. The uniform INID codes are applied by all patent offices according to WIPO standard ST. 9 and allow a consistent understanding of the essential items on the first page of a patent specification, notwithstanding the language of the patent specification. From the year 1977 or patent number DD123500 onward, the INID codes are included in the GDR patent specifications.

In the following, we explain the meaning of some INID codes that were most frequently used for GDR patents and describe the respective items. ${ }^{7}$ These codes encompass:
(11) Patent or identification number
(12) Kind of the document, i.e. type of patent
(19) Country
(21) Application number ("Aktenzeichen")
(22) Date of filing the application
(32) Date of filing priority application(s)
(44) Publication date
(51) IPC class
(54) Title of the invention
(55) Keywords
(57) Abstract, i.e. description of the invention
(71) Applicant
(72) Inventor
(73) Owner
(74) Attorney or agent, i.e. representative

The patent or identification number (11) was assigned to each patent with consecutive numbering by the AfEP. The number ranges between 1 and 302,036. However, there are gaps between the numbers 160,000 and 200,000. Therefore,

[^2]the total number of GDR patents is below the last granted integer 302,036 and amounts to $261,822 .{ }^{8}$

At the end of the identification number, there is usually a code indicating a specific kind of patent. In most cases, the AfEP used one of the following codes: A1, A2, A3, A4, A5, A6, A7, A8, B1, B3, C2, and C4. ${ }^{9}$ Each code stands for a respective legislation that was in force at the time of application or examination. For instance, A1 or A3 indicates an economic patent issued by the East German patent office, and distinguishes between the examination procedures of the protection requirements or the status of claims, whereas A2 means a supplement of the economic patent and A5 stands for an exclusive patent under the Patent Law of the GDR. ${ }^{10}$ The kind of the document (12) corresponds to the type of patent and, thus, concerns the economic or exclusive patent. "DD" designates the patent office of the country GDR and is introduced by code (19) uniformly in all GDR patent documents.

The dates have the following chronological order: (22) filing date before (44) publication date. In case of a foreign patent, which mostly corresponds to an exclusive patent, the date of filing the priority application (32) is also specified and it precedes (22) and (44) (see Figure 3 below). ${ }^{11}$

The IPC class (51) contains only one main class and can include several secondary classes. It was introduced internationally only in 1968 and was ex-post assigned by the patent office to patents of earlier years. The IPC contains one of the capital letters A-H, which represent the following fields of technology, as well as various digits for the respective subclasses (DPMA, 2019a):
$A$ Human necessities
$B$ Performing operations; Transporting

[^3]$C$ Chemistry; Metallurgy
$D$ Textiles; Paper
$E$ Fixed constructions
$F$ Mechanical engineering; Lighting; Heating; Weapons; Blasting
$G$ Physics
$H$ Electricity
The applicant (71), inventor (72), owner (73), and legal representative (74) may be the same in some cases (e.g., in case of patent DD0000124680B2, inventor and owner are the same person, whereas the applicant and the representative are the same organization). The institution for which the inventor worked is often mentioned as applicant or owner of a GDR patent. In addition to the surname, first name and, if applicable, the academic title of the inventor, the data for (71)-(74) also contain the geographical location of the applicant, inventor, and/or owner. ${ }^{12}$ Several persons may be named. The geographic information may contain the street and house number, the city, the postcode, and the country. This data is presented in a full or abbreviated designation.

Changes in the structure of the patent specification over time led to challenges in the machine processing of the data by the DPMA, which in turn made some manual processing of the retrieved data necessary. The applied data processing is described in the following section. ${ }^{13}$

[^4]
## PATENTSCRRRFR 127756

Ausschließungspatent
Erteilt gemà 55 Absatz 1 des Anderungsgesetzes zum Patentgesetz
In der vom Anmelder singereichten Fassung verōffentlicht

|  | Int. CI. $^{2}$ |  |  |  |
| :--- | :--- | :--- | :--- | :--- | :--- |
| (11) | 127756 | (44) | 12.10 .77 | $2(51)$ A $61 \mathrm{M} 11 / 00$ |
| (21) AP A $61 \mathrm{~m} / 196263$ | (22) | 10.12 .76 |  |  |
| (31) $7514057-3$ | (32) | 12.12 .75 | (33) SW |  |

siehe (73)
Aktiebolaget Draco, Lund, SW
(74)
Internationales Patentbüro Berlin, 102 Berlin, Wallstraße 23/24

## (54) Aerosolinhalator

(57) Der Aerosolinhalator zum Inhalieren pharmakologisch aktiver
Substanzen durch einen Inhalierauslas besitzt eine austauschbare
Einheitsdosierkapsel mit einer Membran, die perforierbar ist, wobei
die Kapsel eine Einheitsdosis aktiver Substanz in Fliesmittel- oder
Pulverform und ein unter Druck stehendes Treibmittel enthält. Die
Einheitsdosierkapsel ist zwischen zwei Bechern gehalten, wobei
der eine Becher ein mittleres Loch aufweist, durch welches eine
Perforiernadel hindurchbringbar ist, die ein Kapillarlangsrohr
aufweist, welches ein Zufuhrrohr fur eine Sprühduse bildet, die
auf der Perforiernadel angebracht ist, Die Sprühüse ist innerhalb
eines Inhalierauslasses, welcher in den Mund des Patienten eingebracht
werden soll, zur Führung des abgegebenen Aerosols angebracht. Die
Einheitsdosierkapsel und die Perforiernadel sind relativ zueinander
derart verschiebbar, wobei die Perforiernadel zum Durchstechen der
Einheitsdosierkapsel drückbar ist. Die Einheitsdosierkapsel, die
Becher, und die perforiernadel sind innerhall eines Gehäuses angeordret
an welchem der Inhalierauslas befestigt ist.

Figure 3: Example of a patent from the late 1970s


DEUTSCHE DEMOKRATISCHE REPUBLIK

| (21) WPC 11 D / 308 2047 | (22) | 20.08 .87 | (44) | 04.01 .89 |
| :--- | :--- | :--- | :--- | :--- |

(71) VEB Chemiekombinat Bitterfeld, Bitterfeld, 4440, DD
(72) Hambrock, Dieter, Dipl.-Chem.; Baumgärtel, Rolf, Dipl.-Mineraloge; Heinrich, Klaus-Dieter, Dipl.-Chem.; Holtz, Helmar, Dipl.-Ing.; Meissner, Gerhard, Dipl.-Chem., DD
(54) Abflußreiniger mit tensidbildender Wirkung
(55) Abflußreiniger, tensidbildende Wirkung, Åtznatron, Aluminiumgrieß, agglomerierte Komponente, Natriumorthosilikat, Natriumtriphosphat, Carbonsäuren ( $\mathrm{C}_{3}$ bis $\mathrm{C}_{23}$ ), organische Komplexbildner
(57) Die Erfindung beinhaltet einen Abflußreiniger mit tensidbildender Wirkung. Die Erfindung betrifft ein Mittel zur Reinigung von Abflüssen, Rohren, Syphons u. ä., das starke emulgierende, dispergierende und schmutztragende Wirkungen bei seiner Auflösung und Umsetzung im Wasser besitzt. Das Mittel besteht aus einem Gemisch von festen Átznatron, Aluminium in Form von Pulver, Grieß, Granalien oder Spānen und einer agglomerisierten Komponente in Kugelform von 0,3 bis 3 mm Durchmesser, die in Natriumorthosilikat eingebundenes, feinverteiltes Ãtznatron, Carbonsäuren mit Kettenlāngen im Bereich von $\mathrm{C}_{2}$ bis $\mathrm{C}_{23}$ sowie polymeren Phosphaten mit Anteilen an organischen Komplexbildnern und gegebenenfalls Riech- und Farbstoffen.

Figure 4: Example of a patent from the 1980s

## 4. Methods

### 4.1 Data source

With the unification of the two German states in 1990 and the Unification Treaty, the patent law of the FRG became effective in the territory of the former GDR. The patents of the AfEP were transferred to the DPMA and included in the German Patent Information System (DEPATIS) database (DPMA 2019b). For the compilation of the CPDB, we used the online version of the document archive DEPATISnet. DEPATIS contains data on granted patent applications of the GDR for the period from 1949 to 1990, including both economic and exclusive patents (DPMA, 2021b). The DPMAregister platform, which is the official register for all patent applications, also provides an electronic data set with current legal and procedural status information from 1981 onwards (DPMA, 2019c). However, considering the information available, this data set is incomplete, as not all data
from the GDR patent specifications were correctly transferred to DEPATIS.
Figure 5 shows an example of the information from a patent specification. The contents of the text correspond to the information in the patent document, but it is in a machine-readable format, illustrating the information that can be retrieved from DEPATIS.

Dieser Text wurde mittels automatischer OCR-Wandlung aus dem Originaldokument erzeugt und kann daher fehler- und/oder lückenhaft sein. Er enthält keine Zeichnungen. Tabellen und Formeln kōnnen eine schlechte Darstellungsqualität haben oder ganz fehlen.

DD 000000258791 A1

Anmeldeland: DD
Anmeldenummer: 29388686
Anmeldedatum: 27.08.1986
Veröffentlichungsdatum: 03.08.1988
Hauptklasse: B65H 28/24
Mauptklasse: B65H $28 / 24$
MCD-Hauptklasse: B65H 29/24(2006.01A)
MCD-Nebenklasse: B65H 29/88(2006.01,A)
MCD-Nebenklasse:
CPC: B65H 29/886
CPC: B65H 2801/21
ECLA: B85H $29 / 88$ B
Erfinder WIERTH GERD, DD
Erfinder. WIERTH GERD, DD
Erfinder: ZIMMERMANN HANS, DD
Anmelder. POLYGRAPH LEIPZIG, DD
[DE]ANORDNUNG VON SAUGRINGEN IN BOGENBREMSEN VON BOGENAUSLEGERN
[DE]Die Erfindung betrift eine Anordnung von Saugringen in Bogenbremsen von Bogenauslegern in Druckmaschinen. Die Bogenbremsen sind vor dem Auslegerstapel angeordnet und bestehen aus einer Saugringtraverse, einer Vierkantwelle als Antrieb, darauf axial verschiebbare voneinander beabstandete Saugringe sowie einer Saugluftzufuehrung. Aufgabe der Erfindung ist es, eine Anordnung von Saugringen in Bogenbremsen zu schaffen, die eine axiale Verstellung der Saugringe gestattet und in jeder Einstellung gewaehrleistet, dass der Saugring mit einer definierten Kraft am Saugringlager anliegt. Erfindungsgemaess wird das dadurch erreicht, dass auf der Antriebswelle drehfest ein in den Saugring eingreifendes Drehuebertragungselement vorgesehen ist. Das Drehuebertragungselement ist federbelastet einer starr mit dem Saugringlager verbundenen Kugellaufbahn und der Saugring federbelastet einem starr mit dem Saugringlager verbundenen Anlaufring zugeordnet. Das Drehuebertragungselement ist verschiebbar auf der Antriebswelle angeordnet.

$$
\begin{aligned}
& \text { Seite } 1-(\mathrm{BI}, \mathrm{AB}) \\
& \text { Seite } 2 \cdots(\mathrm{CL}, \mathrm{DE})
\end{aligned}
$$

1. Anordnung von Saugringen in Bogenbremsen von Bogenauslegern, wobei eine Antriebswelle und Saugringe vorgesehen sind, jeder Saugring einem Saugringlager zugeordnet ist und die Beaufschlagung des Saugringes über das Saugringlager erfolgt, dadurch gekennzeichnet, daß auf der Antriebswelle (7) drehfest ein in den Saugring (1) eingreifendes Drehübertragungselement (2) vorgesehen, das Drehübertragungselement (2) federbelastet einer starr mit dem Saugringlager (3) verbundenen Kugeliaufbahn (4) und der Saugring (1) federbelastet einem starr mit dem Saugringlager (3) verbundenen Anlaufring (6) zugeordnet ist.
2. Anordnung nach Anspruch 1, dadurch gekennzeichnet, daß das Drehübertragungselement (2) verschiebbar auf der Antriebswelle (7) angeordnet ist.
Hierzu 1 Seite Zeichnungen
Anwendungsgebiet der Erfindung
Die.Erfindung betrift eine Anordnung von Saugringen in Bogenbremsen von Bogenauslegem in Druckmaschinen.
Die Bogenbremsen sind vor dem Auslegerstapel angeordnet und bestehen aus einer Saugringtraverse, einer Vierkantwelle als Antrieb, darauf axial verschiebbare voneinander beabstandete Saugringe sowie einer Saugluftzuführung.
Charakteristik des bekannten Standes der Technik
Aus der DD 215060 ist eine Anordnung von Saugringen in Bogenbremsen von Bogenauslegern in Druckmaschinen bekannt, wobei die Saugringe mit dem Saugringschaft fest einer relativ bewegten Welle und einem feststehenden Saugringlager zugeordnet sind. Die Saugringe werden über das Saugringlager pneumatisch beaufschlagt und mittels eines fest am Saugringschaft angeordneten Andruckringes und Druckfedern gegen das Saugringlager gedrūckt.
Nachteilig an dieser Bogenbremse ist, daß sich bei axialer Verstellung der Saugringe zwischen den Stimflächen der Laufpaarung Saugring/ Saugringlager ein Luftspalt bilden kann, insbesondere dann, werin die Klemmkraft zwischen der Antriebswelle und dem Saugring größer ist als die Andrückkraft der Federn. Das fürt dazu, daß Falschluft gezogen und damit der Unterdruck reduziert wird, was bis zur völigen Wirkungslosigkeit der Bogenbremse führen kann.

Dieser Sachverhalt kann auch, bedingt durch Fertigungsungenauigkeiten oder infolge der Durchbiegung der Antriebswelle, während des Fortdruckes auftreten.
Der Nachteil bedingt zusätzliche Stellhandlungen bzw. führt zu Störungen im Produktionsablauf
Ziel der Erfindung " "\#..-"
Es ist Ziel der Erfindung, eine funktionssichere Bogenbremse in Bogenauslegern von Druckmaschinen zu schaffen, bei der eine axiale Verstellung ohne zusätzliche Bedienhandlungen möglich ist.
Darlegung des Wesens der Erfindung
Aufgabe der Erfindung ist es, eine Anordnung von Saugringen in Bogenbremsen zu schaffen, die eine axiale Verstellung der Saugringe gestattet und in jeder Einstellung gewährleistet, daß der Saugring mit einer definierten Kraft am Saugringlager anliegt.
Erfindungsgemäß wird das dadurch erreicht, daß auf der Antriebswelle drehfest ein in den Saugring eingreifendes - Drehübertragungselement vorgesehen ist. Das Drehübertragungselement ist federbelastet einer starr mit dem Saugringlager verbundenen Kugellaufbahn und der Saugring federbelastet einem starr mit dem Saugringlager verbundenen Anlaufring zugeordnet. Das Drehübertragungselement ist verschiebbar auf der Antriebswelle angeordnet.
Ausführungsbeispiel
An einem Ausführungsbeispiel soll nachfolgend die Erfindung näher erläutert werden. In den Zeichnungen zeigt
Fig. 1: die Draufsicht auf eine Saugringanordnung
Fig.2: die Seitenansicht längs der Linie A-A gem. Fig. 1

Figure 5: Example of a patent specification in text format

### 4.2 Data preparation

All corrections and extensions performed for the published CPDB concern the inventor and applicant data as well as the application and publication dates. In case the data extraction performed by the DPMA in the process of patent digitalization resulted in incorrect data, we sought to correct all detected errors manually.

The following data preparation steps were performed:
Step 1: The raw data was extracted from the DEPATISnet database by the Patent Information Centre of the Friedrich Schiller University Jena in the year 2019 based on a search query. Data access was limited to a maximum of 1,000 patents per query. The project team at the Friedrich Schiller University Jena processed the raw data and created the database.

Step 2: The team at the University of Bremen was responsible for further processing of these data. This particularly included manual data cleaning as well as subsequent creation, preparation, and archiving of the database.

Step 3: The team at the Friedrich Schiller University Jena created an additional module with regional information for the patents of the years 1989 and 1990 (see Section 6).

Each summary table downloaded in step 1 contained the following information listed in columns: 1) serial number, 2) publication number, 3) filing date, 4) publication date, 5) IPC main class, 6) IPC minor/index classes, 7) reclassified IPC, 8) DEKLA IPC, 9) inventor, 10) applicant/owner, 11) title, 12) abstract, 13) PDF URL, and 14) searchable text URL. This resulted in a total of approximately 300 Excel tables, which were transferred to a database. In addition to the overview tables in Excel format, all related patent specifications were downloaded in PDF format.

The content of columns 1)-6) as well as 9)-12) is automatically retrieved from the patent specification of the DPMA and corresponds to the INID codes of the same names (see Chapter 3). Columns 7)-8) and 13)-14) reflect information that is not directly contained in the patent specification. Column 7) stands for the state-of-the-art adapted and reclassified IPC classes. Since the technical
definitions may change with each IPC revision, individual documents are reclassified using WIPO's Master Classification Database (MCD). The reclassification is not done in the patent document but in the database (DPMA 2020). Column 8) entails an adjusted technological classification. This adjustment is made by the experts of the DPMA, who believe that in certain cases the technological area specified in the patent document is not accurately and/or solely reflected in the given IPC code(s). This column may contain not only internationally listed IPC codes, but also codes from a more refined German patent classification ("Deutsche Patent-Feinklassifikation", DEKLA). These socalled Prüfstoff IPC and reclassified IPC are not assigned in all cases by the DPMA examining staff, and therefore, columns 8) and 9) have many missing values that cannot be filled out manually. Columns 13) and 14) represent hyperlinks that contain the copy of the original patent specification and the patent text that has been generated from the original document by using automatic Optical Character Recognition (OCR) conversion, respectively. The latter document is deprived of any drawings and allows a quick information search within the patent document.

In step 2, the details of the applicants and inventors in all empty fields were manually compared with the data in the respective patent specifications, digitized, and supplemented. For the applicant/owner, all persons indicated under INID codes (71) and (73) were added from the patent specification. In some cases, the information on the representative (74) was added.

In some cases, the machine reading of the application and publication data by the DPMA led to inadequate recording of the dates. For example, there was an indication that a patent was published in 1968 but not filed until 1988. In such cases, the year of filing and the year of publication were manually checked and corrected. In addition, patents for which the publication date corresponds to the application date were manually checked and the information was corrected.

The date format was adjusted to the standard DD.MM.YYYY for all patents.

The placeholders in the title and abstract were removed and the language information from the text (DE or EN) was transferred to a new column
(sprachetitel and spracheabstract). Obvious transfer errors that led to incorrect information in the title were corrected manually. The CPDB was prepared according to the formal requirements of the Leibniz Institute for the Social Sciences (GESIS) and the necessary information was added.

There were several erroneous entries in the database. The respective patent numbers are summarized in Table A1 in the Appendix. For instance, the digitized but non-existing 103 patents data mentioned in Footnote 2, were manually removed from the database, as they do not represent patents. They are listed in Table A1, column 1.

In addition, the downloaded DPMA database contains 49 patent entries for which an IPC class was automatically generated but no patent specification exists. Such patent entries were removed from the GDR patent database. The corresponding publication numbers are documented in the Appendix in Table A1, column 2.

Furthermore, there were obvious date errors for 47 patents. In these cases, the documents contain handwritten or difficult-to-read information for which the text recognition automatically assigned the date 31.12.9999. Patents with this date are listed in Table A1, column 3. They were manually checked and corrected for the GDR patent database. If publication data was non-existent or difficult to read, which was the case in 19 patent documents, the date information could not be corrected and a "NULL" was assigned. Any other filing and publication dates with missing values could be corrected. Figure 6 shows an excerpt from the final GDR patent database.
Die Erfinc DE https://dehttps://de Ausland 1

Figure 6: Excerpt from the CPDB

## 5. Comprehensive Patent Database (CPDB)

The final database contains all granted patents of the GDR published by AfEP (later DPMA) in the period between January 1, 1939 (application before but granted in the GDR) and June 29, 2006 (application in but granted after the GDR). The core database covers the years 1950 to 1990 and contains 24 variables with manually cleaned and processed information on a total of 286,478 patent entries, which correspond to 261,822 unique GDR patents. This difference can be explained by the fact that for around 24,500 patents (around $9 \%$ of all entries), several (up to 3) documents of the patent family are included in the database. The CPDB of the GDR is freely available in Excel format (.xlsx) as well as delimited text file (.csv) at the Leibniz Institute for the Social Sciences (GESIS);
https://doi.org/10.7802/2423. Figure A1 in the Appendix shows a yearly amount of granted patents in the GDR according to the publication date. Most patents were published in the late 1980s with the year 1985 being a forerunner, when 14,744 patents were published.

Information is missing in the database if it is not included in the patent specifications. In several cases, this concerns the IPC secondary classes and the abstract. For the years before 1975, only a few abstracts are available. In total, abstracts are missing for 165,740 patents.

Despite its availability in the patent documents, data may be missing in the database in case of more than one applicant or inventor, because the focus in preparing the data was on completing the empty lines. In addition, it is often not possible to distinguish between applicant and owner if, for example, only headquarters or the patent attorney are named. The patent attorney is included in the variable anmelderinhaber, although he or she is not the inventor or applicant. Rarely, there is no information on the inventor in the patent specifications (coded as "is not named") because he or she did not want to be mentioned as an inventor. For the supplementary module with the regional data for 1989/90, the inventor names are considered sensitive data and are anonymized by the designation "inventor".

In a few cases, there are transcription errors, with the correct data being contained in the patent specifications but not in the database. This is particularly the case for handwritten annotations or special fonts that could not be processed without error by the text-recognition system. The correct information could then be found in the PDF files of the patent specification. In some cases, no PDF URL to the patent specifications could be retrieved; in this case, the searchable text had to be used. Table 1 provides an overview of the variables, their description, and further notes.

Table 1: Variable description

| Variable | Description | Document/Notes |
| :--- | :--- | :--- |
| veroeffentlichungsnummer | Publication number of the granted patent <br> application assigned by the German <br> Patent and Trademark Office (DPMA) | DPMA INID-Code* 11 <br> Note: Corresponds to the columns <br> publn_auth, publn_nr, and publn_kind <br> from the PATSTAT table |
| tls211_pat_publn |  |  |

* INID codes are numbers for identifying bibliographic data according to WIPO standard ST. 9 and are used by all patent offices. From 1977 or DD123500, the INID codes are noted on the GDR patents.
** Numbers 1 to 7.


## 6. Regional information

For a total of 17,772 patents from 1989 and 1990, the CPDB contains additional information that could be usefully recorded because of a change in the database. In the course of a reform of the GDR patent law in June 1990, the documentation of applicants and inventor information was also improved. Whereas previously only the combine or the parent company was mentioned as the applicant, from summer of 1990 onwards, the actual applicant establishment of the combine was also named in the entries. Furthermore, some of the address data of the inventor(s) was entered. In practice, this change means that GDR patent applications of the years 1989 and 1990, which were granted from summer 1990 onwards, either before or after German reunification, open up the possibility to assign a patent to a certain location, thereby identifying the regional structure of innovation activities in the GDR (see exemplary patent from 1990 in Figure 7). For patent applications prior to 1989, we know only the headquarter of the respective combine
(Kombinatszentrale) that is indicated as applicant in the patent specification. Since the establishment of the combine that generated the invention was often located in considerable distance to the headquarter, there was no way to link a patent to a certain region. Moreover, for the indicated period it is also possible to distinguish the exact location of the research institute. ${ }^{14}$

Against this background, we additionally extracted information from the original PDFs of the patent specifications for the GDR patents of the years 1989 and 1990 in order to identify the location of the patent applicants/owners in more detail than in the DPMA database. After cleaning the applicant and owner data, we assigned a municipality (Gemeinde) number (as of 2021) to each applicant. For patents with several applicants in different municipalities, several municipality numbers (up to 7 municipalities) were assigned to the patent. If the patent applicants are also the inventors, they are assigned a municipality number

[^5] marked separately.
(19) BUNDESREPUBLIK DEUTSCHLAND

PATENTSCHRIFT

|  | (12) Ausschließungspatent |
| :---: | :---: |
|  | Erteilt gemäß 517 Absatz 1 |
|  | Patentgesetz der DDR vom 27.10.1983 |
| . | in Oberoinstimmung mit don entsprechenden Festiegungen im Einigungsvertrap |

(11) DD 292077

DEUTSCHES PATENTAMT In der vom Anmelder eingereichten Fa3sung veröftemlicht

| (21) | DD G 01 D/337 7796 | (22) | 12.02.90 | (44) | 18.07.91 |
| :---: | :---: | :---: | :---: | :---: | :---: |
| (71) | VEB IFA-Motorenwerke Nordhausen, Freiharr-vom-Stein-Straße 30c, 0-5500 Nordhausen, DE |  |  |  |  |
| (72) | Artymiak, Dieter, Dr-Ing.: Bause, Hans-Jürgen, Dipl.-Ing.: Droste, Peter, Dipl.Ing., DE |  |  |  |  |
| (73) | VEB IFA.Motorenwerke Nordhausen, 0-5500 Nordhausen; VEB Kombinat Landtechnik |  |  |  |  |

(54) Einrichtung zur berührungslosen Messung frei einstellbarer Positionen translatorisch bewegter Teile
(55) Messung: Position, translatorisch; Magnetkreis, gaschlossen; Rahmenstruktur, rechteckig: Schichten; Bleche, L.fórmig: Spulen;

Fig. 1
Magnetkreisbeeinflussungselement, berïhrungslos
(57) Die Erfindung hat eine Einrichtung zur
berührungslosen Messung frei einstellbarer Positionen translatorisch bewegter Taile zum Gegenstand und eignet sich für in Grenzen zueinander, insbesondere rhythmisch brw. stochastisch bewegte Teile. Die Einrichtung besteht aus einem geschlossenen Magnetkreis (2) mit rechteckiger Rahmenstruktur und mehreren Schichten, wobei jede Schicht aus zwei L-förmigen Blechen (11) derart gebildet wird, daß das stirnseitige Ende des langen Schenkels (9) des einen L-fórmigen Bleches an der Innenkante des kurzen Schenkels (10) des anderen L-förmigen Bleches anliegt. Die auf einer Seite des geschlossenen Magnetkreises (2) befindlichen langen Schenkel (9) werden von zwei mehrlagigen Spulen (3) umgeben, die mit ihrer bußeren Stirnseite an den benachbarten kurzen Scheniceln (10)

anliegen, also maximal vonainander entfernt sind. Die nicht von den Spulen (3) umschlossenen langen Schenkel (9) sind von einem elektrisch leitenden, verwindungssteifen Magnetkreisbeeinflussungselement (4) berührungsfrei umgeben, das mit dem translatorisch bewegten Teil verbunden ist. Fig. 1

Figure 7: Exemplary patent from the year 1990
Note: Patents published after reunification and filed before $3^{\text {rd }}$ October 1990 were published as exclusive patents.

## References

Acs, Z.J., Anselin, L., Varga, A., 2002. Patents and innovation counts as measures of regional production of new knowledge. Research Policy 31, 1069-1085. https://doi.org/10.1016/S0048-7333(01)00184-6
Baar, L., Petzina, D., 1999. Deutsch-deutsche Wirtschaft 1945 bis 1990: Strukturveränderungen, Innovationen und regionaler Wandel. Ein Vergleich. St. Katharinen: Scripta Mercaturae.
Bähr, J., Petzina, D. (eds.), 1996. Innovationsverhalten und Entscheidungsstrukturen. Berlin: Duncker \& Humblot.
Bergeaud, A., Verluise, C., 2022. A new Dataset to Study a Century of Innovation in Europe and in the US. Centre for Economic Performance. London School of Economics and Political Science. Discussion Paper no. 1850.
DPMA, 2021a. 30 Jahre Deutsche Einheit - zwei deutsche Patentämter wurden eins. https://www.dpma.de/dpma/wir_ueber_uns/geschichte/30jahre_einheit/ind ex.html

DPMA, 2021b. Datenbestand. Munich: Deutsches Patent- und Markenamt. https://depatisnet.dpma.de/DepatisNet/depatisnet?window=1\&space=men u\&content=index\&action=datenbestand
DPMA, 2020. DPMAinformativ. Patentrecherche mit Klassifikationssymbolen. Munich: Deutsches Patent- und Markenamt.
DPMA, 2019a. Die internationale Patentklassifikation IPC [WWW Document]. Munich: Deutsches Patent- und Markenamt. https://www.dpma.de/recherche/klassifikationen/patenteundgebrauchsmust er/internationalepatentklassifikation/index.html
DPMA, 2019b. 1986 to 2000: The German Patent Office until the turn of the millennium. Munich: Deutsches Patent- und Markenamt.
DPMA, 2019c. DPMA Register. Dateninhalt. Munich: Deutsches Patent- und Markenamt.
DPMA, 2014. DPMAinformativ. Normierung von Patentliteratur. Munich: Deutsches Patent- und Markenamt.
DPMA, 2012. DPMAinformativ. Aktenzeichenformate der verschiedenen Schutzrechtsarten im Deutschen Patent- und Markenamt seit 1877 bis heute. Munich: Deutsches Patent- und Markenamt.
Fritsch, M., Greve, M., Wyrwich, M., 2022. Shades of a Socialist Legacy? Innovation Activity in East and West Germany 1925-2014. Jena Economic Research Papers (forthcoming)
Glitz, A., Meyersson, E., 2020. Industrial Espionage and Productivity. American Economic Review 110, 1055-1103. https://doi.org/10.1257/aer.20171732
Grupp, H., I. Dominguez-Lacasa and M. Friedrich-Nishio (2002): Das deutsche Innovationssystem seit der Reichsgründung. Physica-Springer, Heidelberg
Grupp, H., Dominguez Lacasa, I., Friedrich-Nishio, M., Jungmittag, A., 2005. Innovation and growth in Germany over the past 150 years, in: Cantner,
U., Dinopoulos, E., Lanzillotti, R.F. (Eds.), Entrepreneurships, the New Economy and Public Policy. Berlin/Heidelberg: Springer, pp. 267-287. https://doi.org/10.1007/3-540-26994-0_15
Günther, J., Hipp, A., Ludwig, U., 2020. Universalien der Innovation Erfindertum und technischer Fortschritt in der DDR und dessen Rolle nach 1990. University of Bremen: Institute for Economic Research and Policy. https://doi.org/10.26092/ELIB/332
Hemmerling, J., 1986. G.D.R. patent information system promotes the creation of modern high technologies as well as of complex innovation processes. World Patent Information 8, 206-209. https://doi.org/10.1016/0172-2190(86)90028-1
Kogut, B., Zander, U., 2000. Did Socialism Fail to Innovate? A Natural Experiment of the Two Zeiss Companies. American Sociological Review 65, 169-190. https://doi.org/10.2307/2657436
Patentinformationsstelle der Friedrich-Schiller-Universität Jena, 2019. DDR Patentdaten. https://www.sft.unijena.de/Kontakt/Patent +und+Schutzrechtsservice.html
Wiessner, M., 2015. Das Patentrecht der DDR, in: Otto, M. (ed.), Geschichte des deutschen Patentrechts, Geistiges Eigentum und Wettbewerbsrecht. Tübingen: Mohr-Siebeck, pp. 239-288.
WIPO, 1970. Paris Convention for the Protection of Industrial Property. Paris Notification No. 16. Entry into force of Articles 1 to 12 of the Stockholm Act.

## Publications based on the data

Fritsch, M., Greve, M., Wyrwich, M., 2022. Shades of a Socialist Legacy? Innovation Activity in East and West Germany 1925-2014. Friedrich Schiller University Jena: Jena Economic Research Papers (forthcoming)
Hipp, A., Ludwig, U., Günther, J., 2022. Und sie wirkten doch: Patente und Produktivität in der DDR, in: Flade, F.; Steinkamp, A.; Walerski, K. (Eds): Transformation in Polen und Ostdeutschland: Neue Einblicke in die Debatte über eine gespaltene Wirtschaft. Harrassowitz Verlag, Wiesbaden, forthcoming.

Hipp, A., Ludwig, U., Günther, J., 2021. Unable to innovate or just bad circumstances? Comparing a state-led and market-based innovation system in Germany. University of Bremen: Papers on Economics \& Innovation \#2111. https://doi.org/10.26092/elib/1330\&nbsp
Günther, J., Hipp, A., Ludwig, U., 2020. Universalien der Innovation Erfindertum und technischer Fortschritt in der DDR und dessen Rolle nach 1990. University of Bremen: Institute for Economic Research and Policy. https://doi.org/10.26092/ELIB/332

## Appendix

Table A1: Removed or adjusted data

| No. | Column 1 | Column 2 | Column 3 |
| :---: | :---: | :---: | :---: |
|  | Non-existing patents | Non-existing patents with an automatically generated IPC class | Patents with text recognition errors |
| 1. | DD000000175507B | DD000000020828A | DD000000002366A1 |
| 2. | DD000000045239A1 | DD000000020831A | DD000000007596A1 (No date) |
| 3. | DD000000086677A1 | DD000000020862A | DD000000002970A5 |
| 4. | DD000000161313B1 | DD000000033578A7 | DD000000000161A1 |
| 5. | DD000000161572A | DD000000034403A | DD000000005933A1 |
| 6. | DD000000163525A | DD000000034464A | DD000000006810A1 |
| 7. | DD000000164201B | DD000000034473A | DD000000000486A1 |
| 8. | DD000000164412A | DD000000034485B | DD000000003082A1 |
| 9. | DD000000165747A | DD000000034486A | DD000000005165A1 (No date) |
| 10. | DD000000168142A | DD000000034496A | DD000000003592A1 (No date) |
| 11. | DD000000169016B | DD000000034497A | DD000000003874A5 (No date) |
| 12. | DD000000172283B | DD000000034519A | DD000000007374A1 (No date) |
| 13. | DD000000172877A | DD000000034589A | DD000000008019A5 (No date) |
| 14. | DD000000173362B | DD000000034616A | DD000000007264A1 (No date) |
| 15. | DD000000173380A | DD000000034634A | DD000000008035A1 (No date) |
| 16. | DD000000173990A | DD000000034710A | DD000000007343A1 (Not granted) |
| 17. | DD000000177196A | DD000000034717A | DD000000293665B4 |
| 18. | DD000000177464B | DD000000034745A | DD000000007445A1 (No date) |
| 19. | DD000000177560B | DD000000034749A | DD000000007154A1 (No date) |
| 20. | DD000000177667A | DD000000034750A | DD000000007610A1 |
| 21. | DD000000177751B | DD000000034763A | DD000000008018A1 (No date) |
| 22. | DD000000177753A | DD000000034788A | DD000000031816A1 (No year) |
| 23. | DD000000177899A | DD000000035486A | DD000000054565A2 (No year) |
| 24. | DD000000181545B | DD000000035492A | DD000000070909A1 (No date) |
| 25. | DD000000181802B | DD000000035495A | DD000000075499A1 |
| 26. | DD000000181841B | DD000000035496A | DD000000076423B1 |
| 27. | DD000000182274A | DD000000035497A | DD000000079613B1 (No month and no year) |
| 28. | DD000000183339B | DD000000035499A | DD000000120721B1 |
| 29. | DD000000183500B | DD000000035500A | DD000000084335A5 |
| 30. | DD000000184294A | DD000000035501A | DD000000108451B1 |


| 31. | DD000000185162A5 | DD000000035503A | DD000000113506B1 |
| :---: | :---: | :---: | :---: |
| 32. | DD000000185369B | DD000000035506A | DD000000117313B1 |
| 33. | DD000000185649B | DD000000035507A | DD000000260261B5 |
| 34. | DD000000185943A | DD000000035508A | DD000000001856B1 |
| 35. | DD000000186024B | DD000000035512A | DD000000012337A5 (No date) |
| 36. | DD000000187291A | DD000000035517A | DD000000050802A1 (No date) |
| 37. | DD000000187987B | DD000000035581A | DD000000058053A1 (No day) |
| 38. | DD000000188466A | DD000000035585A | DD000000116327B1 |
| 39. | DD000000189256B | DD000000035587A | DD000000004663B1 |
| 40. | DD000000189262A | DD000000084291C2 | DD000000028286A1 |
| 41. | DD000000189311A | DD000000172970A | DD000000030198A1 |
| 42. | DD000000189314B | DD000000174750B | DD000000044923A5 |
| 43. | DD000000189399A | DD000000176479A | DD000000045739A1 |
| 44. | DD000000189778A | DD000000195481A | DD000000064160B1 |
| 45. | DD000000190063B | DD000000198487A | DD000000116625B1 |
| 46. | DD000000190603B | DD000000198804A | DD000000207849B1 |
| 47. | DD000000190973B | DD000000199130A | DD000000063147A5 (No day) |
| 48. | DD000000191067B | DD000000199722A |  |
| 49. | DD000000191340B | DD000000291454A5 |  |
| 50. | DD000000191759A |  |  |
| 51. | DD000000192553A |  |  |
| 52. | DD000000192969A |  |  |
| 53. | DD000000193093A1 |  |  |
| 54. | DD000000193386B |  |  |
| 55. | DD000000193465A |  |  |
| 56. | DD000000193468B |  |  |
| 57. | DD000000194411B |  |  |
| 58. | DD000000194631B |  |  |
| 59. | DD000000194776B |  |  |
| 60. | DD000000195426A |  |  |
| 61. | DD000000195506B |  |  |
| 62. | DD000000195850A |  |  |
| 63. | DD000000195922B |  |  |
| 64. | DD000000195948B |  |  |
| 65. | DD000000196198B |  |  |
| 66. | DD000000196289A |  |  |
| 67. | DD000000196474A |  |  |
| 68. | DD000000196698A |  |  |


| 69. | DD000000196733B |  |  |  |
| :---: | :---: | :---: | :---: | :---: |
| 70. | DD000000196780A |  |  |  |
| 71. | DD000000196781A |  |  |  |
| 72. | DD000000196879A |  |  |  |
| 73. | DD000000196977A |  |  |  |
| 74. | DD000000196982B |  |  |  |
| 75. | DD000000197227A |  |  |  |
| 76. | DD000000197272A |  |  |  |
| 77. | DD000000197284B |  |  |  |
| 78. | DD000000197425B |  |  |  |
| 79. | DD000000197433A |  |  |  |
| 80. | DD000000197592B |  |  |  |
| 81. | DD000000197628A |  |  |  |
| 82. | DD000000197640B |  |  |  |
| 83. | DD000000197661A |  |  |  |
| 84. | DD000000197837A |  |  |  |
| 85. | DD000000197853A |  |  |  |
| 86. | DD000000197886B |  |  |  |
| 87. | DD000000198050A |  |  |  |
| 88. | DD000000198106A |  |  |  |
| 89. | DD000000198186A |  |  |  |
| 90. | DD000000198353A |  |  |  |
| 91. | DD000000198361A |  |  |  |
| 92. | DD000000198743A |  |  |  |
| 93. | DD000000199049A |  |  |  |
| 94. | DD000000199089A |  |  |  |
| 95. | DD000000199224A |  |  |  |
| 96. | DD000000199287A |  |  |  |
| 97. | DD000000199346A |  |  |  |
| 98. | DD000000199349B |  |  |  |
| 99. | DD000000199397A |  |  |  |
| 100. | DD000000199495A |  |  |  |
| 101. | DD000000199596A |  |  |  |
| 102. | DD000000199647B |  |  |  |
| 103. | DD000000199986B |  |  |  |



Figure A1: Granted patents in the GDR according to the publication date in the Comprehensive GDR Patent Database and in Patentcity

Note: The Figure depicts only the patents with the data of publication between 1950-1990. 16,455 patents contained in the GDR patent database with the publication data after 1991 are excluded from the graph.

## List of research reports

17001-EEF: Trinks, A., B. Scholtens, M. Mulder, and L. Dam, Divesting Fossil Fuels: The Implications for Investment Portfolios

17002-EEF: Angelini, V., and J.O. Mierau, Late-life Health Effects of Teenage Motherhood
17003-EEF: Jong-A-Pin, R., M. Laméris, and H. Garretsen, Political Preferences of (Un)happy Voters: Evidence Based on New Ideological Measures

17004-EEF: Jiang, X., N. Hermes, and A. Meesters, Financial Liberalization, the Institutional Environment and Bank Efficiency

17005-EEF: Kwaak, C. van der, Financial Fragility and Unconventional Central Bank Lending Operations

17006-EEF: Postelnicu, L. and N. Hermes, The Economic Value of Social Capital
17007-EEF: Ommeren, B.J.F. van, M.A. Allers, and M.H. Vellekoop, Choosing the Optimal Moment to Arrange a Loan

17008-EEF: Bekker, P.A., and K.E. Bouwman, A Unified Approach to Dynamic MeanVariance Analysis in Discrete and Continuous Time

17009-EEF: Bekker, P.A., Interpretable Parsimonious Arbitrage-free Modeling of the Yield Curve

17010-GEM: Schasfoort, J., A. Godin, D. Bezemer, A. Caiani, and S. Kinsella, Monetary Policy Transmission in a Macroeconomic Agent-Based Model

17011-I\&O: Bogt, H. ter, Accountability, Transparency and Control of Outsourced Public Sector Activities

17012-GEM: Bezemer, D., A. Samarina, and L. Zhang, The Shift in Bank Credit Allocation: New Data and New Findings

17013-EEF: Boer, W.I.J. de, R.H. Koning, and J.O. Mierau, Ex-ante and Ex-post Willingness-to-pay for Hosting a Major Cycling Event

17014-OPERA: Laan, N. van der, W. Romeijnders, and M.H. van der Vlerk, Higher-order Total Variation Bounds for Expectations of Periodic Functions and Simple Integer Recourse Approximations

17015-GEM: Oosterhaven, J., Key Sector Analysis: A Note on the Other Side of the Coin
17016-EEF: Romensen, G.J., A.R. Soetevent: Tailored Feedback and Worker Green Behavior: Field Evidence from Bus Drivers

17017-EEF: Trinks, A., G. Ibikunle, M. Mulder, and B. Scholtens, Greenhouse Gas Emissions Intensity and the Cost of Capital

17018-GEM: Qian, X. and A. Steiner, The Reinforcement Effect of International Reserves for Financial Stability

17019-GEM/EEF: Klasing, M.J. and P. Milionis, The International Epidemiological Transition and the Education Gender Gap

2018001-EEF: Keller, J.T., G.H. Kuper, and M. Mulder, Mergers of Gas Markets Areas and Competition amongst Transmission System Operators: Evidence on Booking Behaviour in the German Markets

2018002-EEF: Soetevent, A.R. and S. Adikyan, The Impact of Short-Term Goals on LongTerm Objectives: Evidence from Running Data

2018003-MARK: Gijsenberg, M.J. and P.C. Verhoef, Moving Forward: The Role of Marketing in Fostering Public Transport Usage

2018004-MARK: Gijsenberg, M.J. and V.R. Nijs, Advertising Timing: In-Phase or Out-ofPhase with Competitors?

2018005-EEF: Hulshof, D., C. Jepma, and M. Mulder, Performance of Markets for European Renewable Energy Certificates

2018006-EEF: Fosgaard, T.R., and A.R. Soetevent, Promises Undone: How Committed Pledges Impact Donations to Charity

2018007-EEF: Durán, N. and J.P. Elhorst, A Spatio-temporal-similarity and Common Factor Approach of Individual Housing Prices: The Impact of Many Small Earthquakes in the North of Netherlands

2018008-EEF: Hermes, N., and M. Hudon, Determinants of the Performance of Microfinance Institutions: A Systematic Review

2018009-EEF: Katz, M., and C. van der Kwaak, The Macroeconomic Effectiveness of Bank Bail-ins

2018010-OPERA: Prak, D., R.H. Teunter, M.Z. Babai, A.A. Syntetos, and J.E. Boylan, Forecasting and Inventory Control with Compound Poisson Demand Using Periodic Demand Data

2018011-EEF: Brock, B. de, Converting a Non-trivial Use Case into an SSD: An Exercise
2018012-EEF: Harvey, L.A., J.O. Mierau, and J. Rockey, Inequality in an Equal Society
2018013-OPERA: Romeijnders, W., and N. van der Laan, Inexact cutting planes for twostage mixed-integer stochastic programs

2018014-EEF: Green, C.P., and S. Homroy, Bringing Connections Onboard: The Value of Political Influence

2018015-OPERA: Laan, N. van der, and W. Romeijnders, Generalized aplhaapproximations for two-stage mixed-integer recourse models

2018016-GEM: Rozite, K., Financial and Real Integration between Mexico and the United States

2019001-EEF: Lugalla, I.M., J. Jacobs, and W. Westerman, Drivers of Women Entrepreneurs in Tourism in Tanzania: Capital, Goal Setting and Business Growth

2019002-EEF: Brock, E.O. de, On Incremental and Agile Development of (Information) Systems

2019003-OPERA: Laan, N. van der, R.H. Teunter, W. Romeijnders, and O.A. Kilic, The Data-driven Newsvendor Problem: Achieving On-target Service Levels.

2019004-EEF: Dijk, H., and J. Mierau, Mental Health over the Life Course: Evidence for a U-Shape?

2019005-EEF: Freriks, R.D., and J.O. Mierau, Heterogeneous Effects of School Resources on Child Mental Health Development: Evidence from the Netherlands.

2019006-OPERA: Broek, M.A.J. uit het, R.H. Teunter, B. de Jonge, J. Veldman, Joint Condition-based Maintenance and Condition-based Production Optimization.

2019007-OPERA: Broek, M.A.J. uit het, R.H. Teunter, B. de Jonge, J. Veldman, Joint Condition-based Maintenance and Load-sharing Optimization for Multi-unit Systems with Economic Dependency

2019008-EEF: Keller, J.T. G.H. Kuper, and M. Mulder, Competition under Regulation: Do Regulated Gas Transmission System Operators in Merged Markets Compete on Network Tariffs?

2019009-EEF: Hulshof, D. and M. Mulder, Renewable Energy Use as Environmental CSR Behavior and the Impact on Firm Profit

2019010-EEF: Boot, T., Confidence Regions for Averaging Estimators
2020001-OPERA: Foreest, N.D. van, and J. Wijngaard. On Proportionally Fair Solutions for the Divorced-Parents Problem

2020002-EEF: Niccodemi, G., R. Alessie, V. Angelini, J. Mierau, and T. Wansbeek. Refining Clustered Standard Errors with Few Clusters

2020003-I\&O: Bogt, H. ter, Performance and other Accounting Information in the Public Sector: A Prominent Role in the Politicians' Control Tasks?

2020004-I\&O: Fisch, C., M. Wyrwich, T.L. Nguyen, and J.H. Block, Historical Institutional Differences and Entrepreneurship: The Case of Socialist Legacy in Vietnam

2020005-I\&O: Fritsch, M. and M. Wyrwich. Is Innovation (Increasingly) Concentrated in Large Cities? An Internatinal Comparison

2020006-GEM: Oosterhaven, J., Decomposing Economic Growth Decompositions.
2020007-I\&O: Fritsch, M., M. Obschonka, F. Wahl, and M. Wyrwich. The Deep Imprint of Roman Sandals: Evidence of Long-lasting Effects of Roman Rule on Personality, Economic Performance, and Well-Being in Germany

2020008-EEF: Heijnen, P., On the Computation of Equilibrium in Discontinuous Economic Games

2020009-EEF: Romensen, G.J. and A.R. Soetevent, Improving Worker Productivity Through Tailored Performance Feedback: Field Experimental Evidence from Bus Drivers

2020010-EEF: Rao, Z., M. Groneck, and R. Alessie, Should I Stay or Should I Go? Intergenerational Transfers and Residential Choice. Evidence from China

2020011-EEF: Kwaak, C. van der, Unintended Consequences of Central Bank Lending in Financial Crises

2020012-EEF: Soetevent, A.R., Determinants choice set variation in demand estimation

- with an application to the electric vehicle public charging market

2020013-EEF: Kwaak, C. van der, Old-Keynesianism in the New Keynesian model
2020014-EEF: Plaat, m. van der, Loan Sales and the Tyranny of Distance in U.S. Residential Mortgage Lending

2020015-I\&O: Fritsch, M., and M. Wyrwich, Initial Conditions and Regional Performance in the Aftermath of Disruptive Shocks: The Case of East Germany after Socialism

2020016-OPERA: Laan, N. van der, and W. Romeijnders, A Converging Benders' Decomposition Algorithm for Two-stage Mixed-integer Recourse Models

2021001-OPERA: Baardman, L., K.J. Roodbergen, H.J. Carlo, and A.H. Schrotenboer, A Special Case of the Multiple Traveling Salesmen Problem in End-of-aisle Picking Systems

2021002-EEF: Wiese, R., and S. Eriksen, Willingness to Pay for Improved Public Education and Public Health Systems: The Role of Income Mobility Prospects.

2021003-EEF: Keller, J.T., G.H. Kuper, and M. Mulder, Challenging Natural Monopolies: Assessing Market Power of Gas Transmission System Operators for Cross-Border Capacity

2021004-EEF: Li, X., and M. Mulder, Value of Power-to-Gas as a Flexibililty Option in Integrated Electricity and Hydrogen Markets
2021005-GEM: Rozite, K., J.P.A.M. Jacobs, and D.J. Bezemer, Investor Sentiment and Business Investment

2021006-EEF: Spierdijk, L., and T. Wansbeek, Differencing as a Consistency Test for the Within Estimator

2021007-EEF: Katz, M., and C. van der Kwaak, To Bail-in or to Bailout: that's the (Macro) Question

2021008-EEF: Haan, M.A., N.E. Stoffers, and G.T.J. Zwart, Choosing Your Battles: Endogenous Multihoming and Platform Competition

2021009-I\&O: Greve, M., M. Fritsch, and M. Wyrwich, Long-Term Decline of Regions and the Rise of Populism: The Case of Germany

2021010-MARK: Hirche, C.F., T.H.A. Bijmolt, and M.J. Gijsenberg, When Offline Stores Reduce Online Returns

2021011-MARK: Hirche, C.F., M.J. Gijsenberg, and T.H.A. Bijmolt, Promoting Product Returns: Effects of Price Reductions on Customer Return Behavior

2021012-MARK: Hirche, C.F., M.J. Gijsenberg, and T.H.A. Bijmolt, Asking Less, Getting More? The Influence of Fixed-Fee and Threshold-Based Free Shipping on Online Orders and Returns

2021013-I\&O: Sorgner, A., and M. Wyrwich, Calling Baumol: What Telephones Can Tell Us about the Allocation of Entrepreneurial Talent in the Face of Radical Institutional Changes

2021014-I\&O: Slavtchev, V., and M. Wywich, TV and Entrepreneurship
2021015-EEF: Kate, F. ten, M.J. Klasing, and P. Milionis, Diversity, Identity and Tax Morale

2021016-EEF: Bergemann, A., and R.T. Riphahn, Maternal Employment Effects of Paid Parental Leave

2021017-GEM: Abolhassani, M., Productivity Spillovers of Multinational Enterprises through Worker Mobility: New Evidence for the Netherlands

2021018-GEM: Abolhassani, M., Productivity Spillovers of Superior Firms through Worker Mobility

2022001-GEM: Oosterhaven, J., A Price Reinterpretation of the Leontief Quantity Model
2022002-EEF: Ghaemi, S, X. Li, and M. Mulder, Economic Value of Flexibility Provided by Power to gas Conversion Systems in Low-voltage Distribution Grids

2022003-OB: Meer, P.H. van der, Are All Self-employed Happy?
2022004-EEF: Perey, P., and M. Mulder, International Competitiveness of Low-carbon Hydrogen Supply to the North-west European Market

2022005-OPERA: Kasper, A., M. Land, and R. Teunter, University of Groningen, Faculty of Economics and Business, Department of Operations.

2022006-I\&O: Fritsch, M., and M. Wyrwich, Entrepreneurship in the Long-run: Empirical Evidence and Historical Mechanisms.

2022007-EEF: Treurniet, M., and R. Lensink, Belief-based Poverty Traps and the Effects of Material and Psychological Development Interventions.

2022008-EEF: Kwaak, Christiaan van der, Monetary Financing Does Not Produce Miraculous Fiscal Multipliers

2022009-EEF: Beesten, E.R. van, and D. Hulshof, Transmission Capacity Reduction in International Power Systems: Economic Incentives and Welfare Effects

2022010-OPERA: Romeijnders, W., N.D. van Foreest and J. Wijngaard, On Proportionally Fair Solutions for the Divorced-Parents Problem

2022011-I\&O: Hipp, A., M. Fritsch, M. Greve, J. Günther, M. Lange, C. Liutik, B. Pfeifer, M. Shkolnykova, and M. Wyrwich, Comprehensive Patent Data of the German Democratic Republic 1949-1990—Technical Report and Dataset Overview


[^0]:    ${ }^{1}$ For example, Bähr \& Petzina (1996), Baar \& Petzina (1999), Grupp et al. (2002), Glitz \& Meyersson (2020).
    ${ }^{2}$ Glitz \& Meyersson (2020) for example used aggregate data of the number of patent applications (not approved patents) at the level of combines (Kombinate) that is limited to the period 19701989.
    ${ }^{3}$ Project title "Modernisierungsblockaden in Wirtschaft und Wissenschaft der DDR" (Obstacles to Modernization in the Economy and Science of the GDR) (project number 01UJ1806DY).
    ${ }^{4}$ The recently published Patentcity data (Bergeaud \& Verluise 2022) covers only slightly above half of the patents in our database. The coverage of Patentcity varies considerably between single years and sub-periods (see Figure A1 in the Appendix). Patentcity records considerably lower numbers of patents between the mid-1960s and the late 1970s. Moreover, in more than $80 \%$ of the observations, the Patentcity data does not contain the location of the inventor or of the applicant that was published in the years 1989 and 1990. If locations are included, they are quite often rather imprecise.
    ${ }^{5}$ We found a number of typing errors and multiple counts in the original data. Moreover, there were some handwritten annotations on some patent documents that we included in the dataset if relevant. Quite frequently, some International Patent Classification (IPC) codes were added to the original patent ex-post, which we included in the data.

[^1]:    ${ }^{6}$ These criteria were stipulated in the Regulation on the Determination of Benefits for the Remuneration of Innovations and Inventions of 20.7.1972 (Anordnung über die Ermittlung des Nutzens zur Vergütung von Neuerungen und Erfindungen vom 20.7.1972, GBl. II Nr. 48 p. 550) and the Regulation No. 2 on the Determination of Benefits for the Remuneration of Innovations and Inventions of 22.12.1983 (Anordnung Nr. 2 über die Ermittlung des Nutzens zur Vergütung von Neuerungen und Erfindungen vom 22.12.1983, GBl. I Nr. 38 p. 432).

[^2]:    ${ }^{7}$ For the full list of INID codes, see WIPO standard ST. 9 (https://www.wipo.int/export/sites/www/standards/en/pdf/03-09-01.pdf) and part 7.6 of the Handbook on Intellectual Property Information and Documentation entitled "Survey of bibliographic information contained in patent gazettes and in current indexes inserted in patent gazettes or published separately in association with patent gazettes" (https://www.wipo.int/export/sites/www/standards/en/pdf/07-06-01.pdf).

[^3]:    ${ }^{8}$ While digitalizing the patents, 103 additional identification numbers were detected in the register for which respective patent documents did not exist. Therefore, the respective IDs can be regarded as erroneous data entries (see the full list in column 1 of Table A1 in the Appendix).
    ${ }^{9}$ In very few cases also the following codes were used: A9, B2, B4, B5, C5, and T9 as well as just the letters A and B without an integer.
    ${ }^{10}$ For a detailed overview see Part 7.3.2 of the WIPO Handbook on Intellectual Property Information and Documentation (2020) pp. 34-40: https://www.wipo.int/standards/en/part 07.html
    ${ }^{11}$ The order of dates was sometimes incorrect in the database and was manually corrected (see below).

[^4]:    ${ }^{12}$ It should be mentioned that the geographical location is often missing for physical persons, and in case of combines only the location of the headquarter is given. For patents generated within the Academy of Science mostly the patent office (Patentbüro) of the Academy in Berlin is named. Therefore, the location identification is in many cases problematic and can be mostly done for patents of the last two years of the GDR, i.e. 1989-90 (see Section 6 below).
    ${ }^{13}$ In several cases, the ISSN is listed in the lower left margin, which was not transferred to the database. In the lower right margin of the patent, there is often an indication of the number of pages of the patent specification, which was also not transferred to the database.

[^5]:    ${ }^{14}$ While in the earlier years, the location is mostly allocated to the Academy of Science in Berlin, the regional module allows to identify the precise location. It turns out that among all patents registered by the Academy of Science, roughly half of them stem from Berlin, while the others were scattered around the GDR. Overall, less than $10 \%$ of all patents in 1989 and 1990 were applied for by the Academy of Science.

